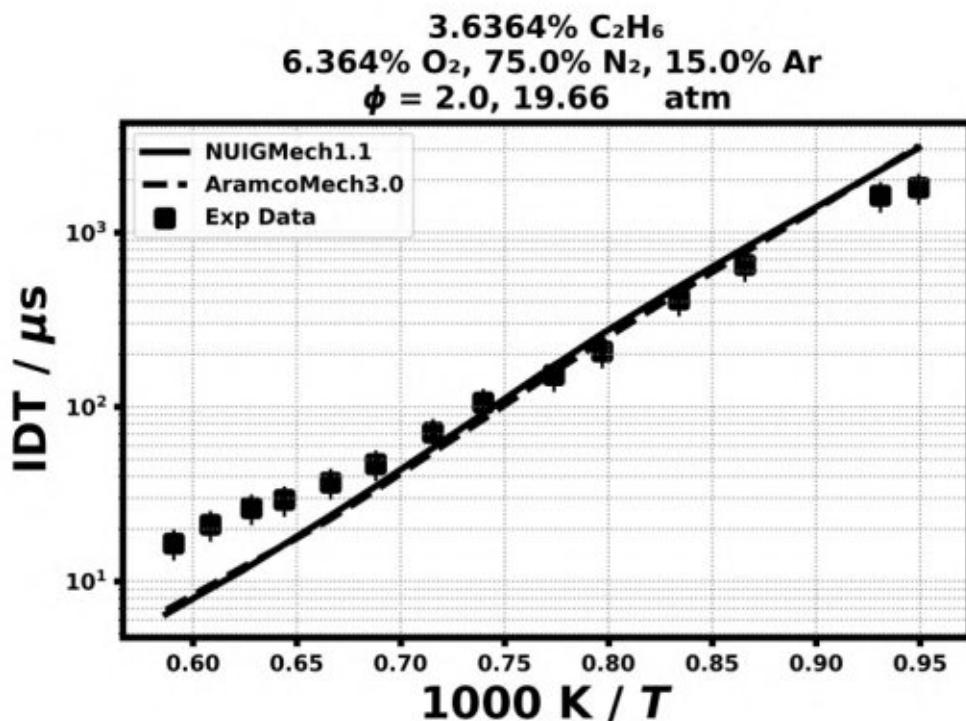
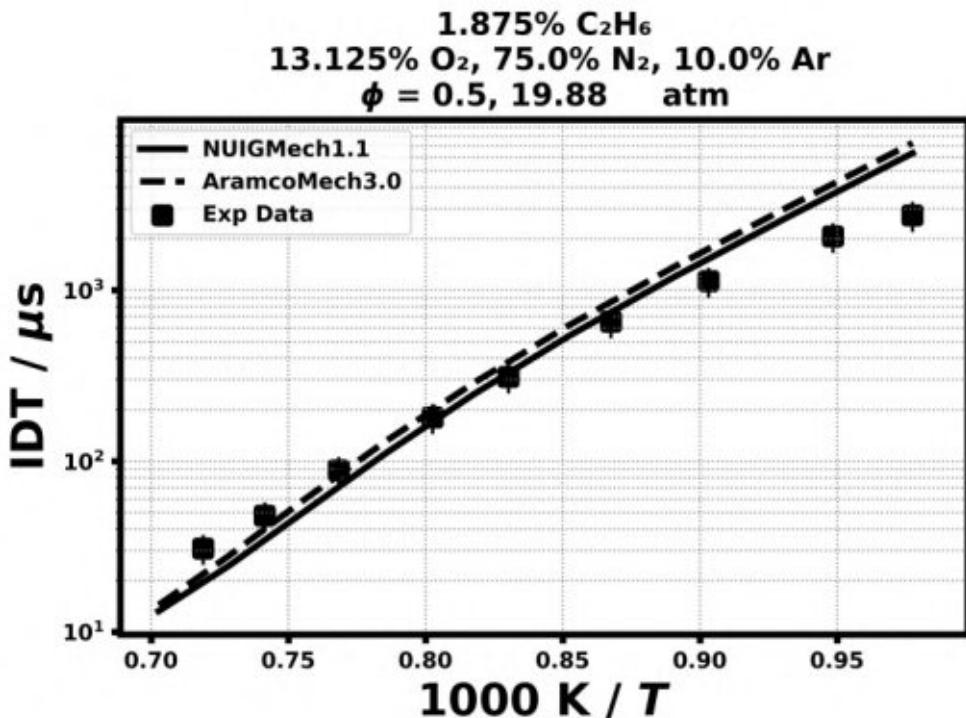
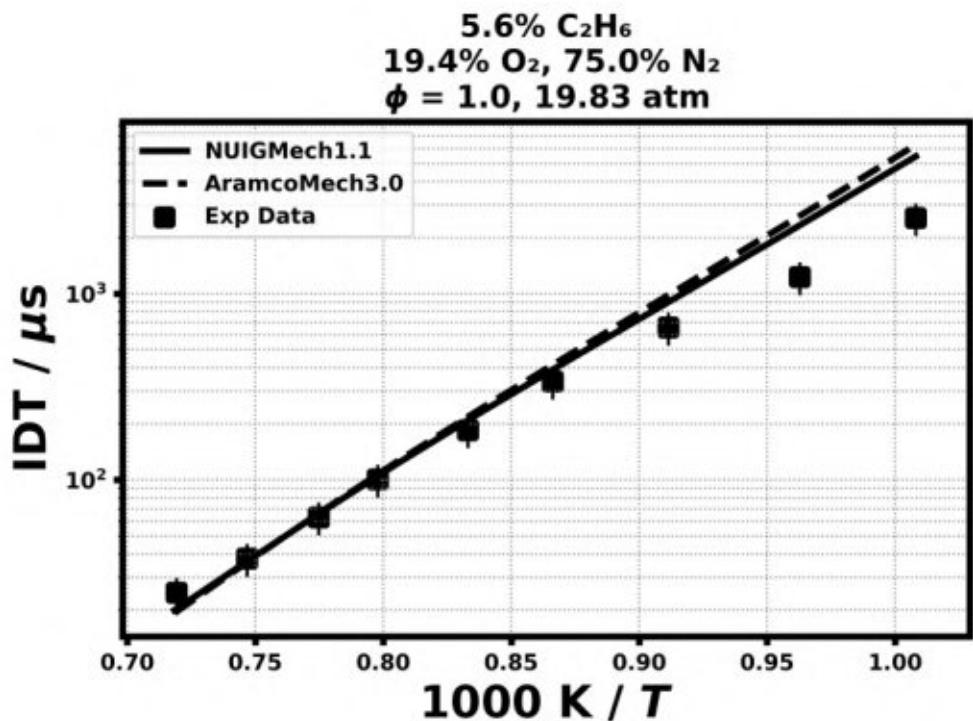
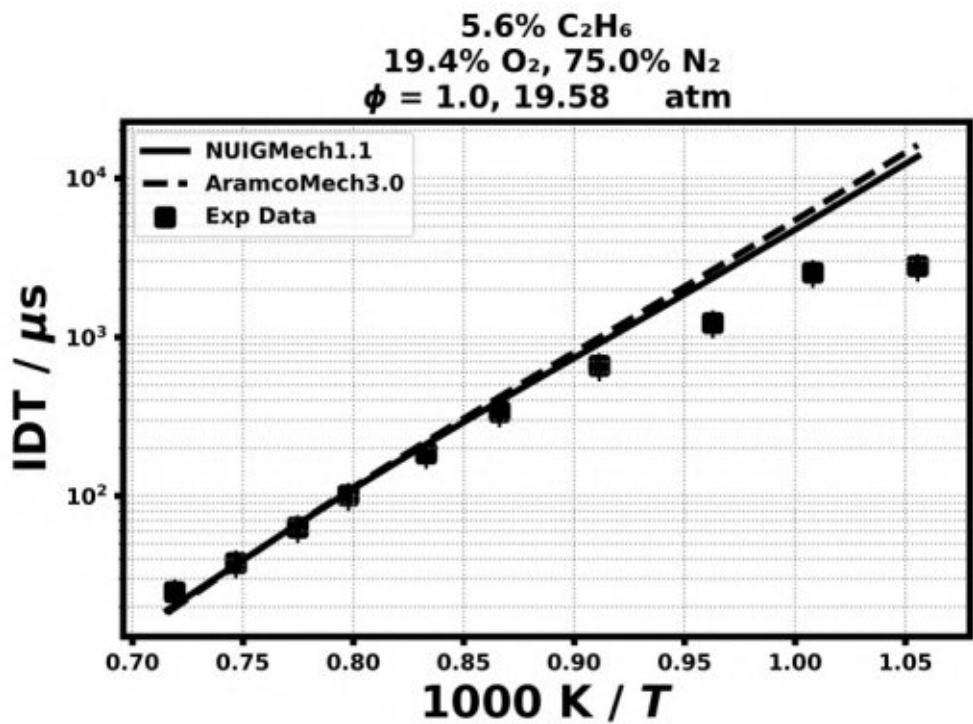


5. Validation for C₂H₆

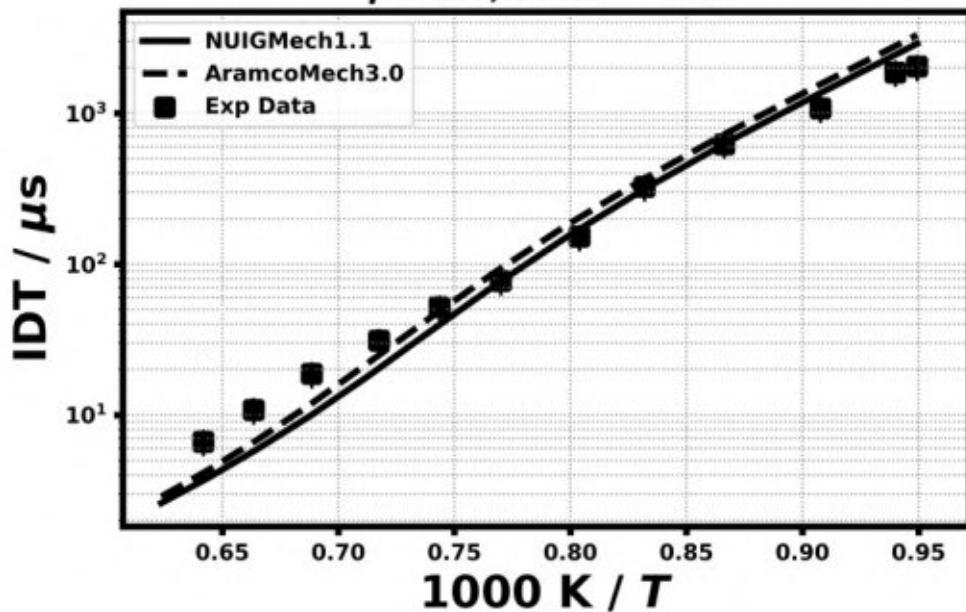
Shock tube ignition delay time

5.1) Baigmohammadi, M., Patel, V., Martinez, S., Panigrahy, S., Ramalingam, A., Burke, U. & Curran, H. J., Energy & Fuels, 34(3) (2020) 3755-3771.

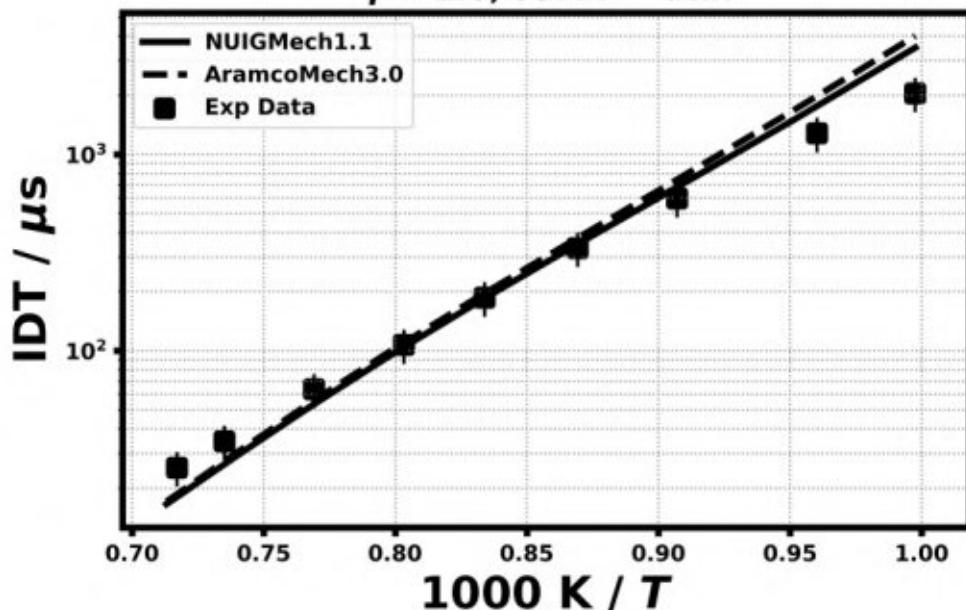




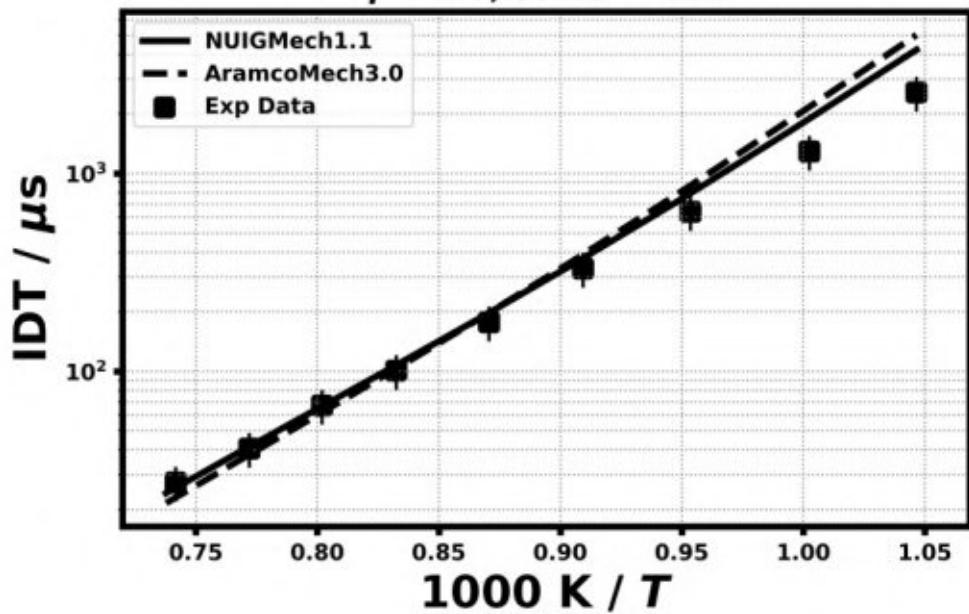
1.25% C₂H₆
8.75% O₂, 75.0% N₂, 15.0% Ar
 $\phi = 0.5, 39.62 \text{ atm}$



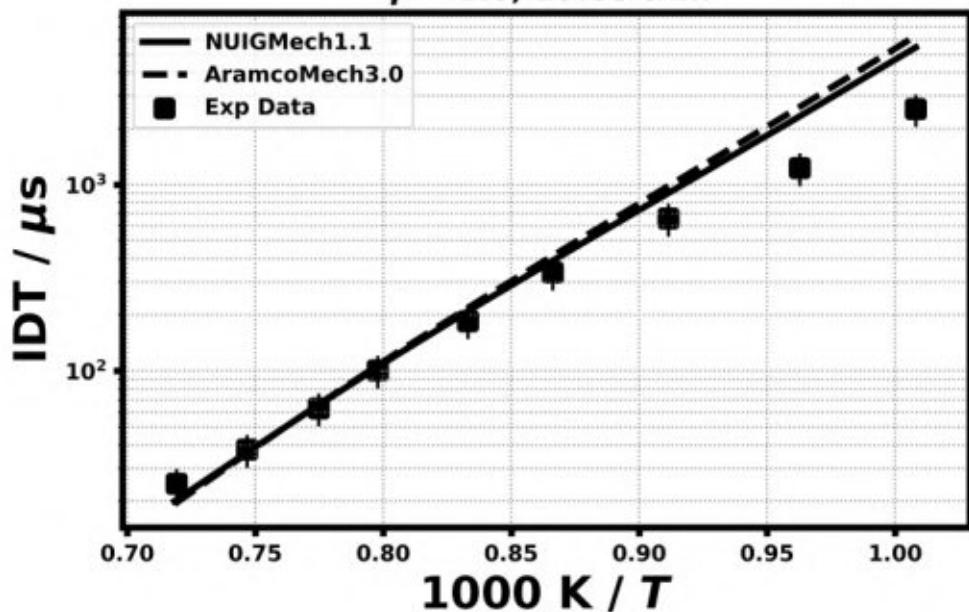
3.333% C₂H₆
11.6667% O₂, 75.0% N₂, 10.0% Ar
 $\phi = 1.0, 39.44 \text{ atm}$

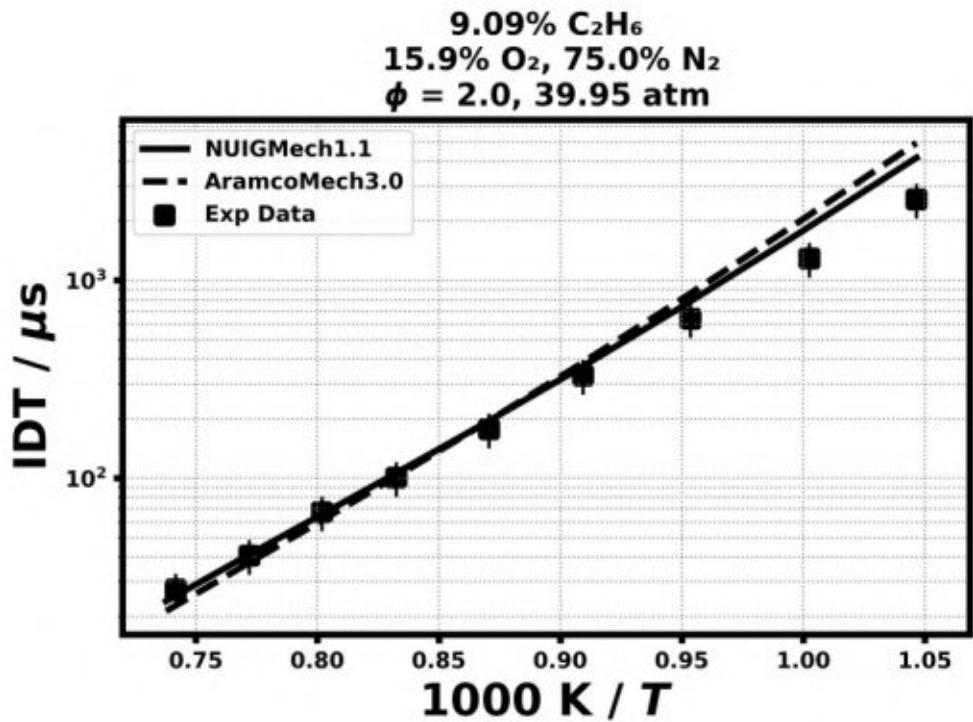


9.09% C₂H₆
15.91% O₂, 75.0% N₂
 $\phi = 2.0, 39.43 \text{ atm}$

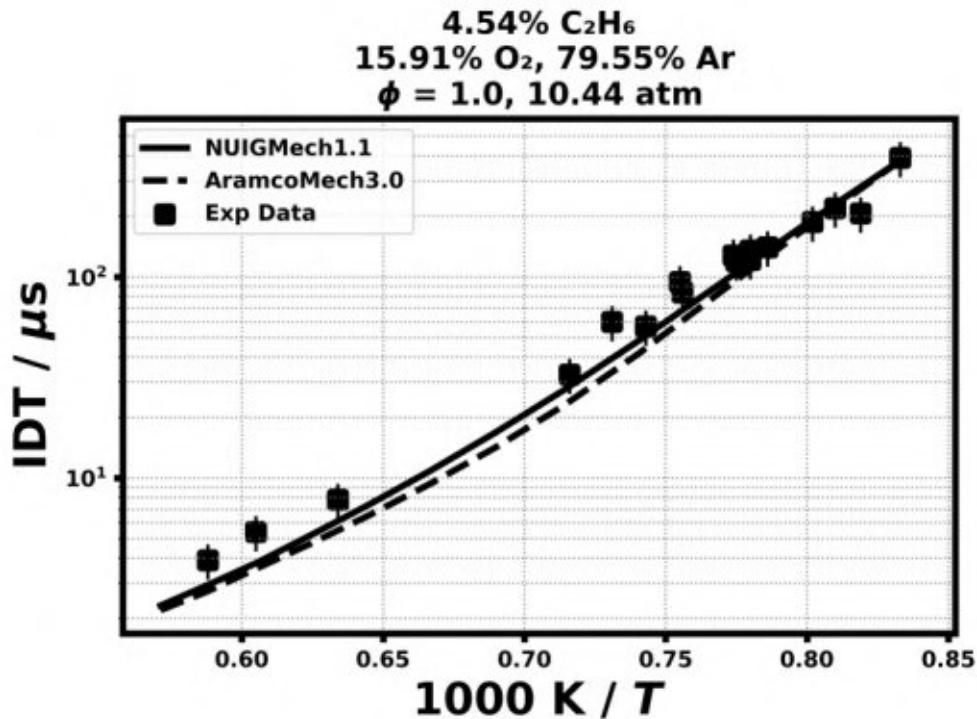


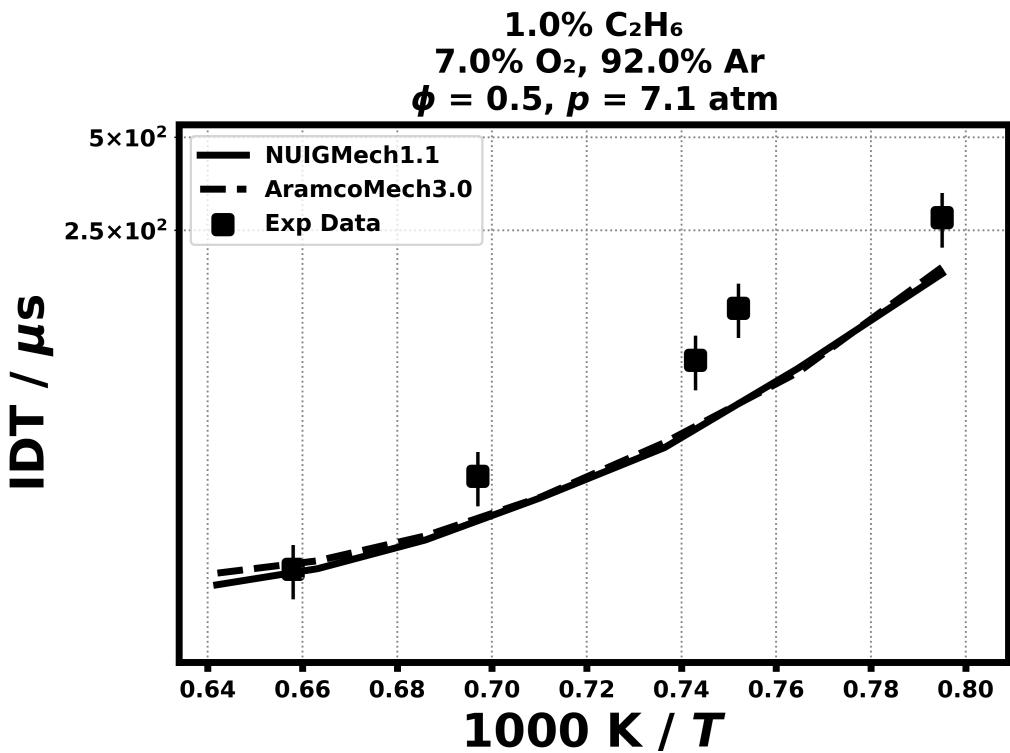
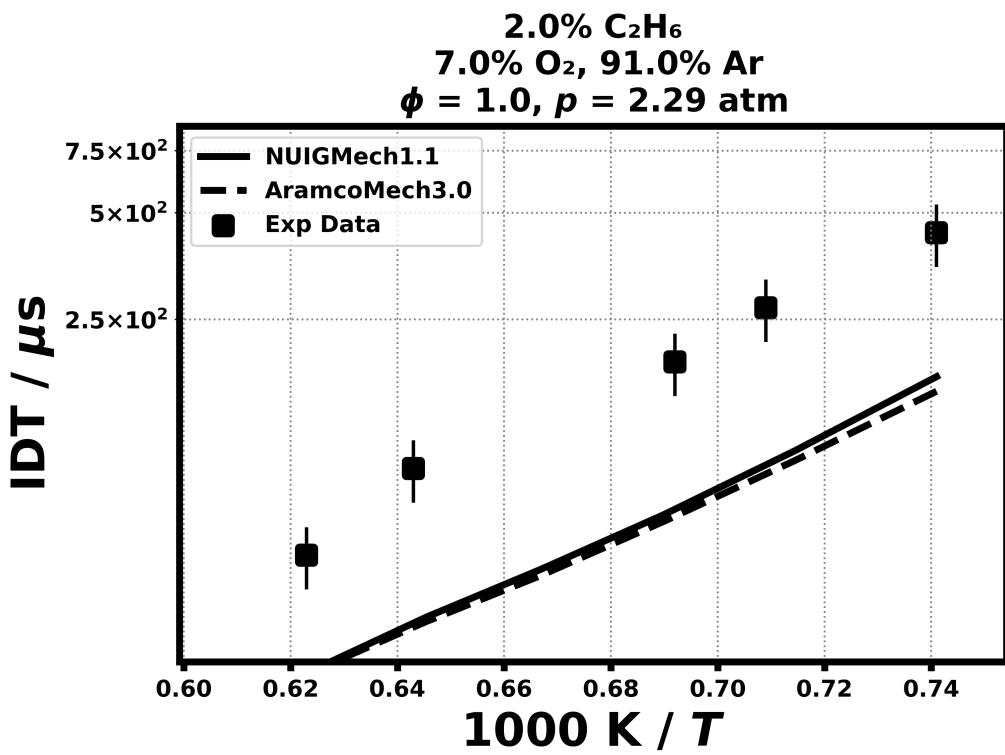
5.6% C₂H₆
19.4% O₂, 75.0% N₂
 $\phi = 1.0, 19.83 \text{ atm}$

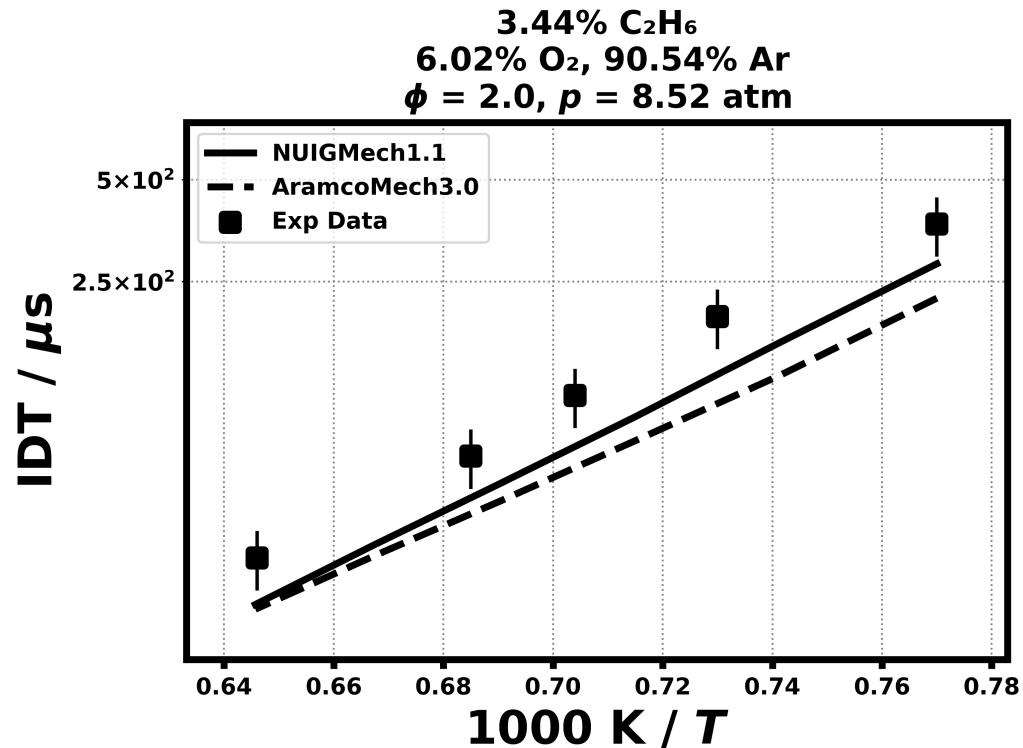
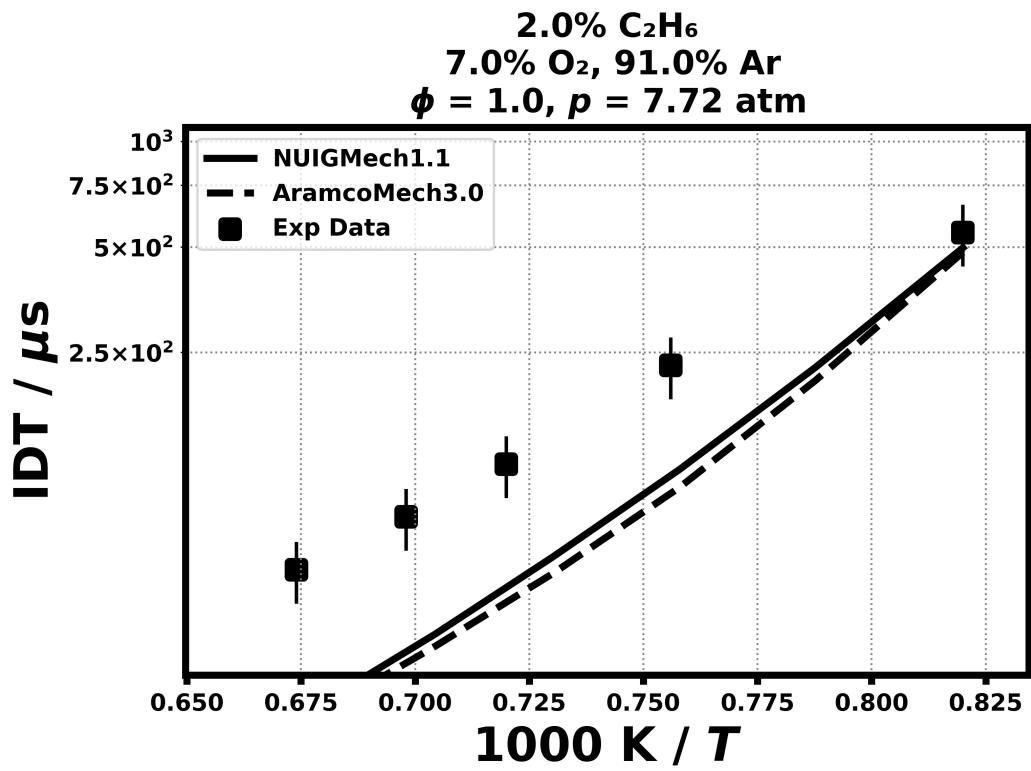




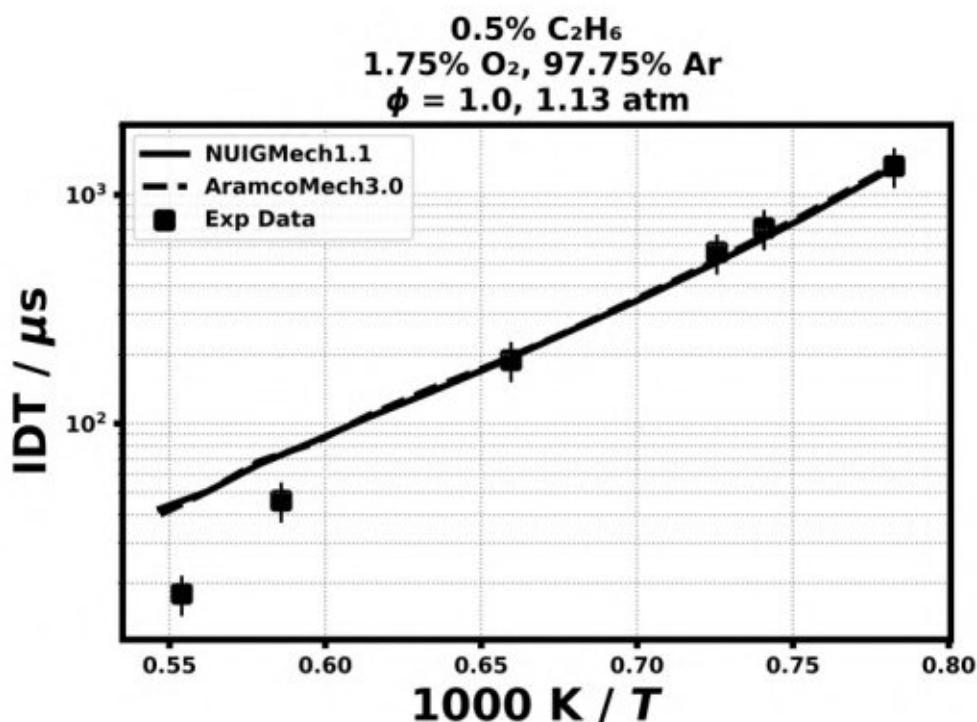
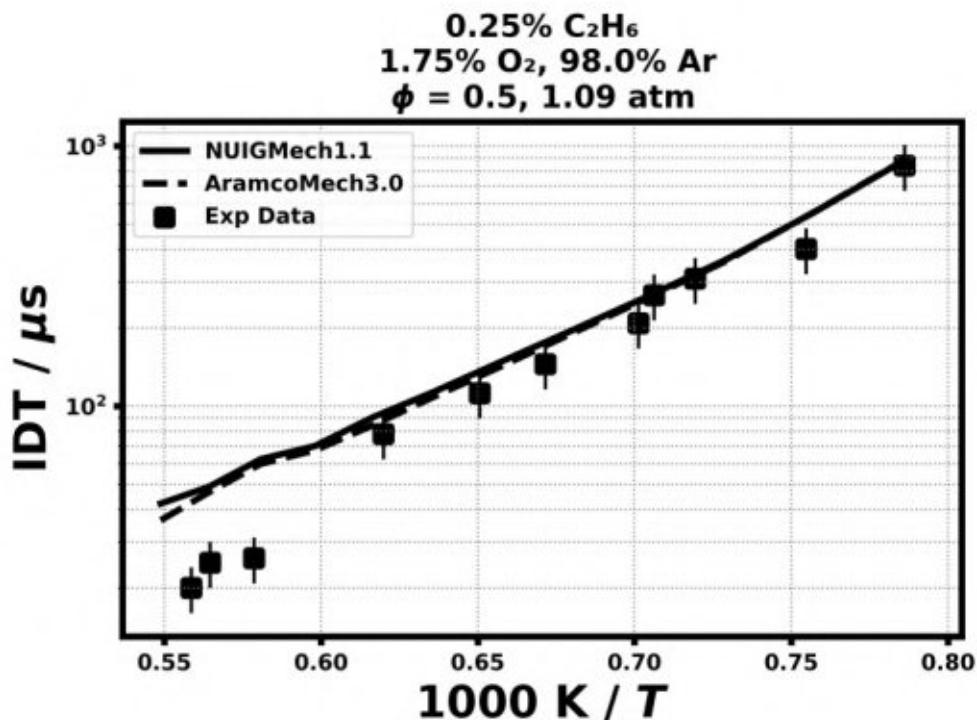
5.2) Burcat, A., Scheller, K., & Lifshitz, A., Combustion and Flame, 16(1) (1971) 29-33.

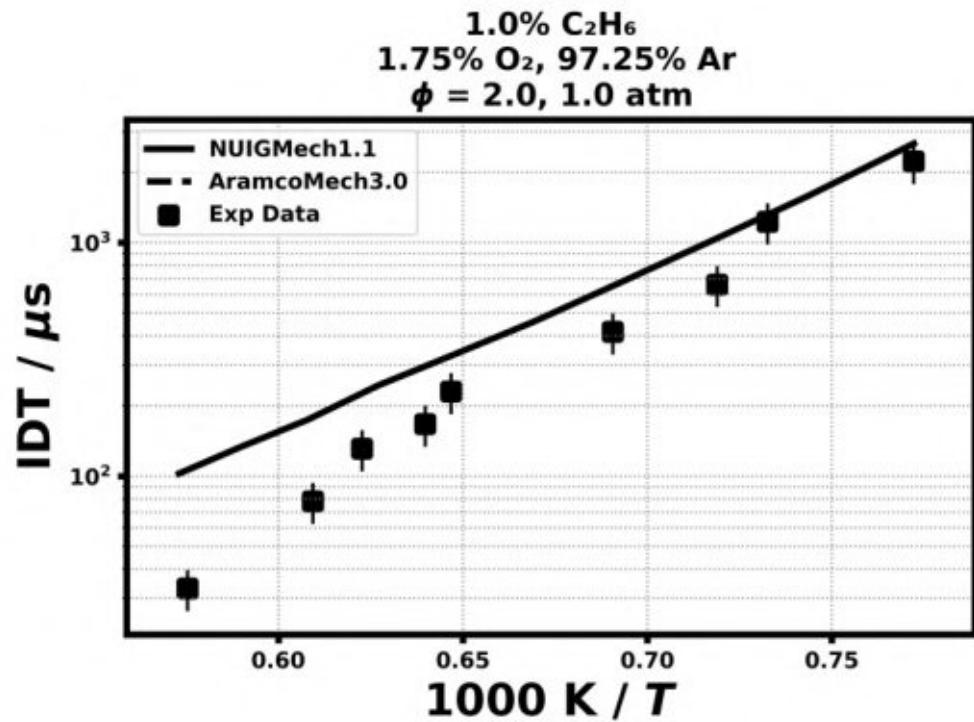




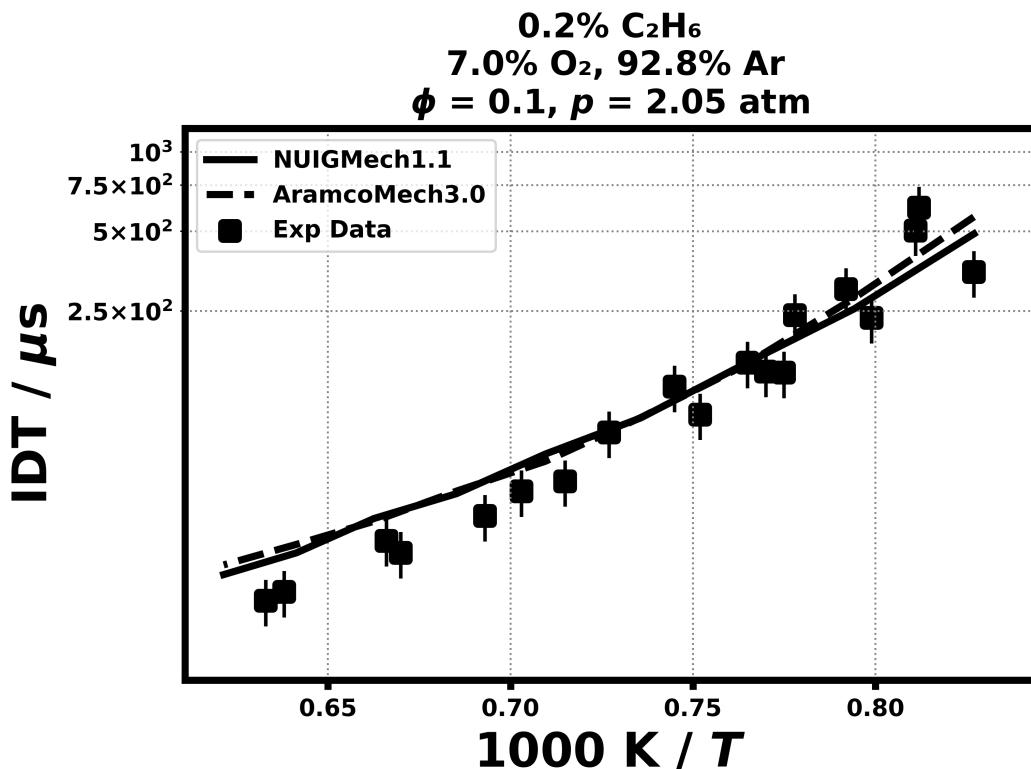


5.4) de Vries, J., Hall, J. M., Simmons, S. L., Rickard, M. J., Kalitan, D. M., & Petersen, E. L., Combustion and flame, 150(1-2) (2007) 137-150.

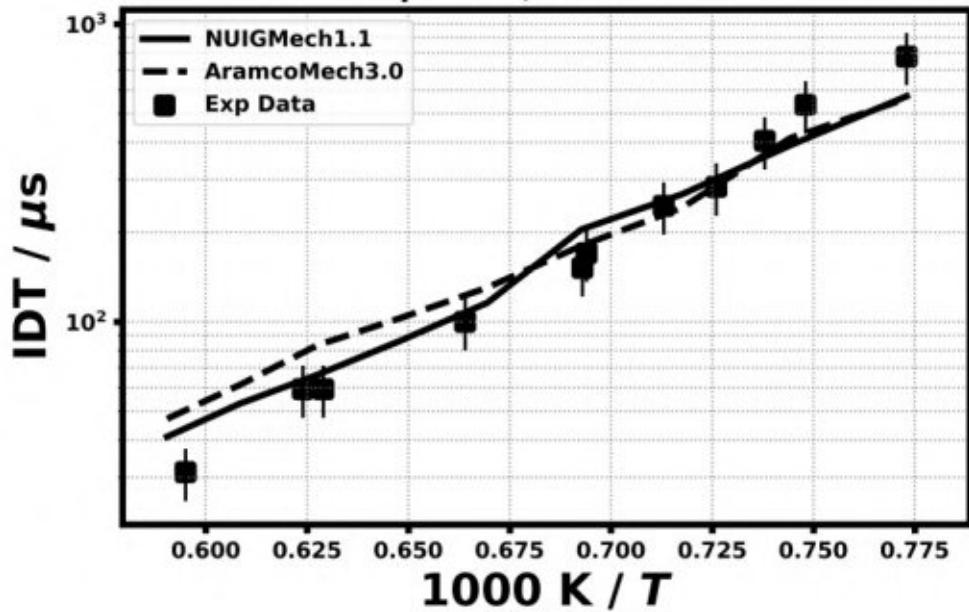




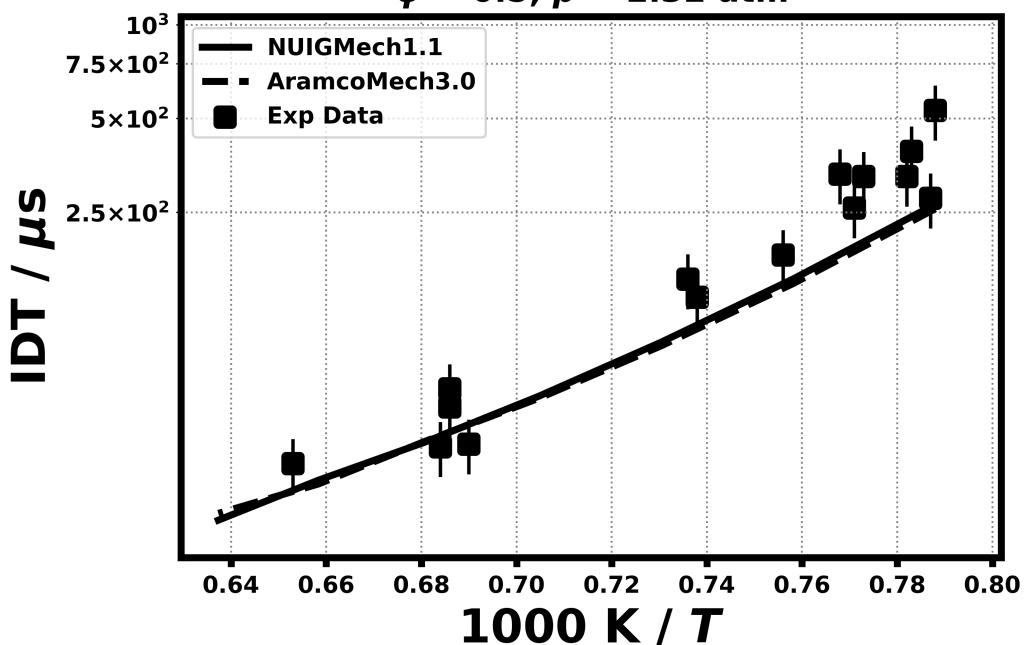
5.3) Hidaka, Y., Sato, K., Henmi, Y., Tanaka, H., & Inami, K. Combustion and flame, 118 (3) (1999) 340-358.



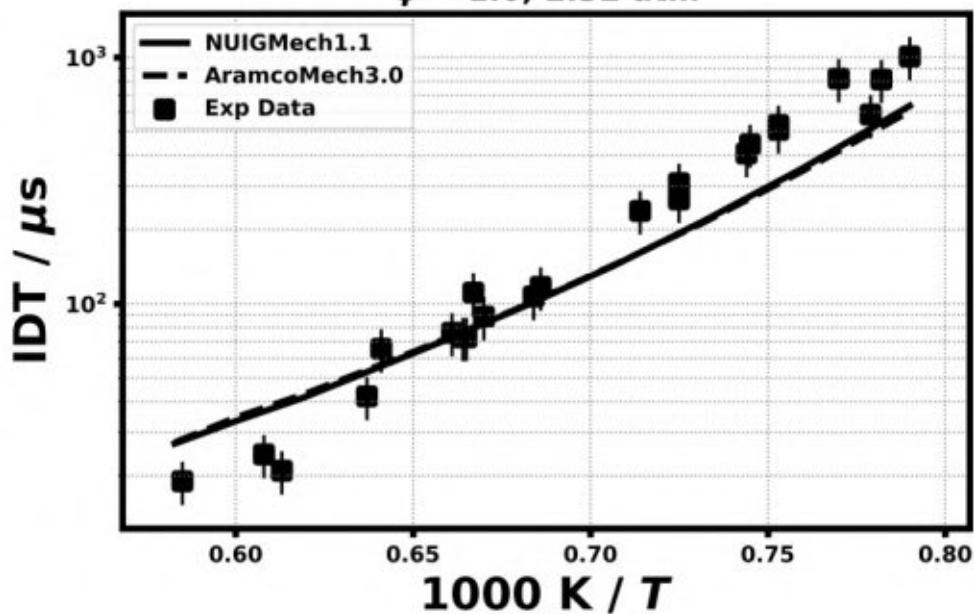
$0.2\% \text{ C}_2\text{H}_6$
 $1.4\% \text{ O}_2, 98.4\% \text{ Ar}$
 $\phi = 0.5, 2.05 \text{ atm}$



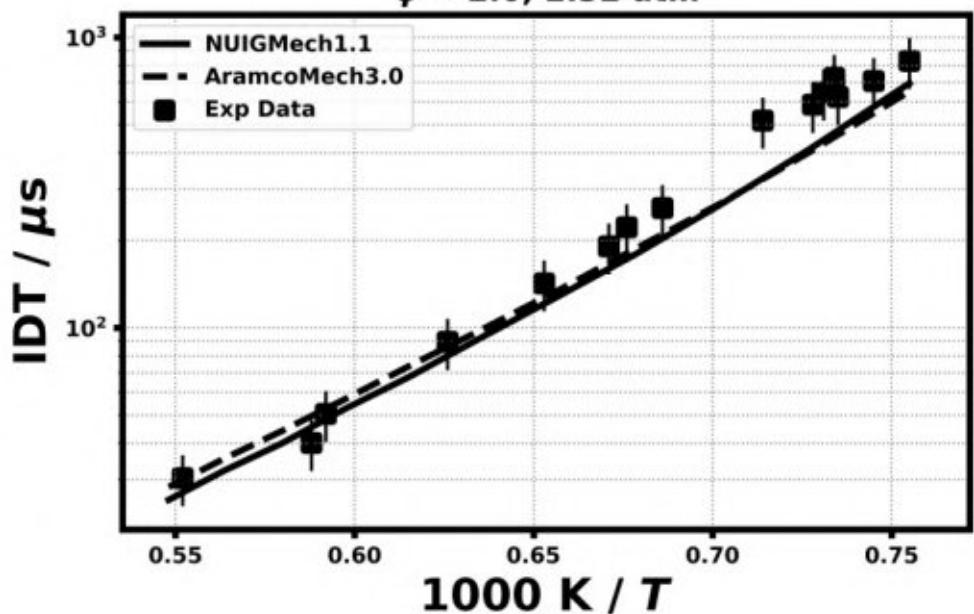
$1.0\% \text{ C}_2\text{H}_6$
 $7.0\% \text{ O}_2, 95.5\% \text{ Ar}$
 $\phi = 0.5, p = 2.32 \text{ atm}$



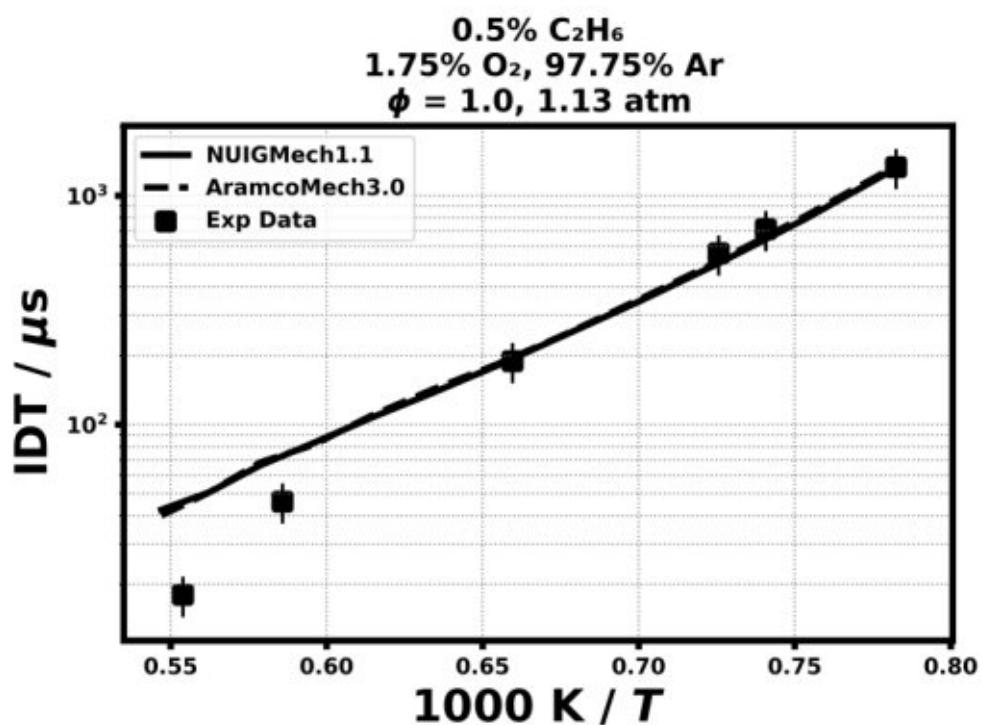
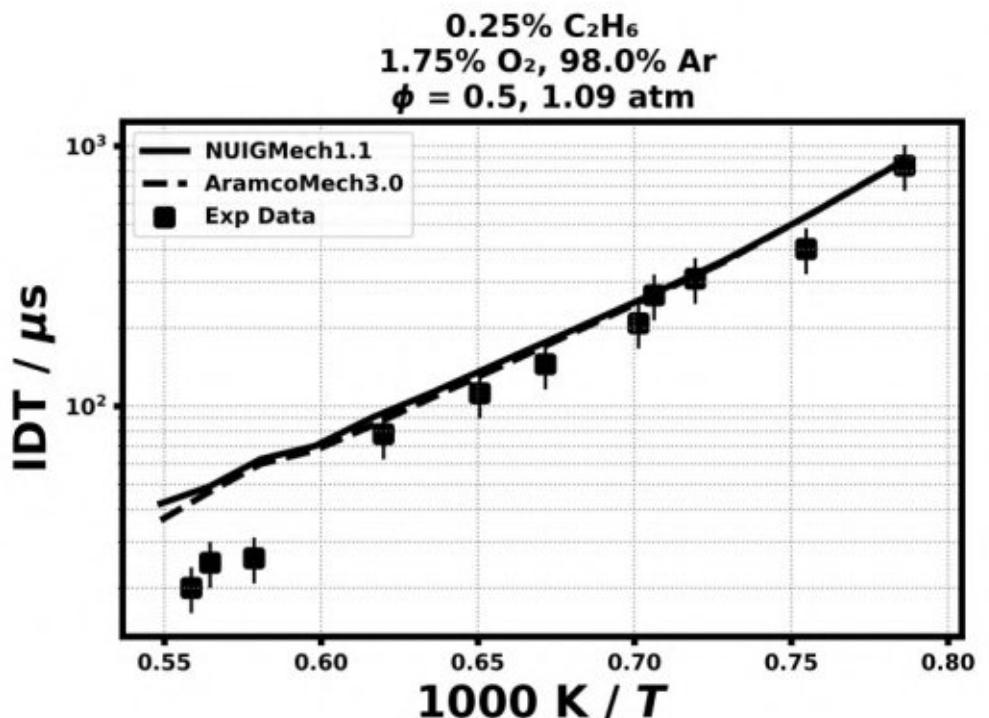
1.0% C₂H₆
3.5% O₂, 95.5% Ar
 $\phi = 1.0, 2.32 \text{ atm}$

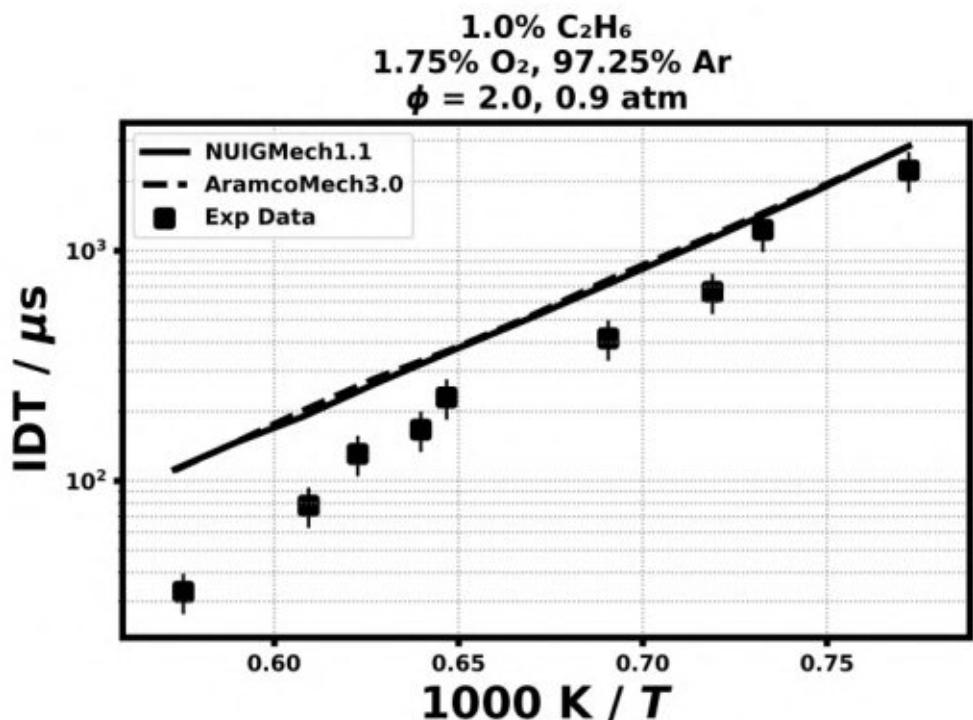
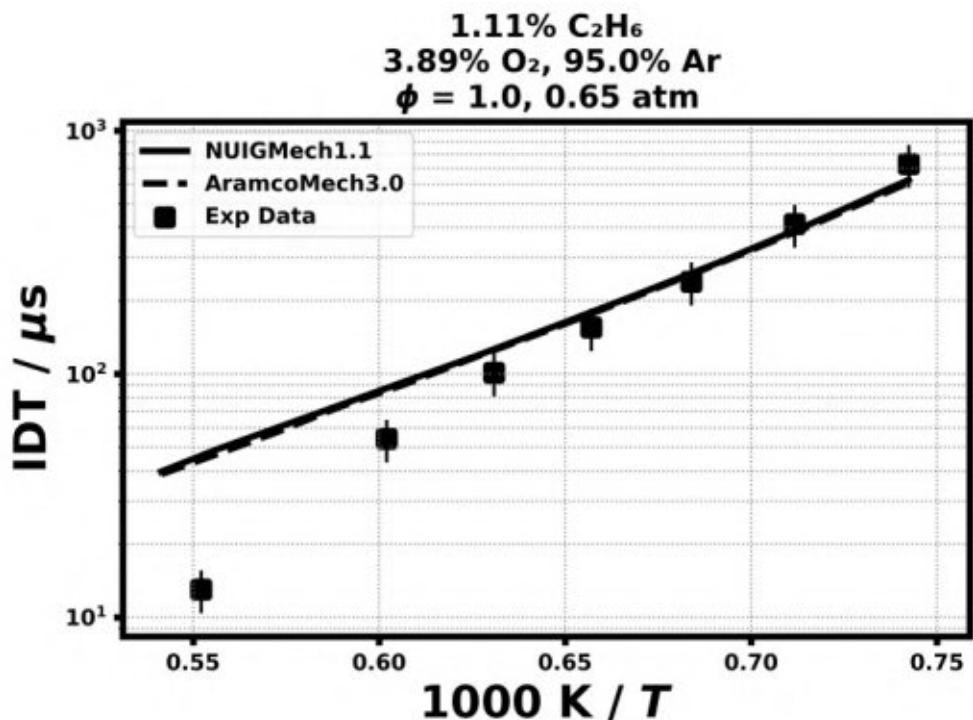


2.0% C₂H₆
3.5% O₂, 94.5% Ar
 $\phi = 2.0, 2.32 \text{ atm}$

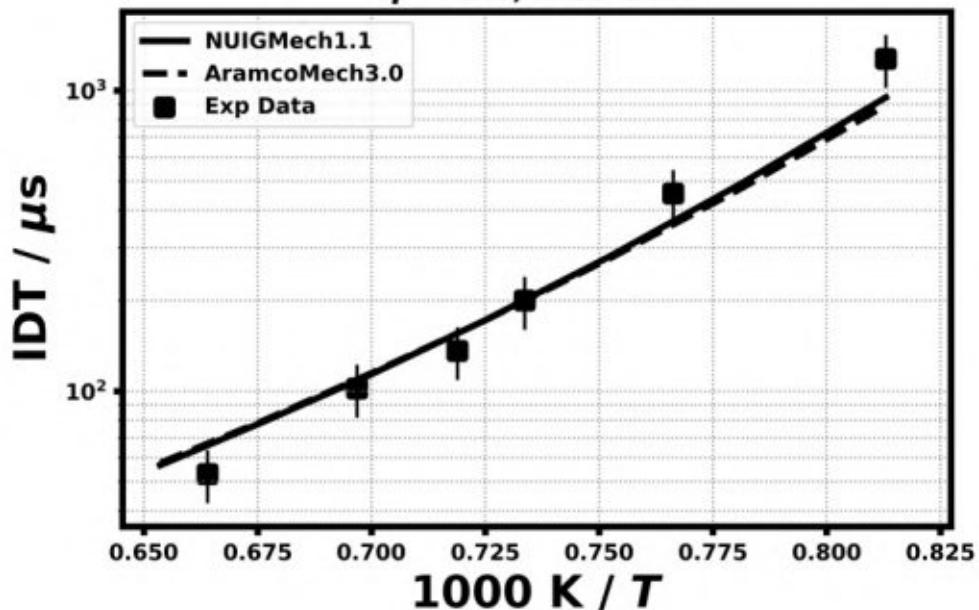


5.5) de Vries, J., Hall, J. M., Simmons, S. L., Rickard, M. J., Kalitan, D. M., & Petersen, E. L., Combustion and flame, 150(1-2) (2007) 137-150.

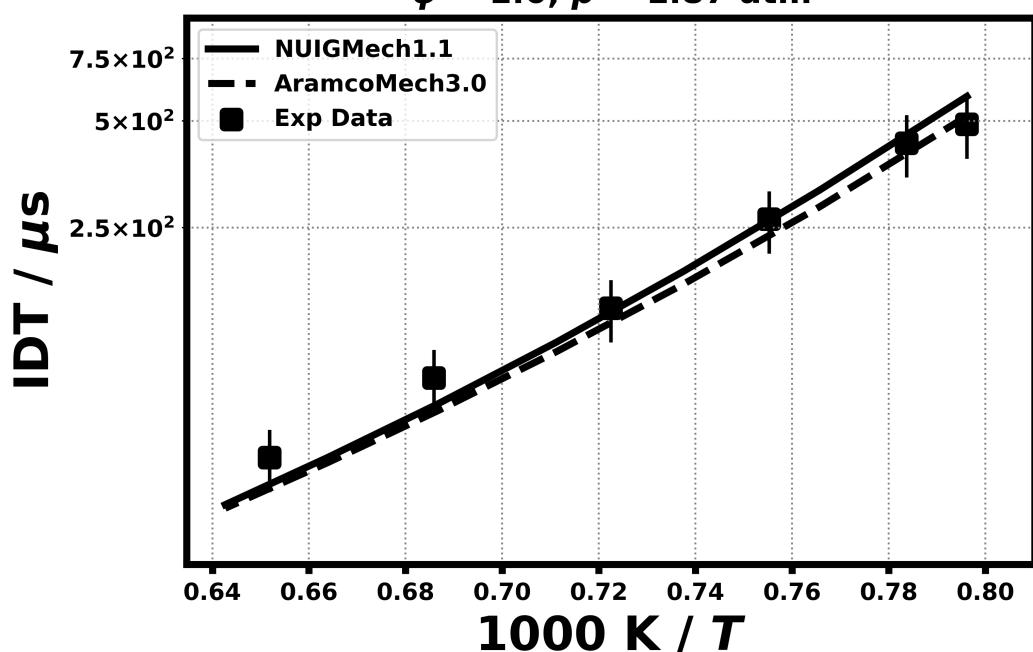




$0.93\% \text{ C}_2\text{H}_6$
 $3.24\% \text{ O}_2, 95.83\% \text{ Ar}$
 $\phi = 1.0, 2.83 \text{ atm}$

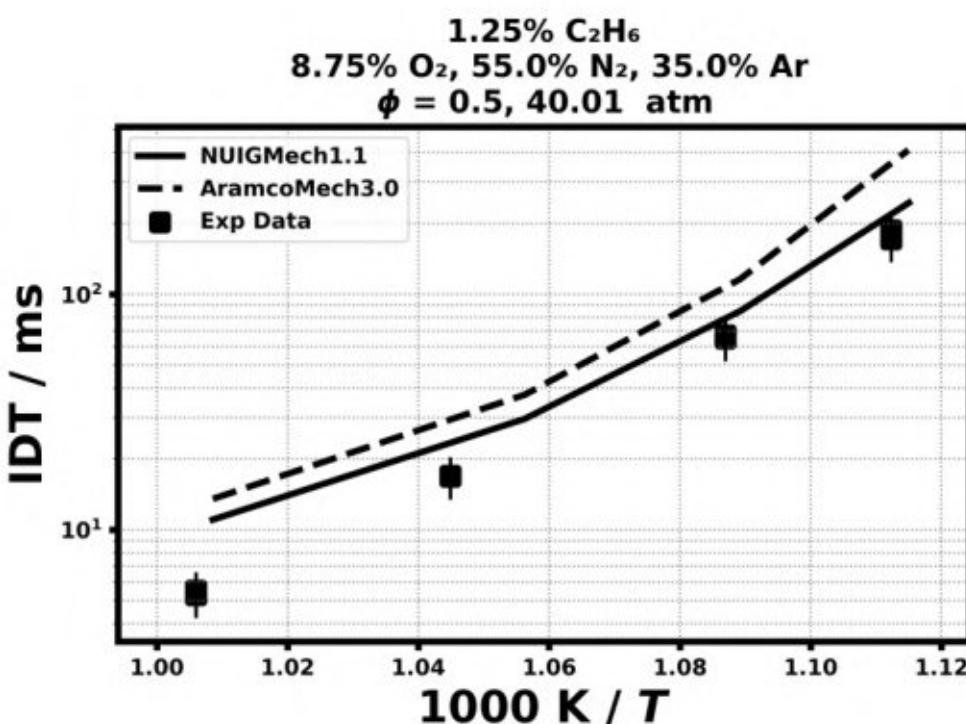
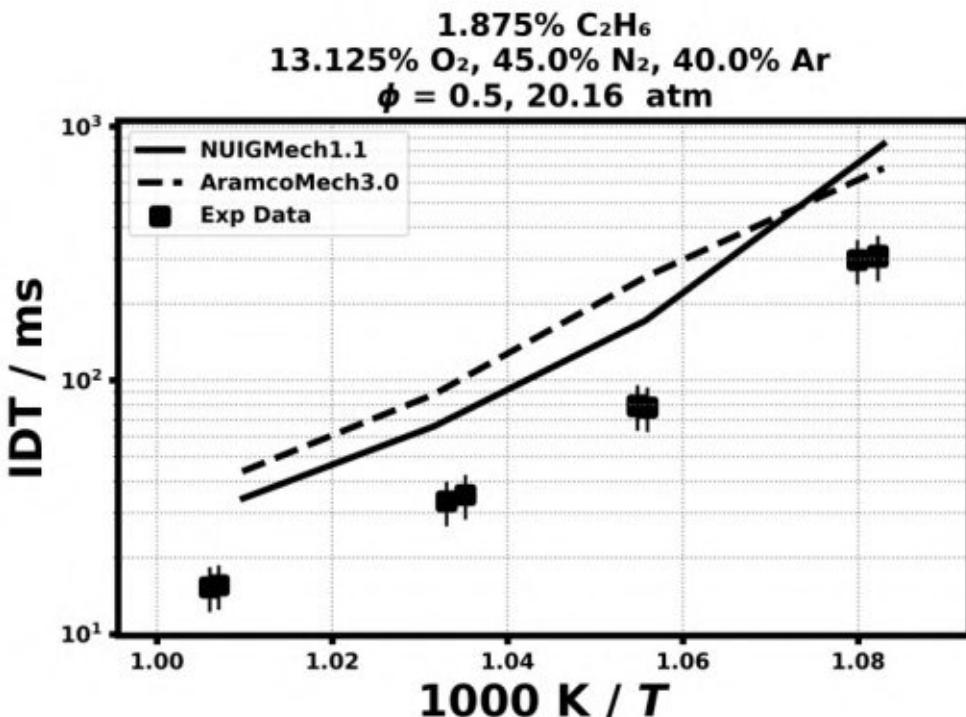


$2.0\% \text{ C}_2\text{H}_6$
 $7.0\% \text{ O}_2, 91.0\% \text{ Ar}$
 $\phi = 1.0, p = 1.87 \text{ atm}$

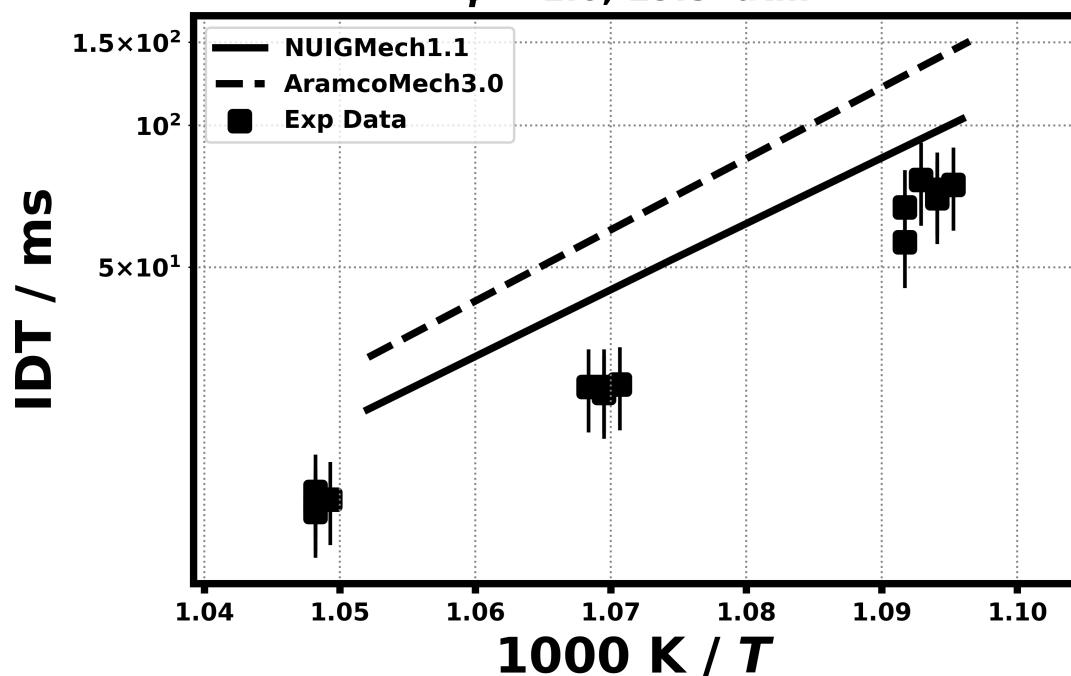


RCM Ignition delay time

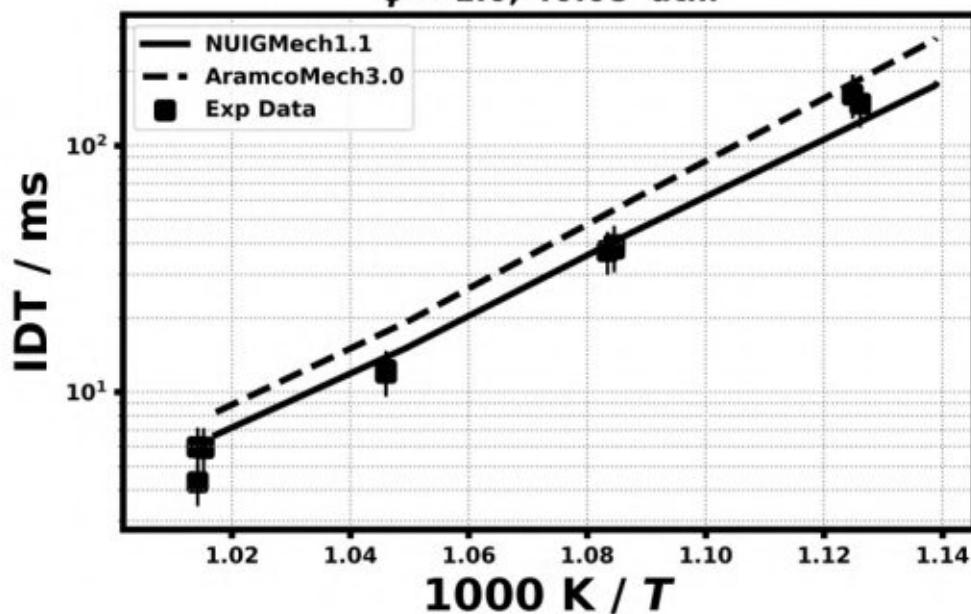
5.6) Baigmohammadi, M., Patel, V., Martinez, S., Panigrahy, S., Ramalingam, A., Burke, U. & Curran, H. J., Energy & Fuels, 34(3) (2020) 3755-3771.



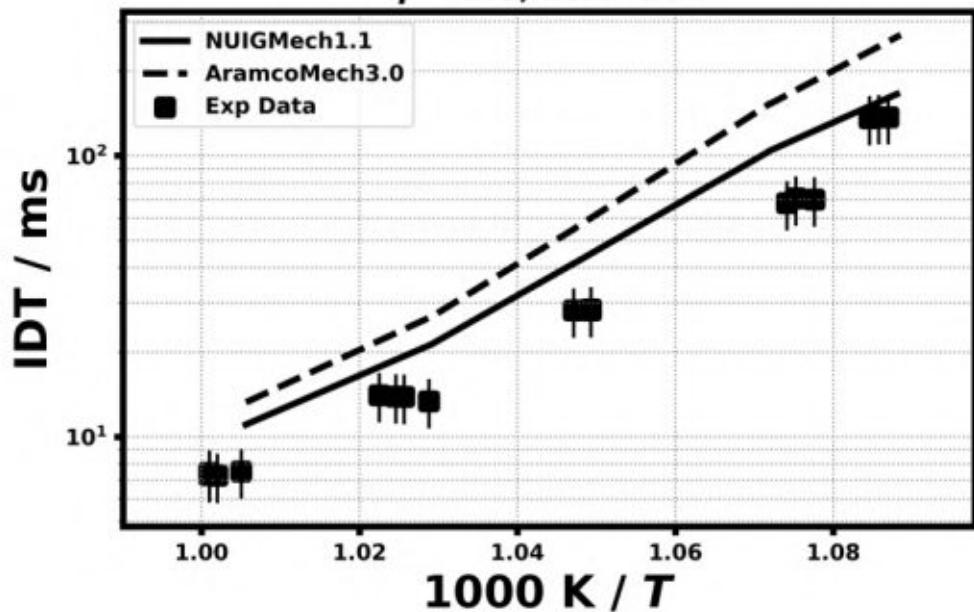
5.556% C₂H₆
19.444% O₂, 22.5% N₂, 52.5% Ar
 $\phi = 1.0, 19.5 \text{ atm}$



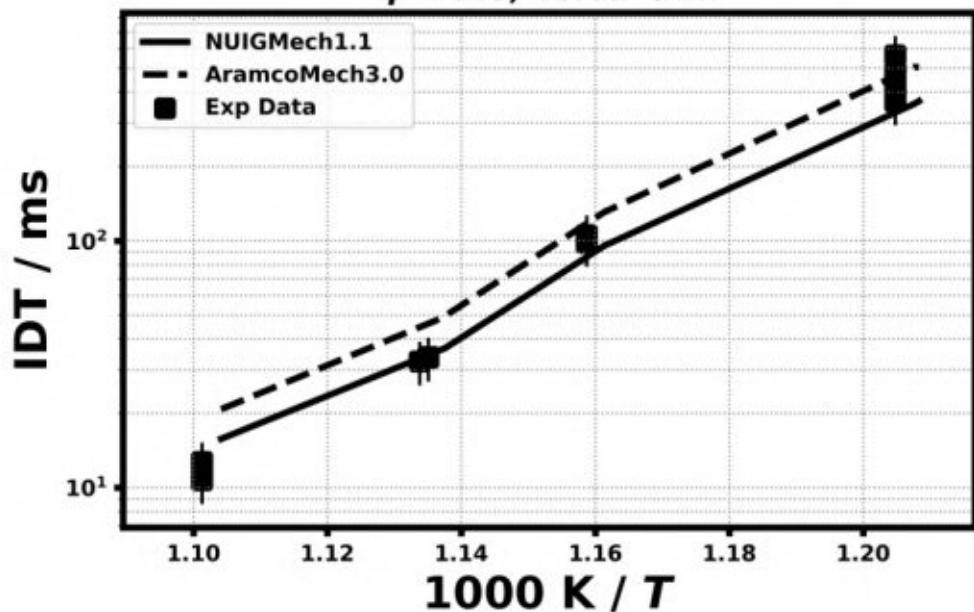
3.333% C₂H₆
11.667% O₂, 40.0% N₂, 45.0% Ar
 $\phi = 1.0, 40.08 \text{ atm}$



$3.636\% \text{ C}_2\text{H}_6$
 $6.364\% \text{ O}_2, 40.0\% \text{ N}_2, 50.0\% \text{ Ar}$
 $\phi = 2.0, 20.0 \text{ atm}$

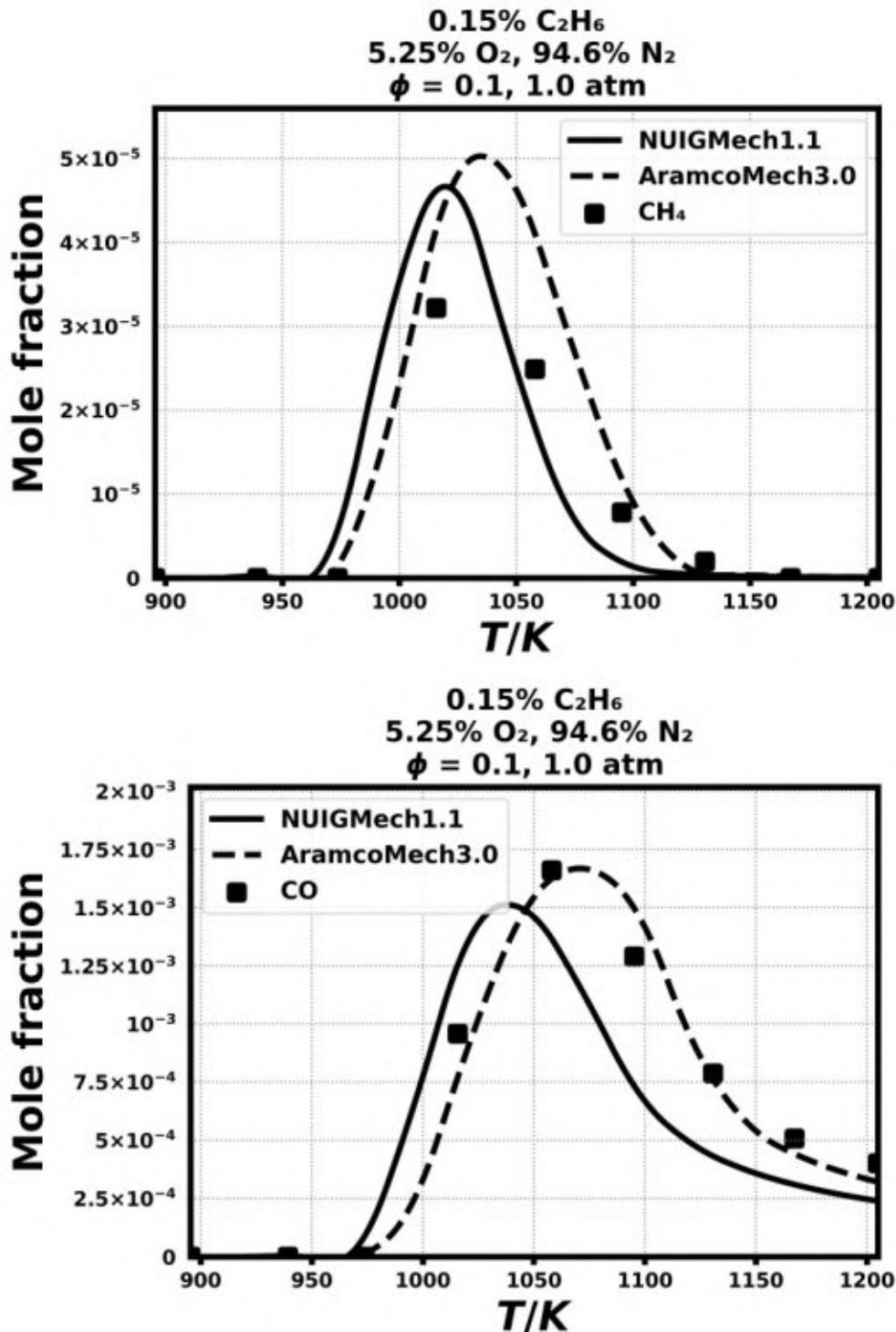


$9.091\% \text{ C}_2\text{H}_6$
 $15.909\% \text{ O}_2, 15.0\% \text{ N}_2, 60.0\% \text{ Ar}$
 $\phi = 2.0, 40.02 \text{ atm}$

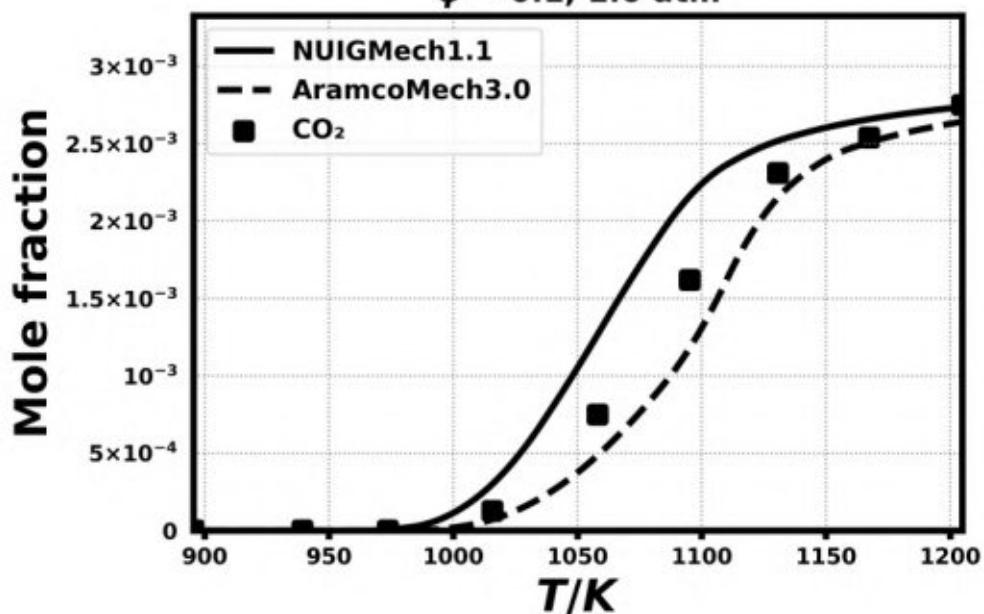


Speciation in Jet-stirred reactor

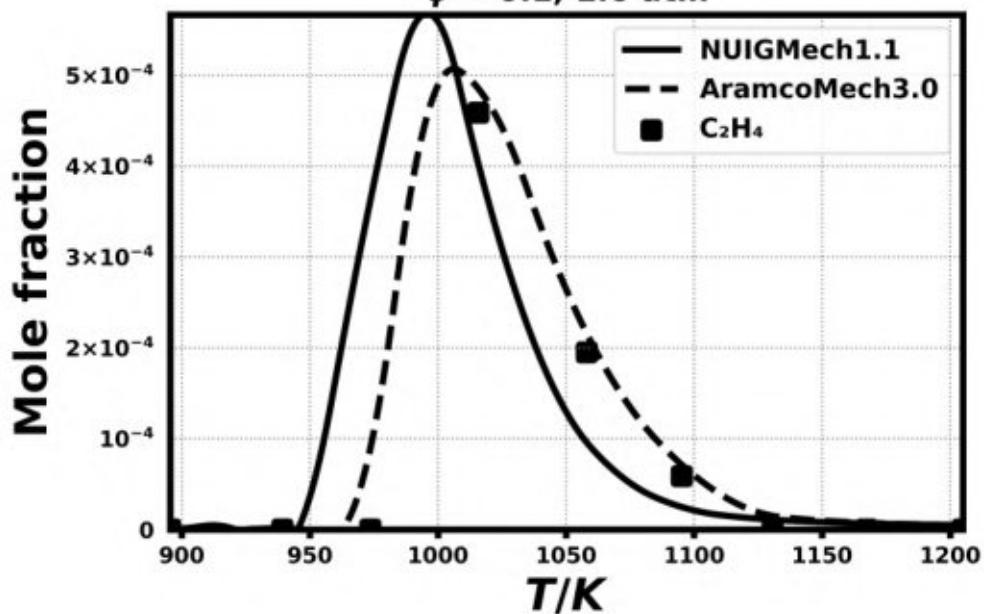
5.7) Dagaut, P., Cathonnet, M., & Boettner, J. C. International journal of chemical kinetics, 23(5) (1991) 437-455.

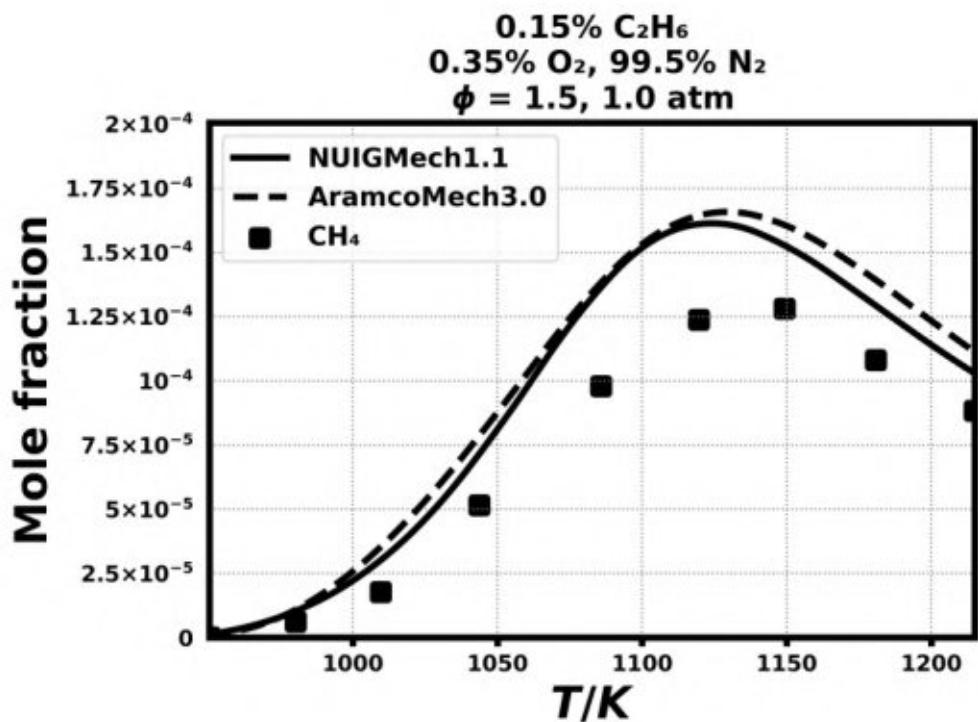
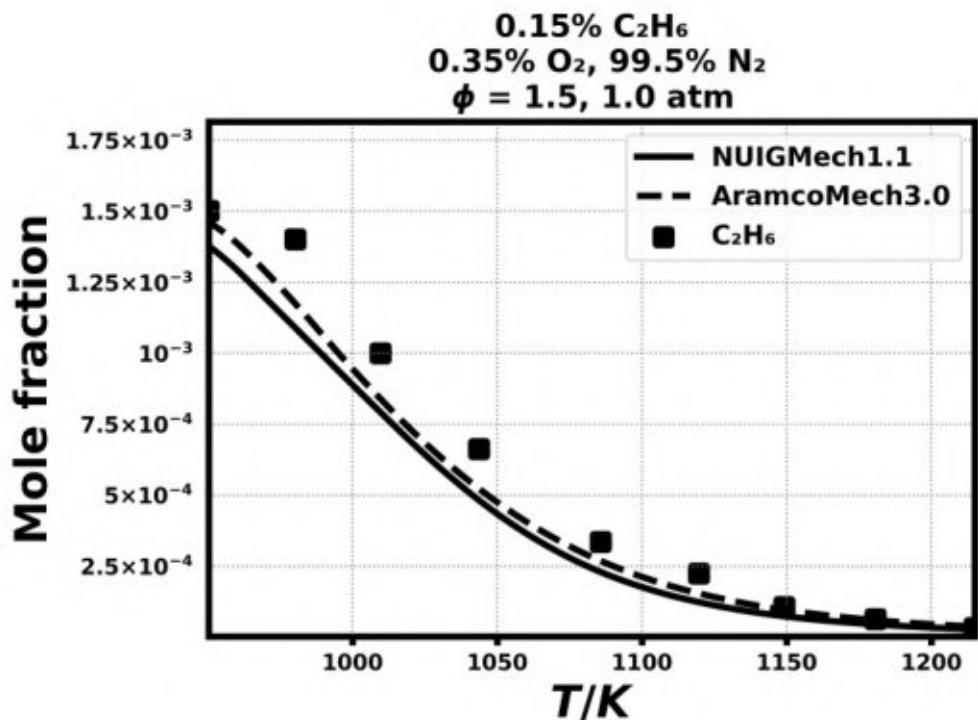


$0.15\% \text{ C}_2\text{H}_6$
 $5.25\% \text{ O}_2, 94.6\% \text{ N}_2$
 $\phi = 0.1, 1.0 \text{ atm}$

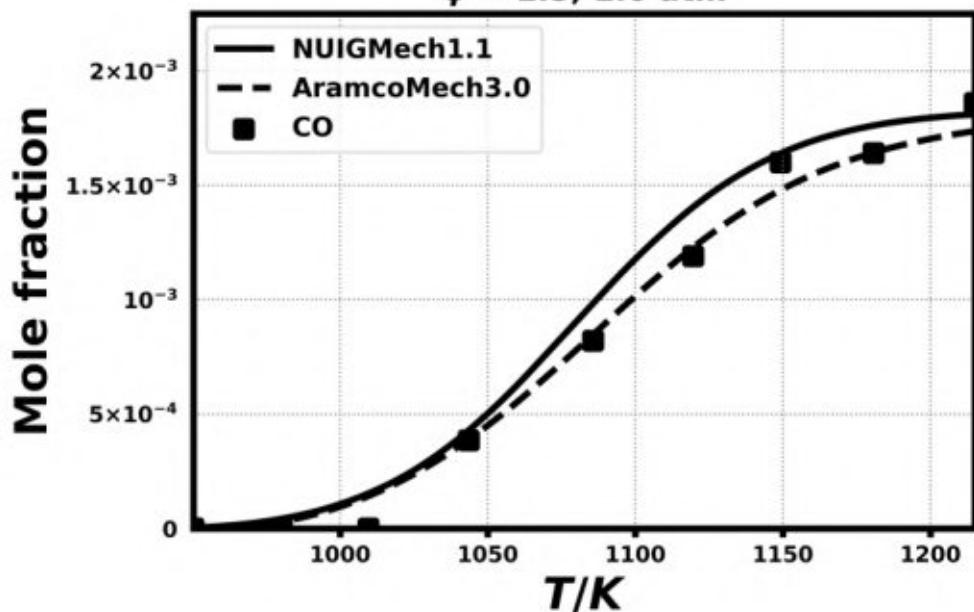


$0.15\% \text{ C}_2\text{H}_6$
 $5.25\% \text{ O}_2, 94.6\% \text{ N}_2$
 $\phi = 0.1, 1.0 \text{ atm}$

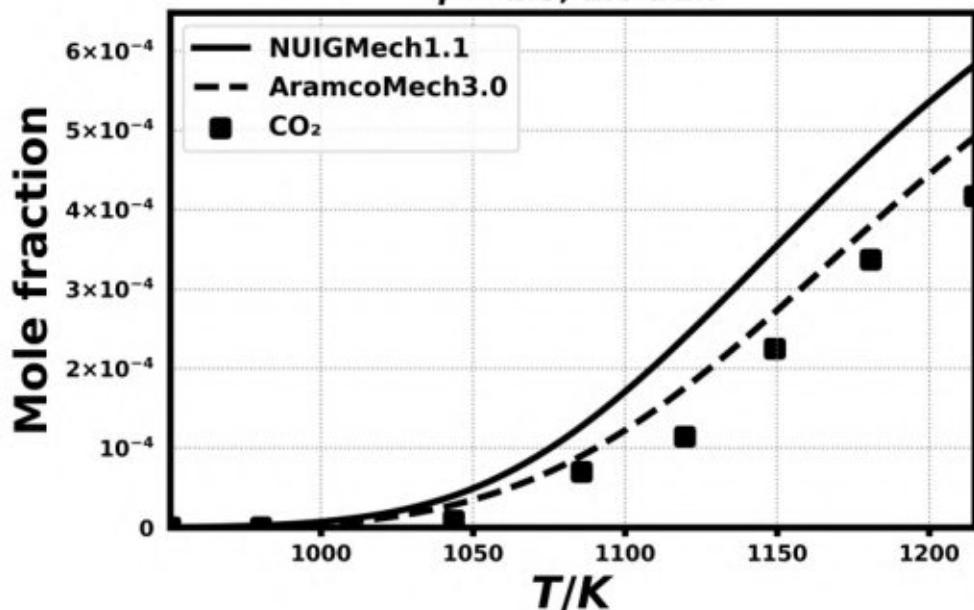


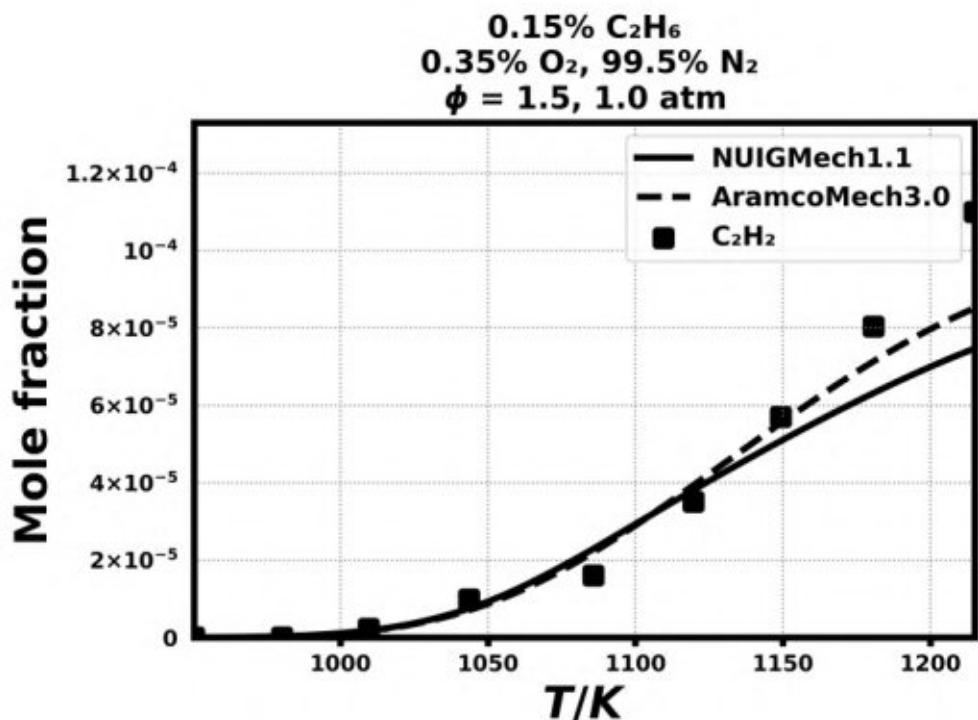
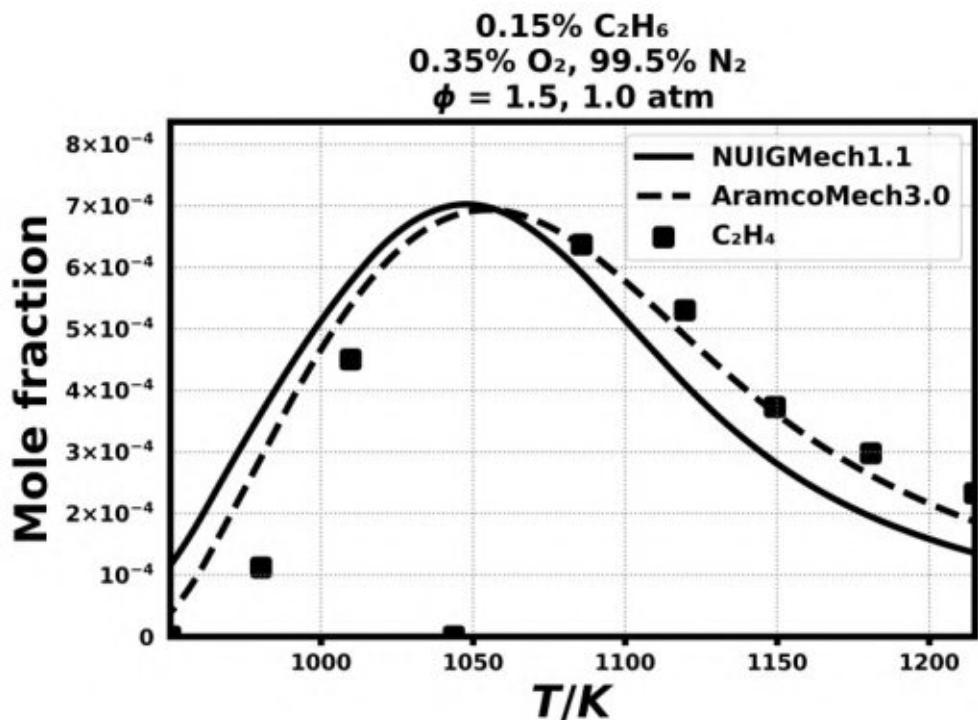


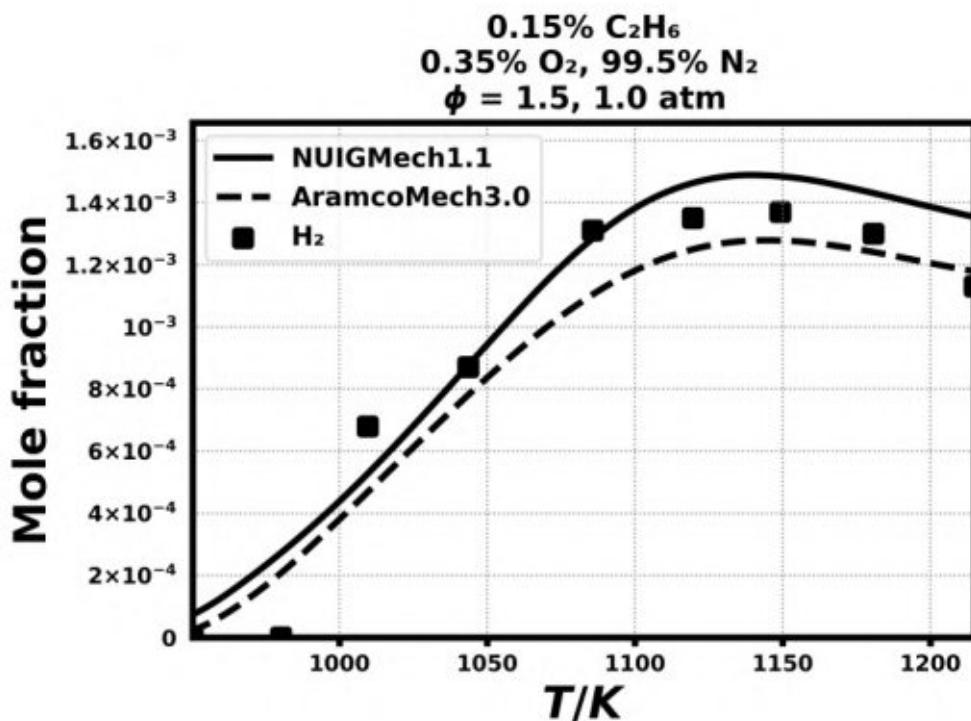
0.15% C₂H₆
0.35% O₂, 99.5% N₂
 $\phi = 1.5, 1.0 \text{ atm}$



0.15% C₂H₆
0.35% O₂, 99.5% N₂
 $\phi = 1.5, 1.0 \text{ atm}$

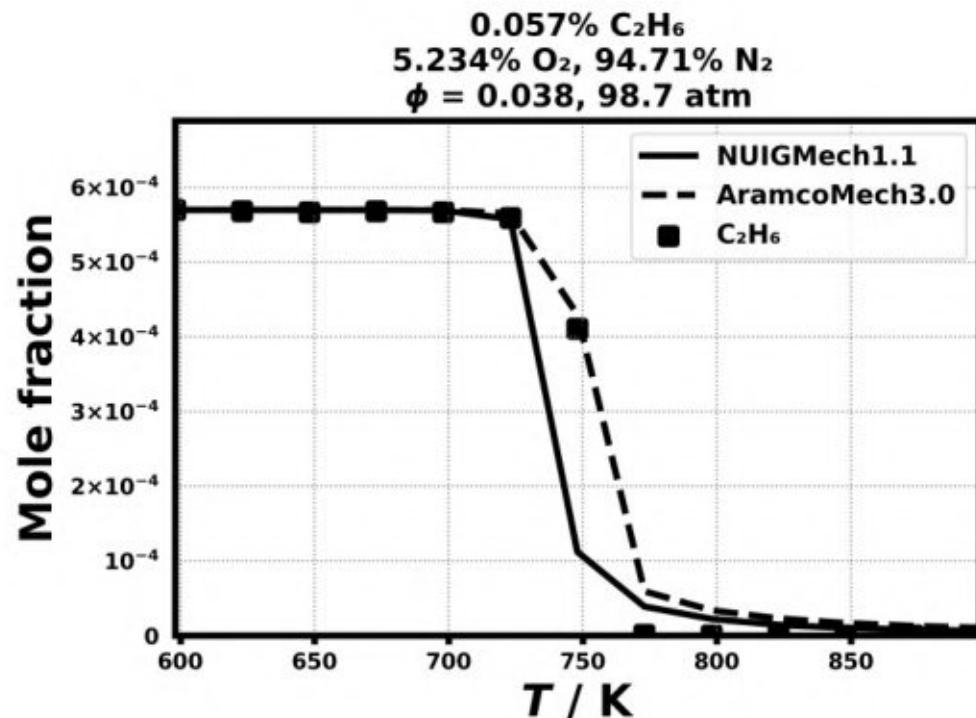


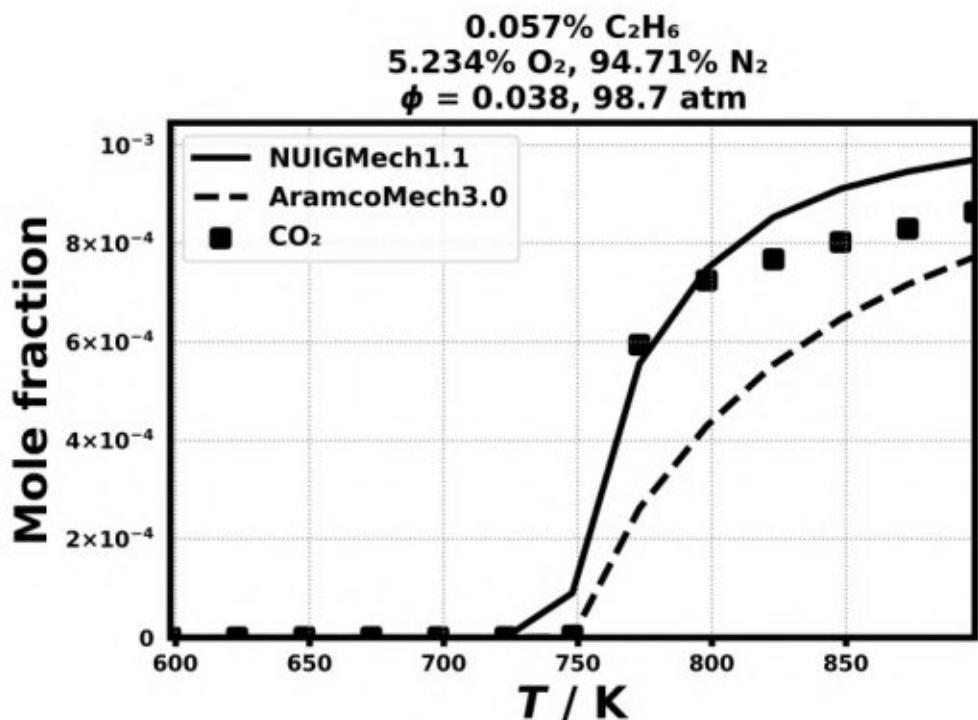
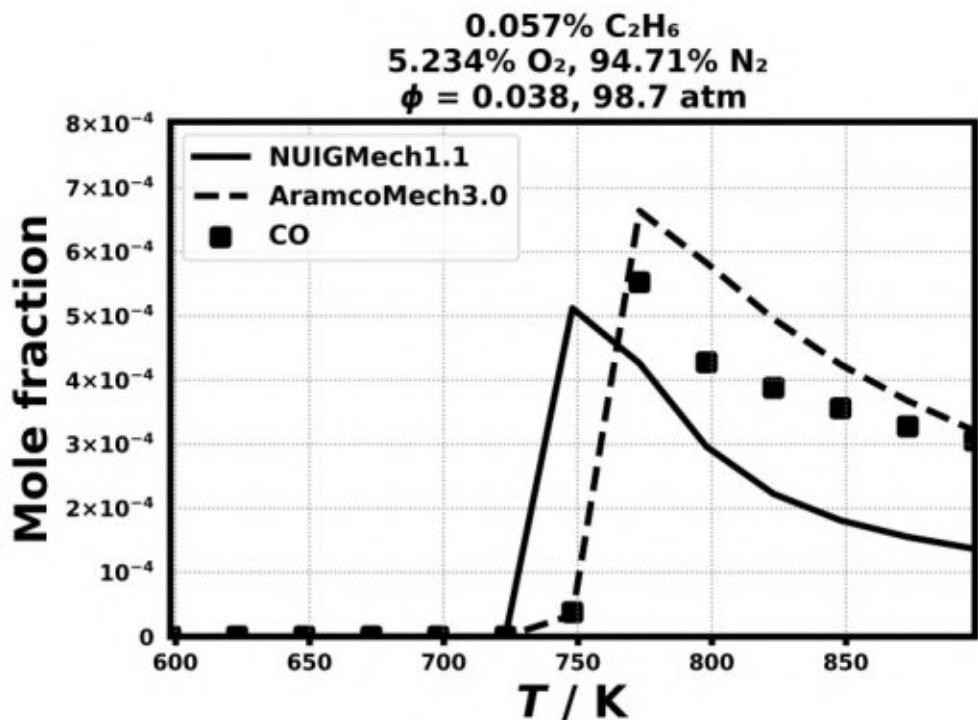




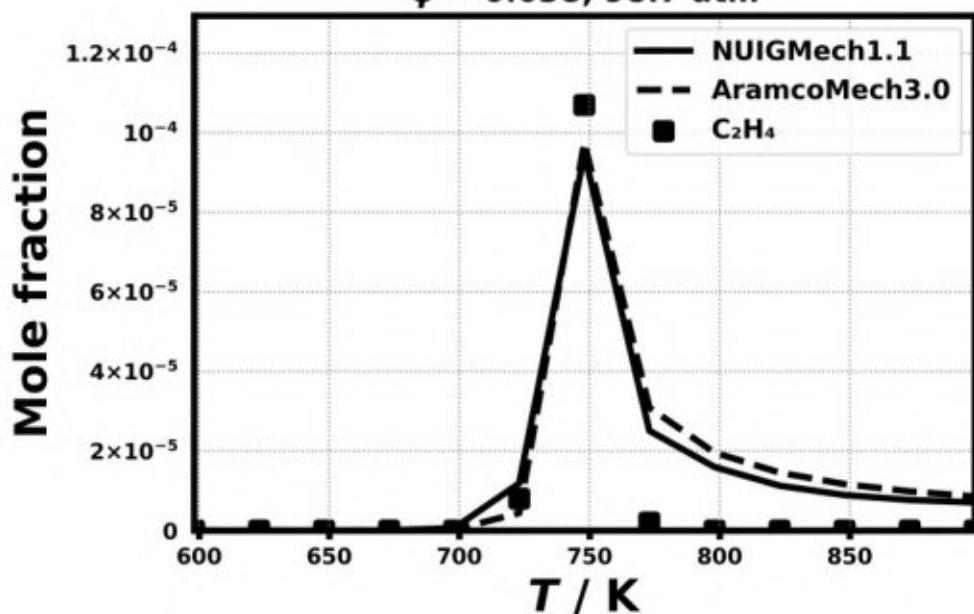
Speciation in Flow reactor

5.8) Hashemi, H., Jacobsen, J. G., Rasmussen, C. T., Christensen, J. M., Glarborg, P., Gersen, S & Klippenstein, S. J., Combustion and Flame, 182 (2017) 150-166.

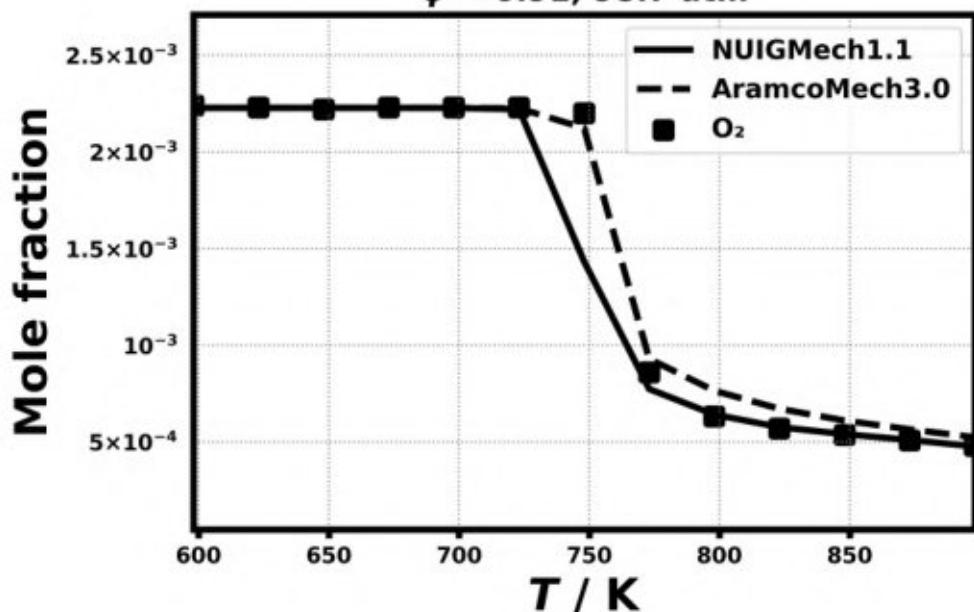


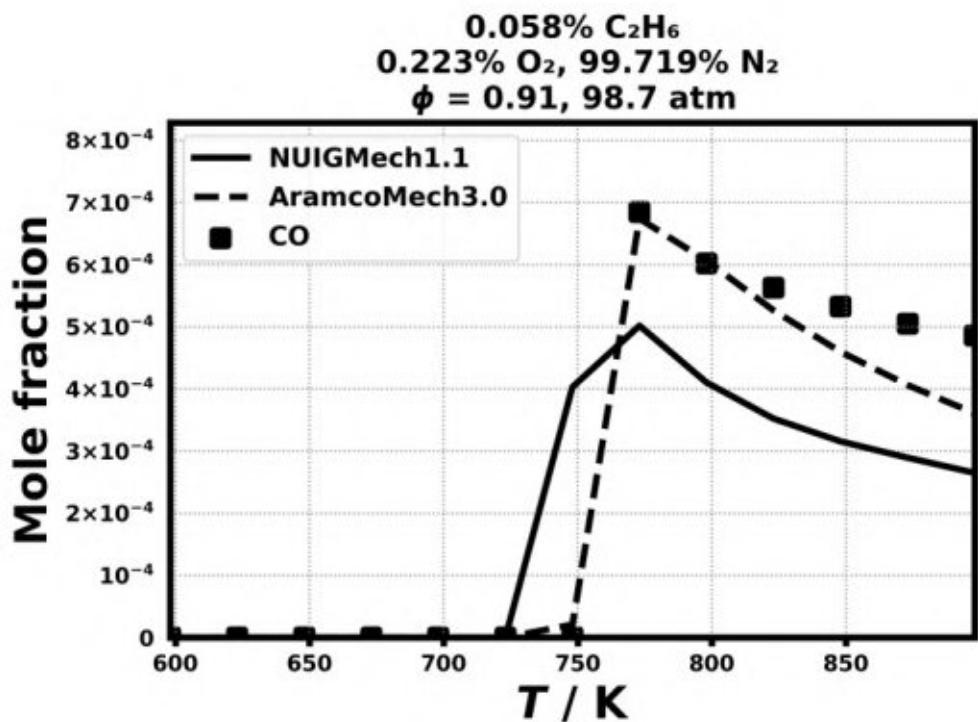
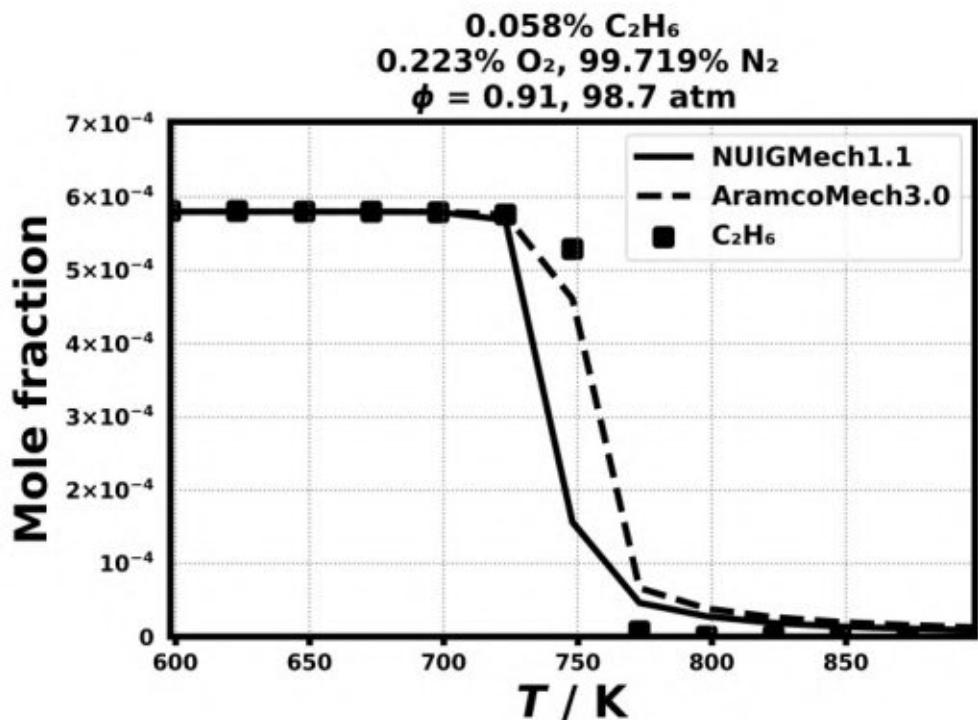


$0.057\% \text{ C}_2\text{H}_6$
 $5.234\% \text{ O}_2, 94.71\% \text{ N}_2$
 $\phi = 0.038, 98.7 \text{ atm}$

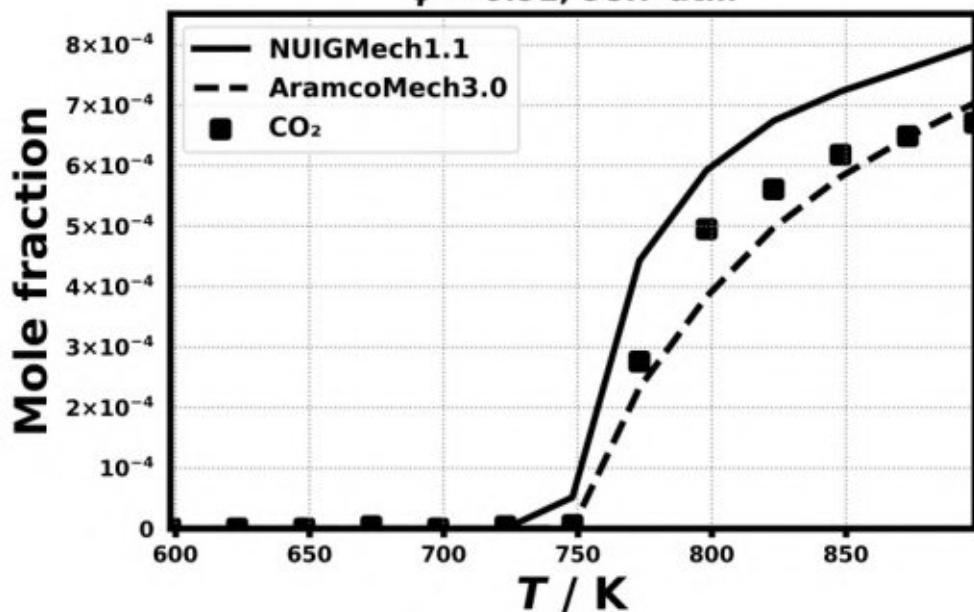


$0.058\% \text{ C}_2\text{H}_6$
 $0.223\% \text{ O}_2, 99.719\% \text{ N}_2$
 $\phi = 0.91, 98.7 \text{ atm}$

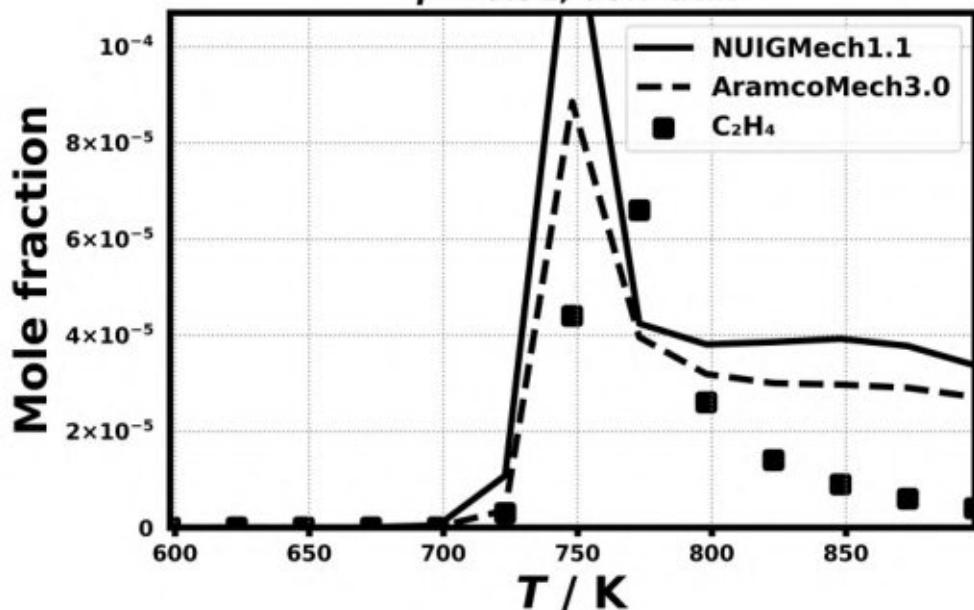


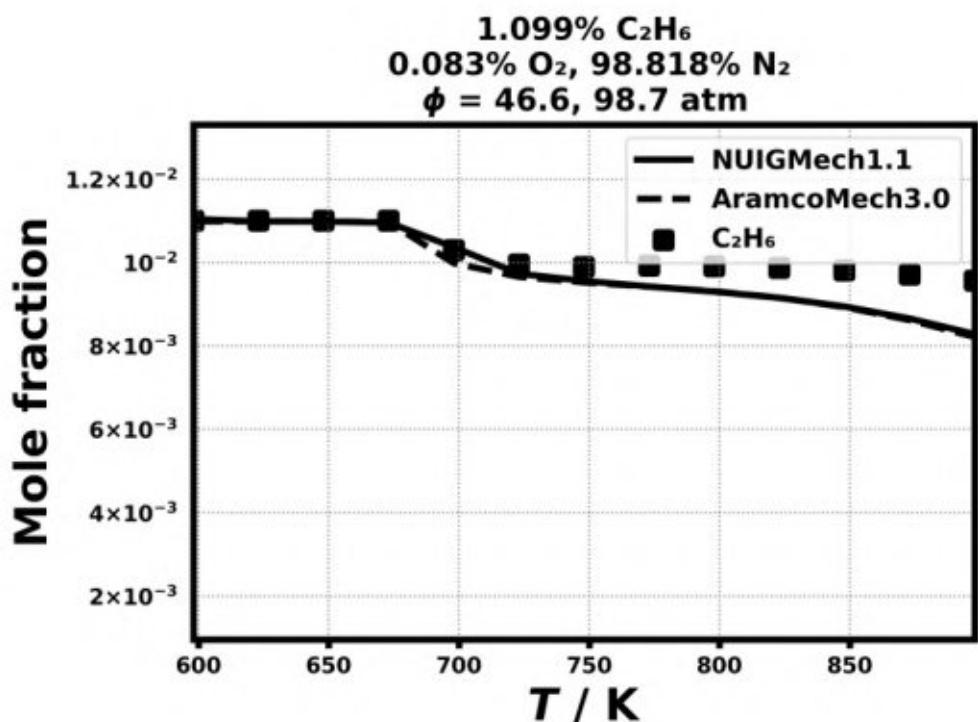
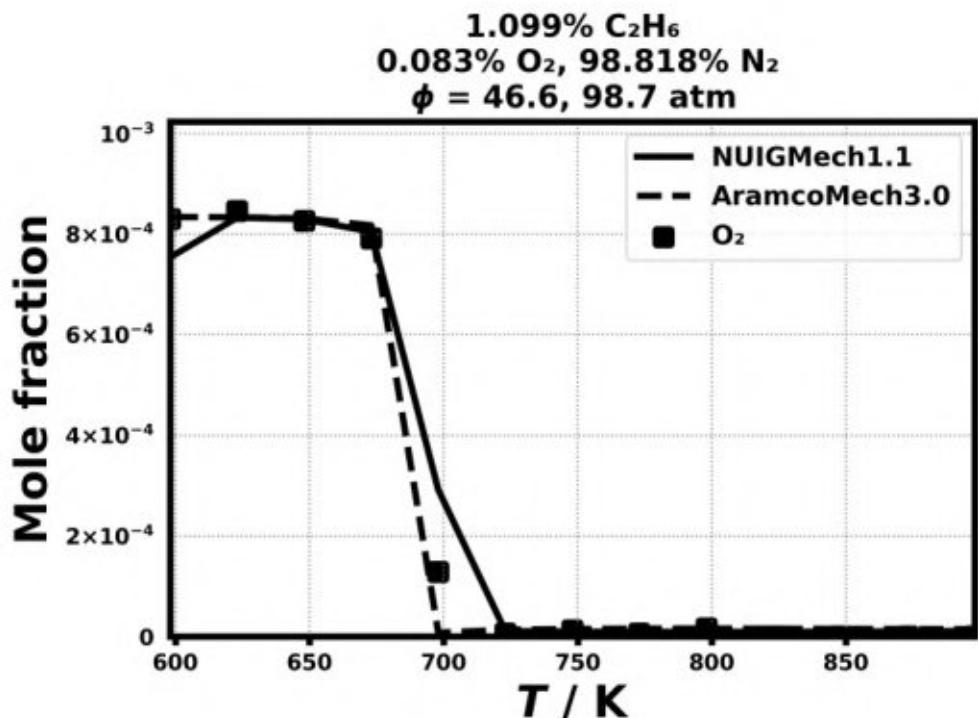


$0.058\% \text{ C}_2\text{H}_6$
 $0.223\% \text{ O}_2, 99.719\% \text{ N}_2$
 $\phi = 0.91, 98.7 \text{ atm}$

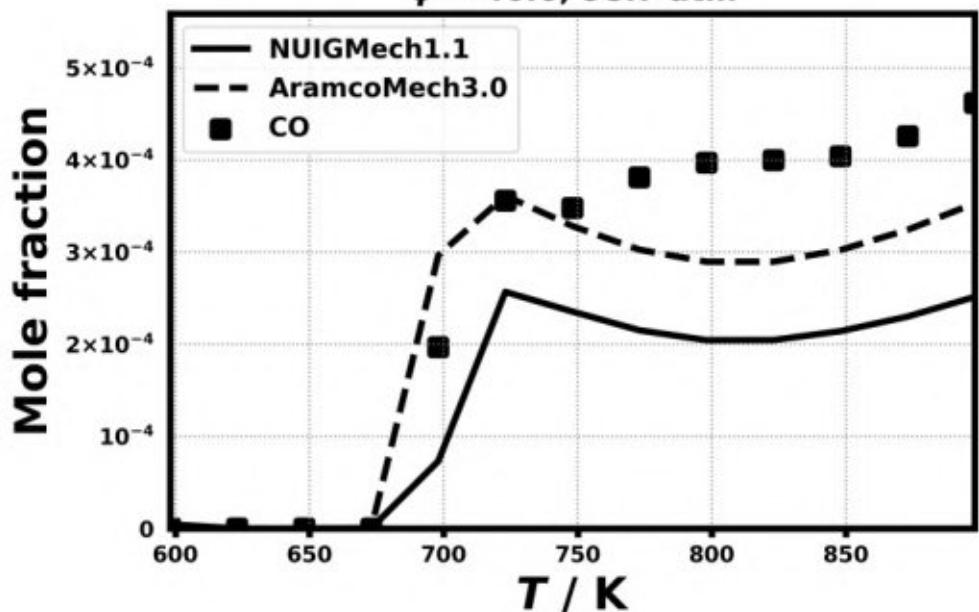


$0.058\% \text{ C}_2\text{H}_6$
 $0.223\% \text{ O}_2, 99.719\% \text{ N}_2$
 $\phi = 0.91, 98.7 \text{ atm}$

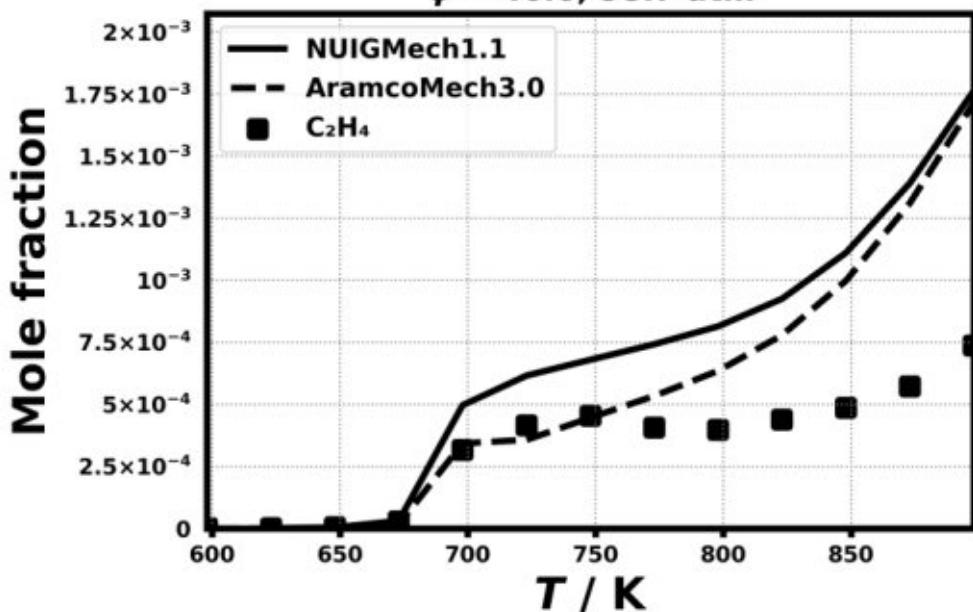


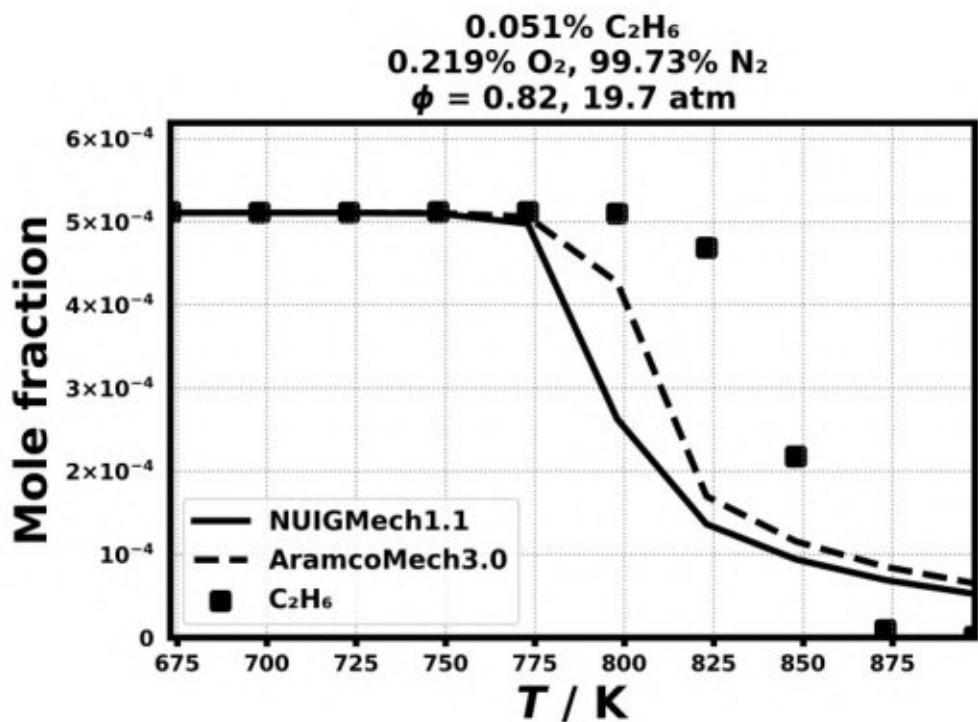
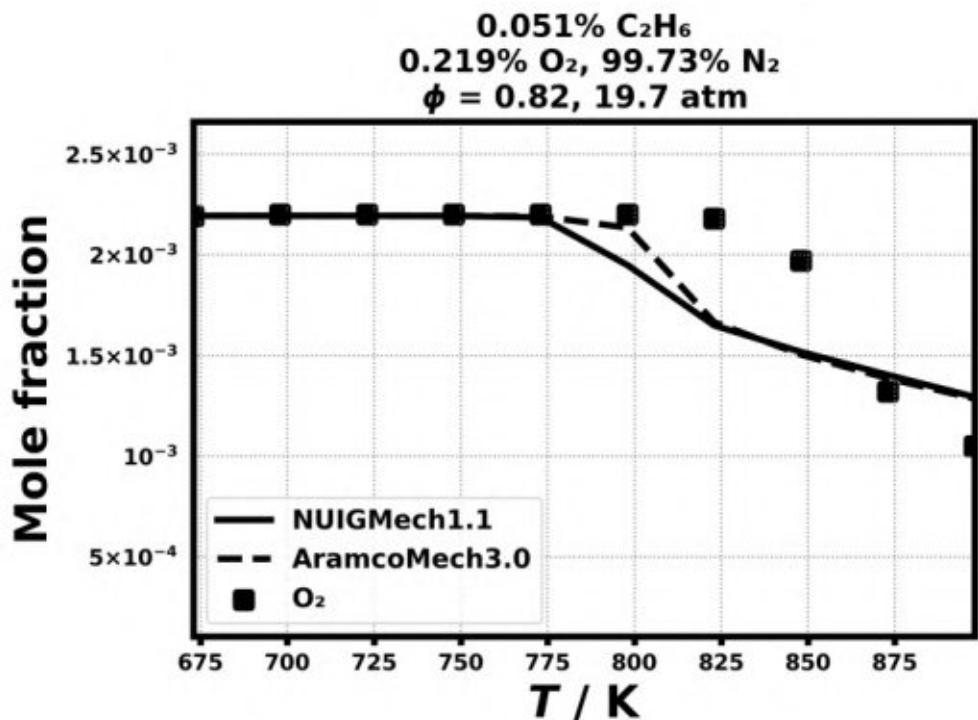


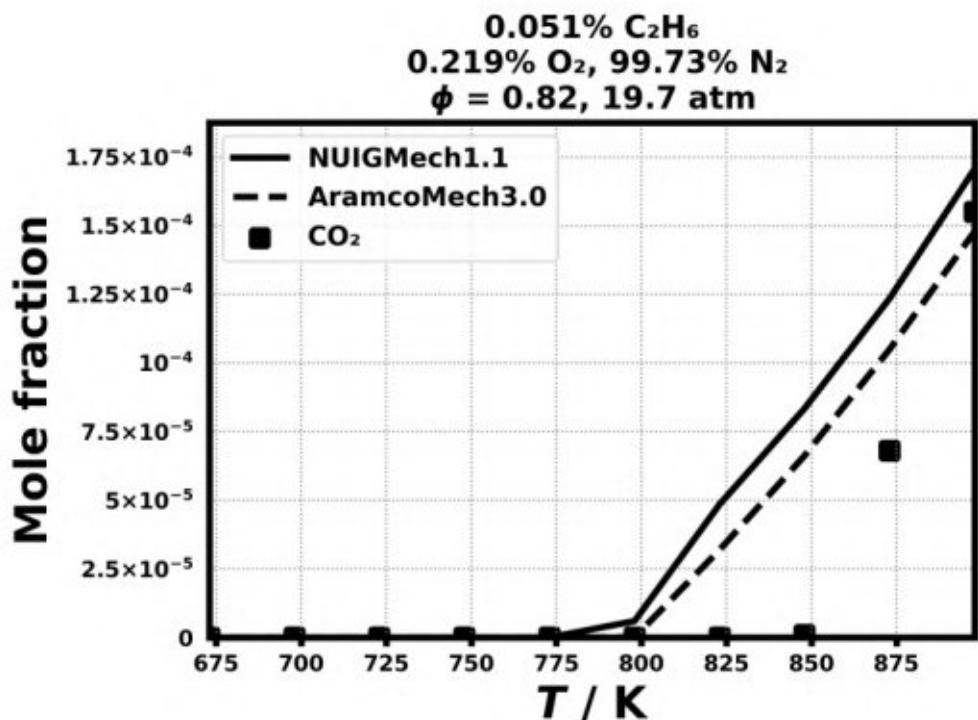
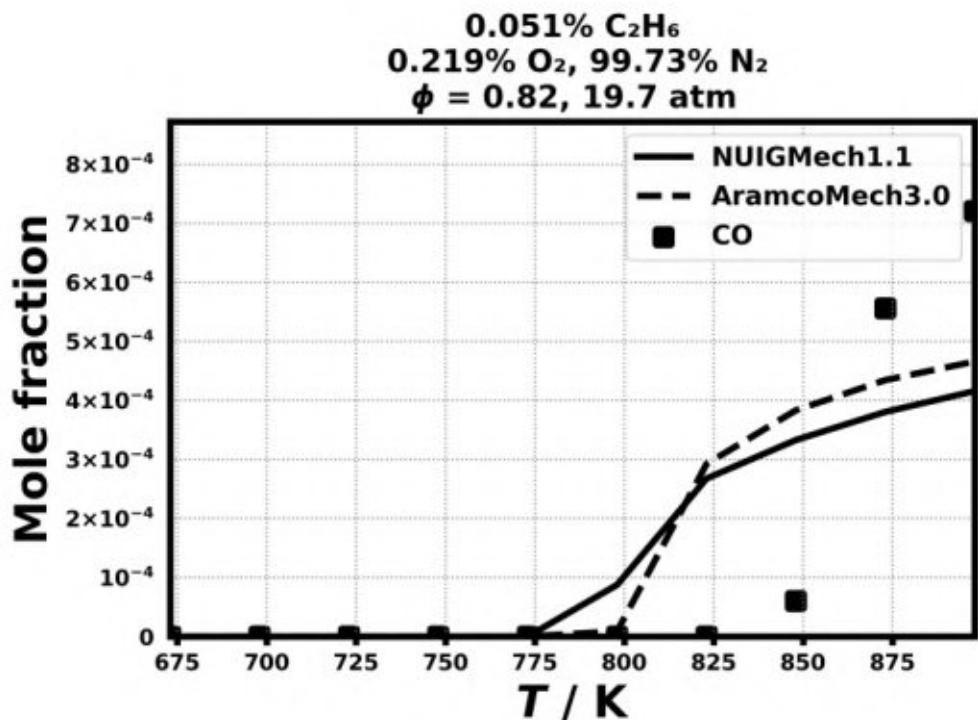
$1.099\% \text{ C}_2\text{H}_6$
 $0.083\% \text{ O}_2, 98.818\% \text{ N}_2$
 $\phi = 46.6, 98.7 \text{ atm}$

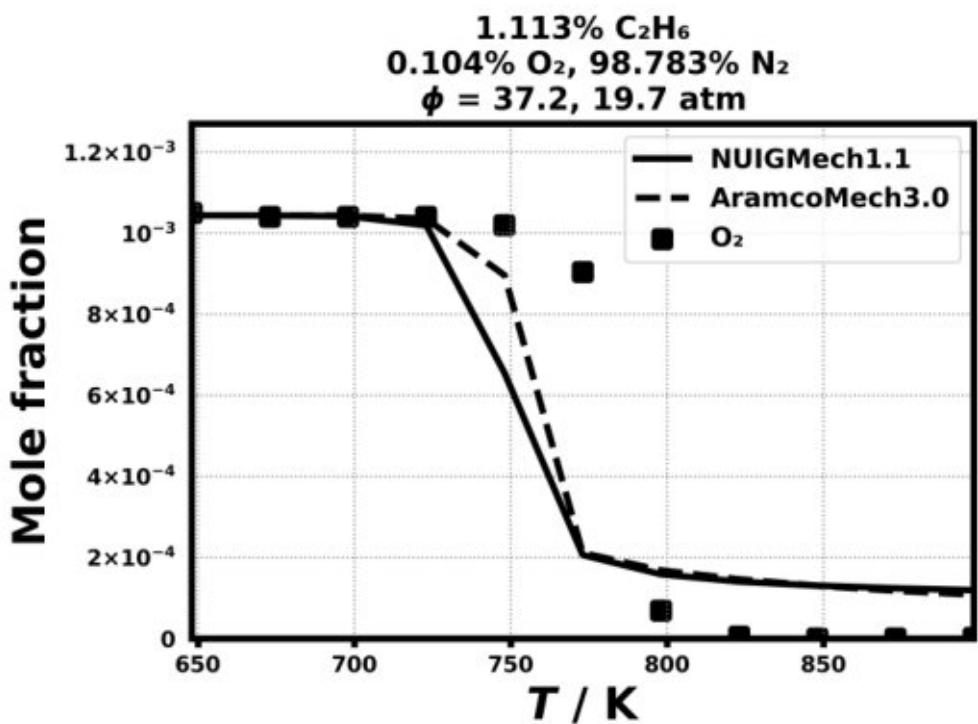
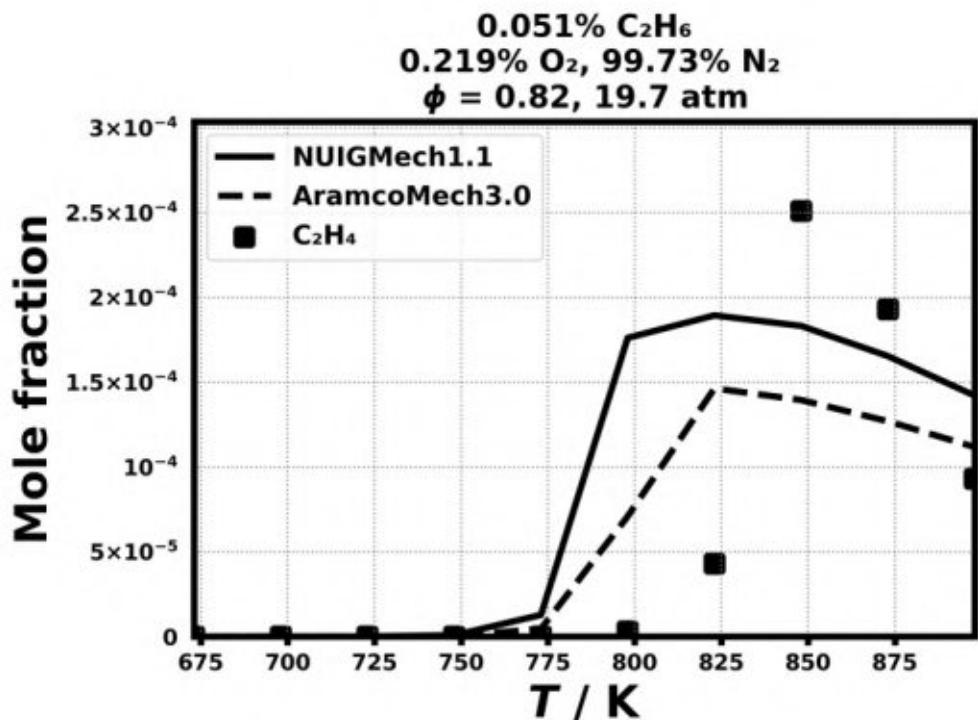


$1.099\% \text{ C}_2\text{H}_6$
 $0.083\% \text{ O}_2, 98.818\% \text{ N}_2$
 $\phi = 46.6, 98.7 \text{ atm}$

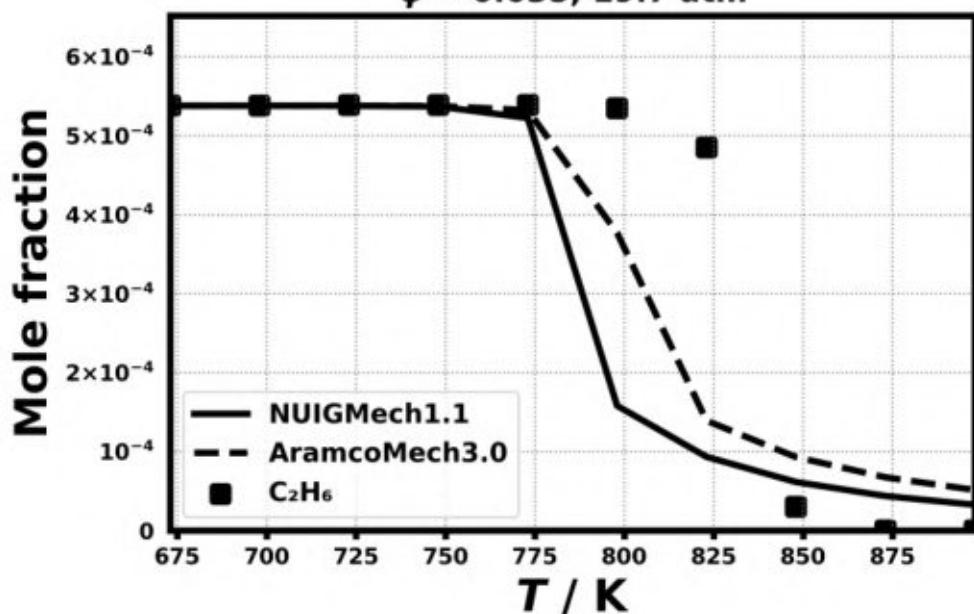




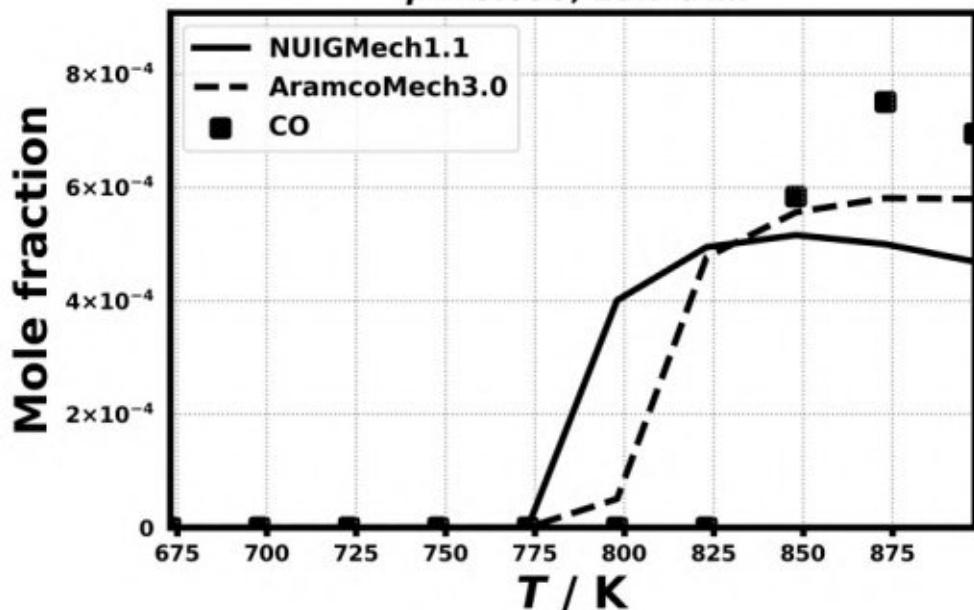




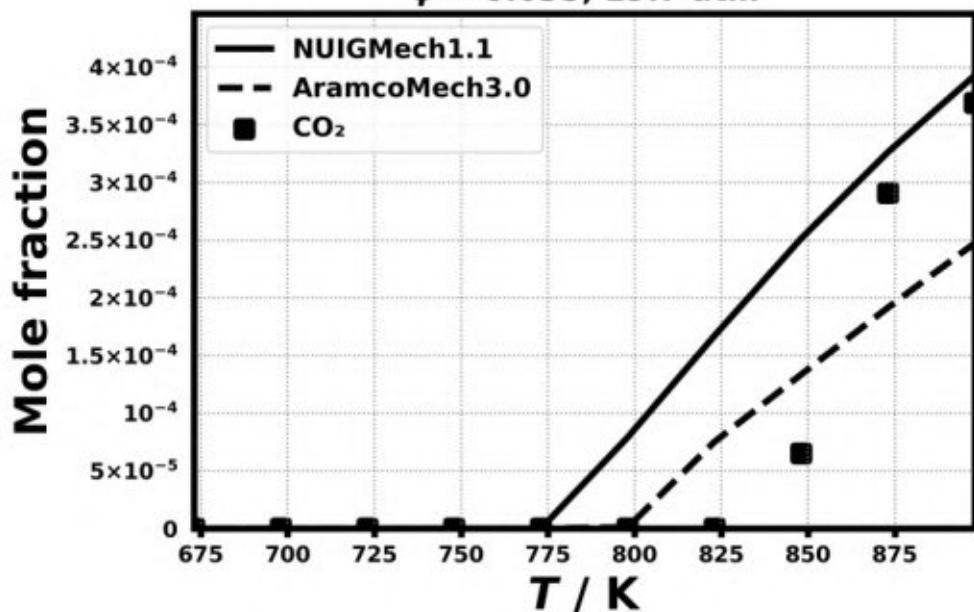
$0.054\% \text{ C}_2\text{H}_6$
 $5.404\% \text{ O}_2, 94.543\% \text{ N}_2$
 $\phi = 0.035, 19.7 \text{ atm}$



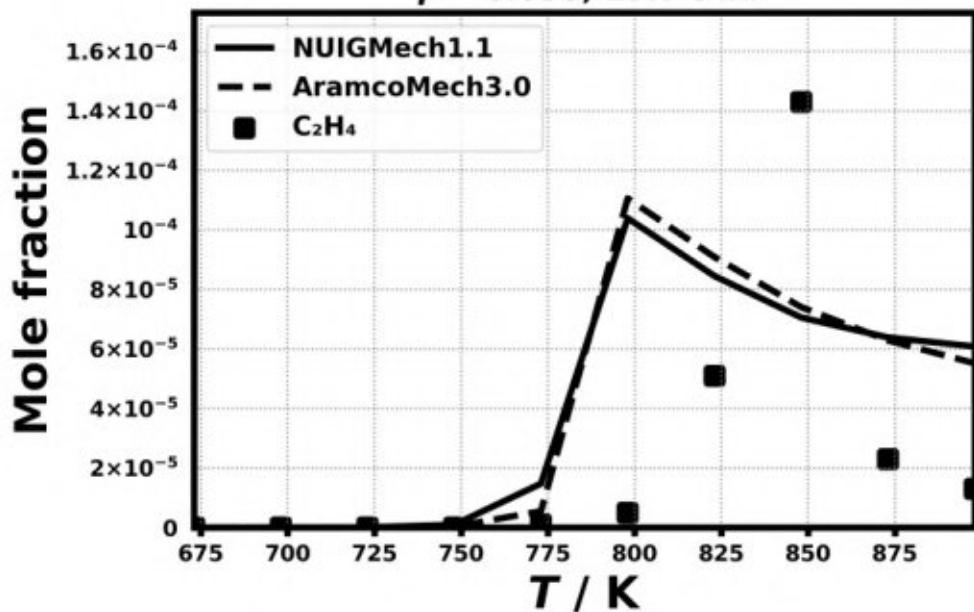
$0.054\% \text{ C}_2\text{H}_6$
 $5.404\% \text{ O}_2, 94.543\% \text{ N}_2$
 $\phi = 0.035, 19.7 \text{ atm}$



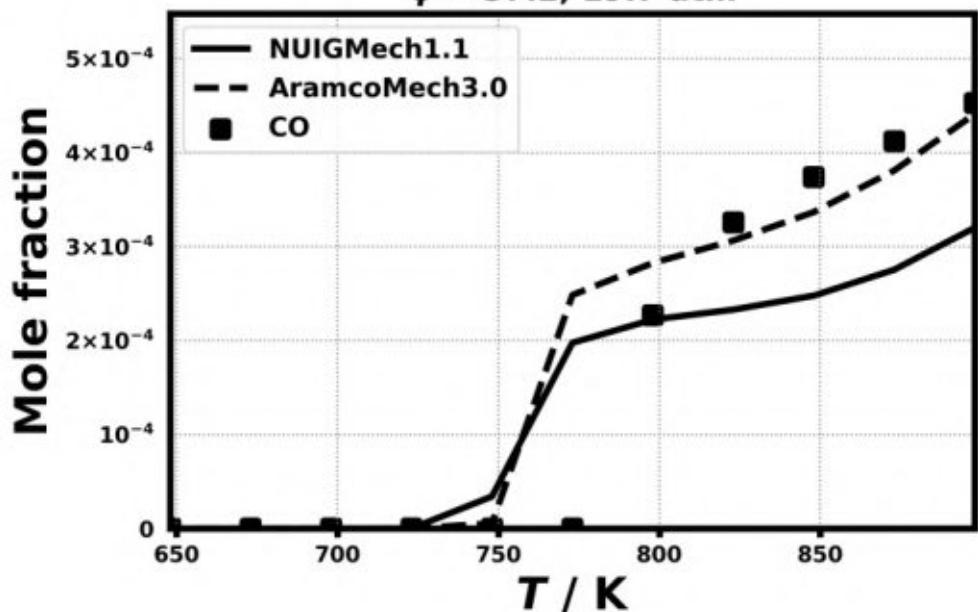
$0.054\% \text{ C}_2\text{H}_6$
 $5.404\% \text{ O}_2, 94.543\% \text{ N}_2$
 $\phi = 0.035, 19.7 \text{ atm}$



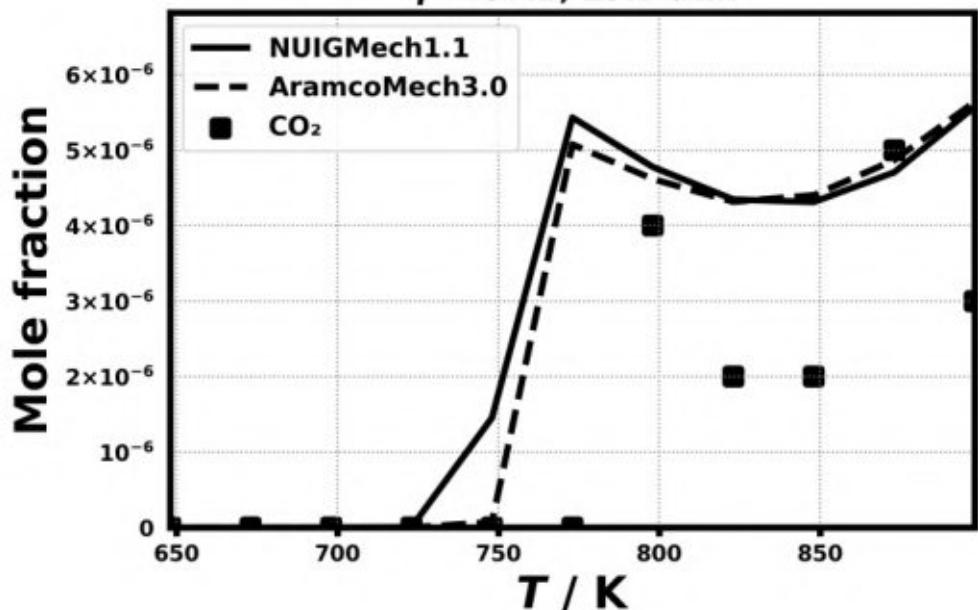
$0.054\% \text{ C}_2\text{H}_6$
 $5.404\% \text{ O}_2, 94.543\% \text{ N}_2$
 $\phi = 0.035, 19.7 \text{ atm}$



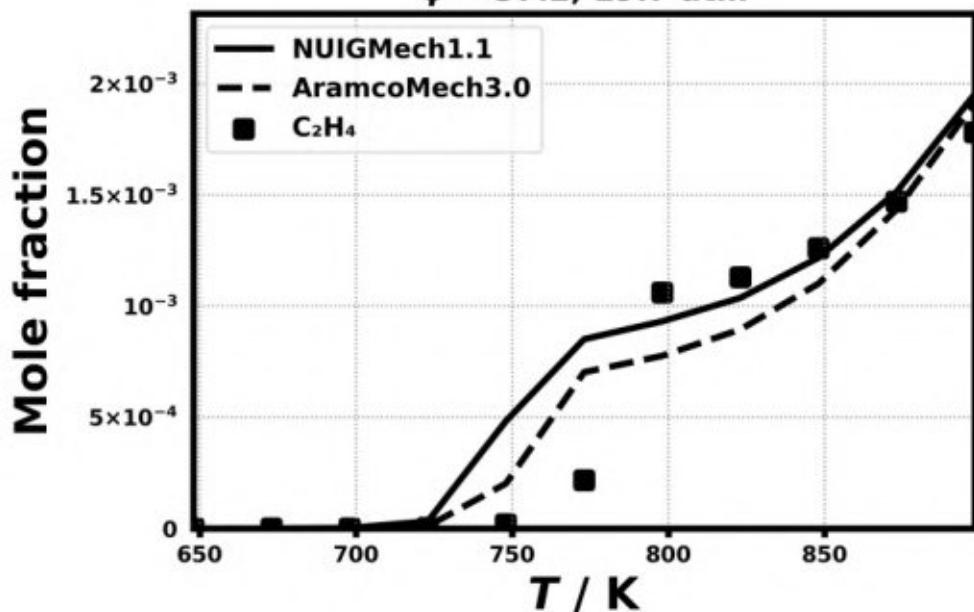
1.113% C₂H₆
0.104% O₂, 98.783% N₂
 $\phi = 37.2, 19.7 \text{ atm}$



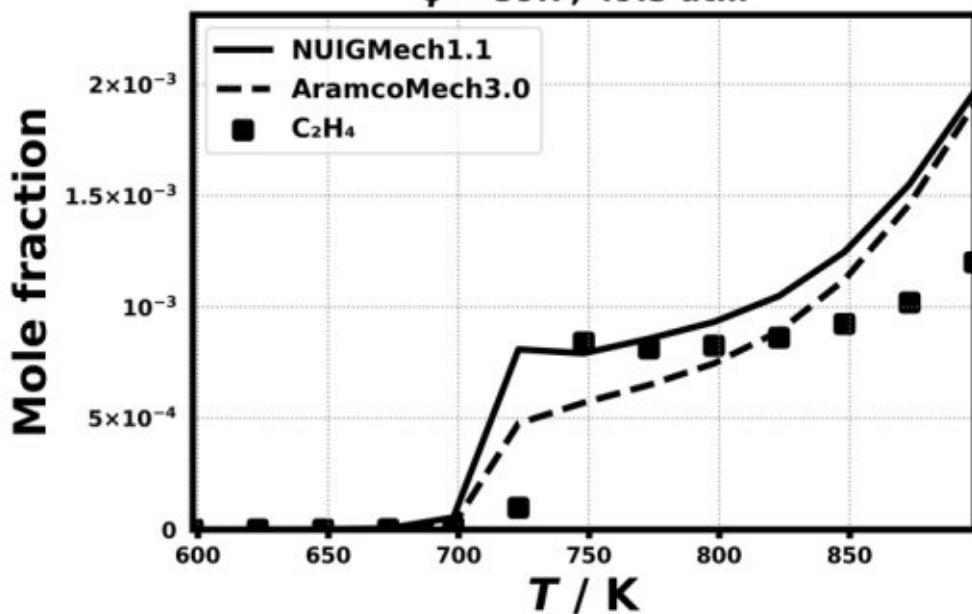
1.113% C₂H₆
0.104% O₂, 98.783% N₂
 $\phi = 37.2, 19.7 \text{ atm}$



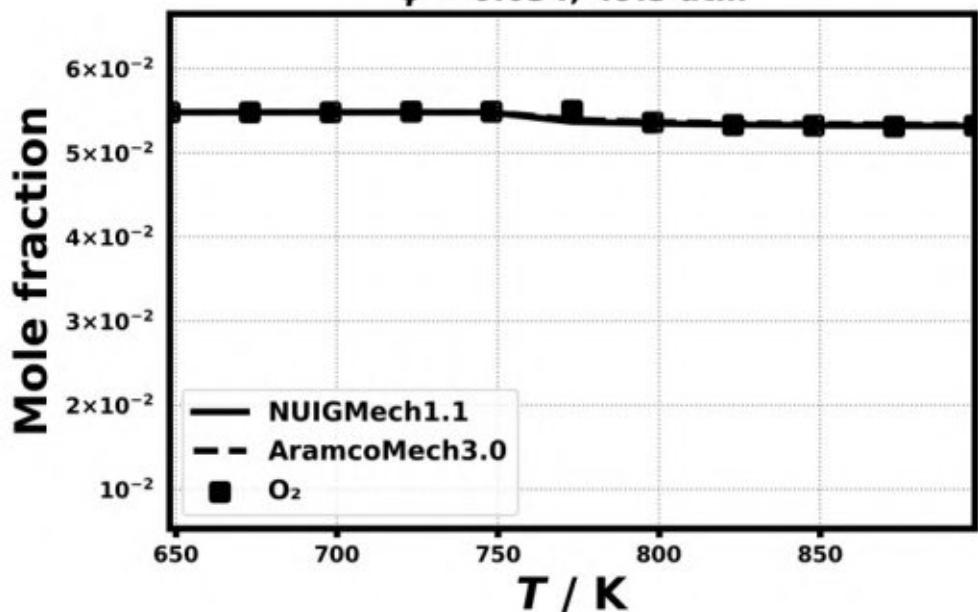
$1.113\% \text{ C}_2\text{H}_6$
 $0.104\% \text{ O}_2, 98.783\% \text{ N}_2$
 $\phi = 37.2, 19.7 \text{ atm}$



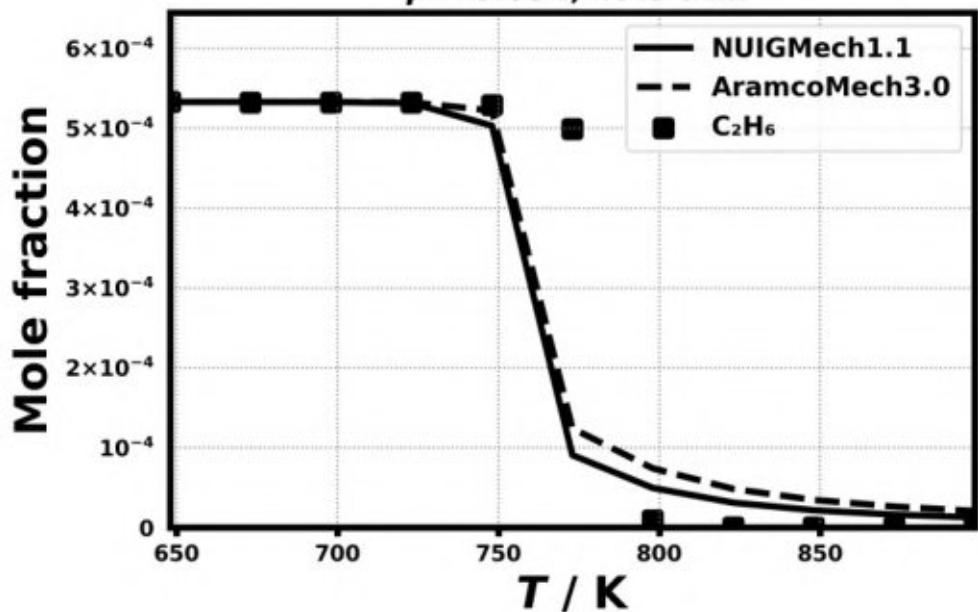
$1.105\% \text{ C}_2\text{H}_6$
 $0.098\% \text{ O}_2, 98.797\% \text{ N}_2$
 $\phi = 39.7, 49.3 \text{ atm}$



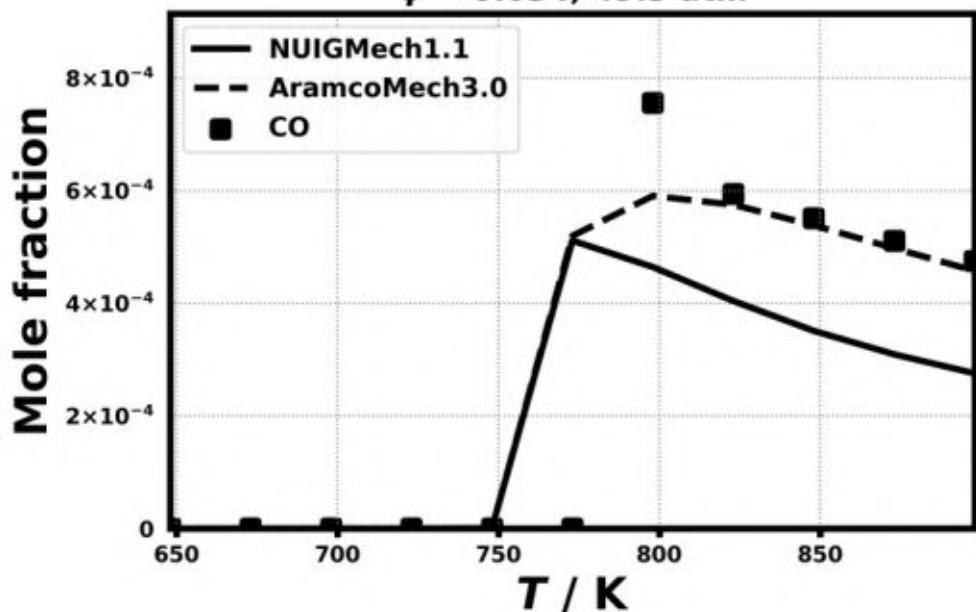
$0.053\% \text{ C}_2\text{H}_6$
 $5.481\% \text{ O}_2, 94.465\% \text{ N}_2$
 $\phi = 0.034, 49.3 \text{ atm}$



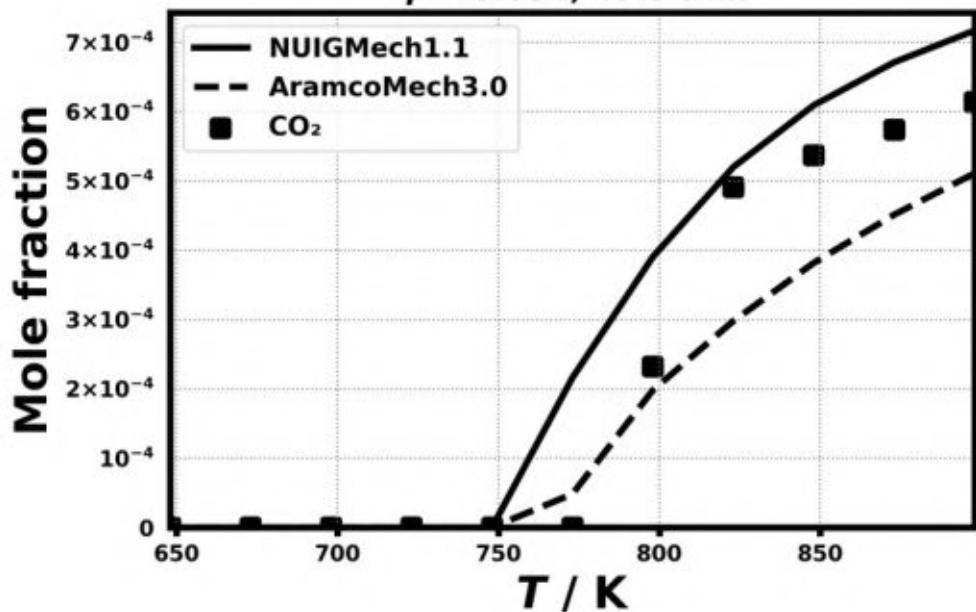
$0.053\% \text{ C}_2\text{H}_6$
 $5.481\% \text{ O}_2, 94.465\% \text{ N}_2$
 $\phi = 0.034, 49.3 \text{ atm}$



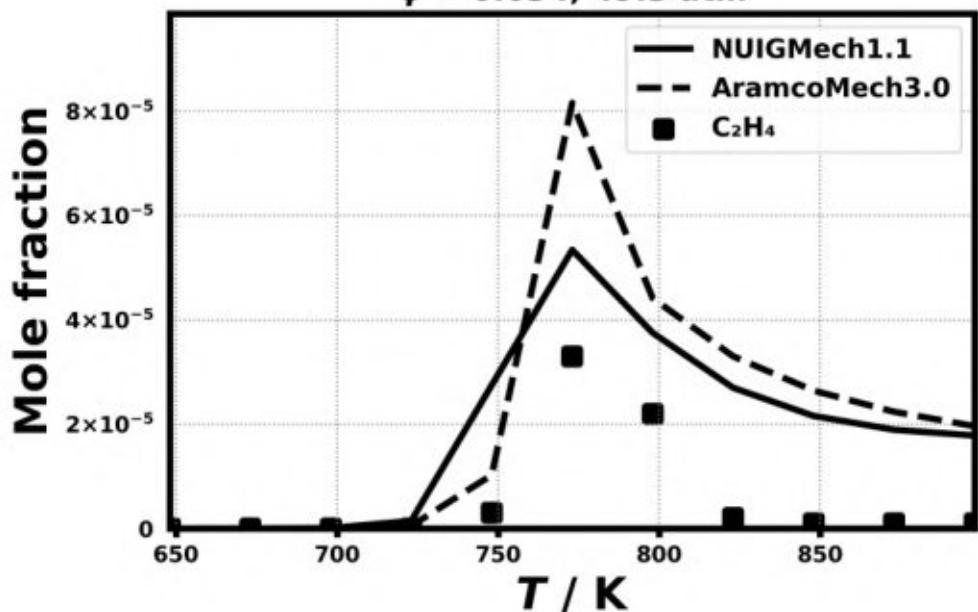
$0.053\% \text{ C}_2\text{H}_6$
 $5.481\% \text{ O}_2, 94.465\% \text{ N}_2$
 $\phi = 0.034, 49.3 \text{ atm}$



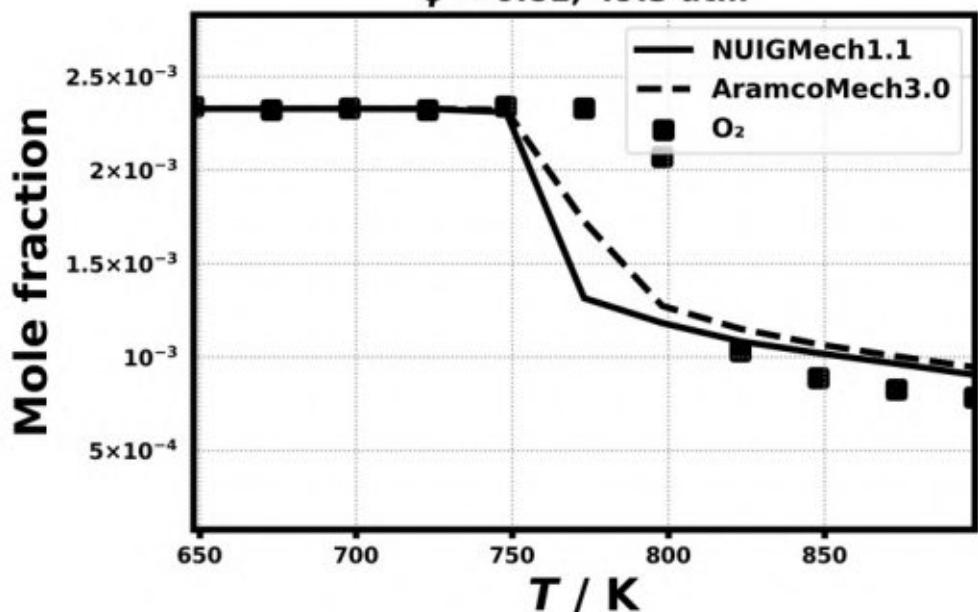
$0.053\% \text{ C}_2\text{H}_6$
 $5.481\% \text{ O}_2, 94.465\% \text{ N}_2$
 $\phi = 0.034, 49.3 \text{ atm}$



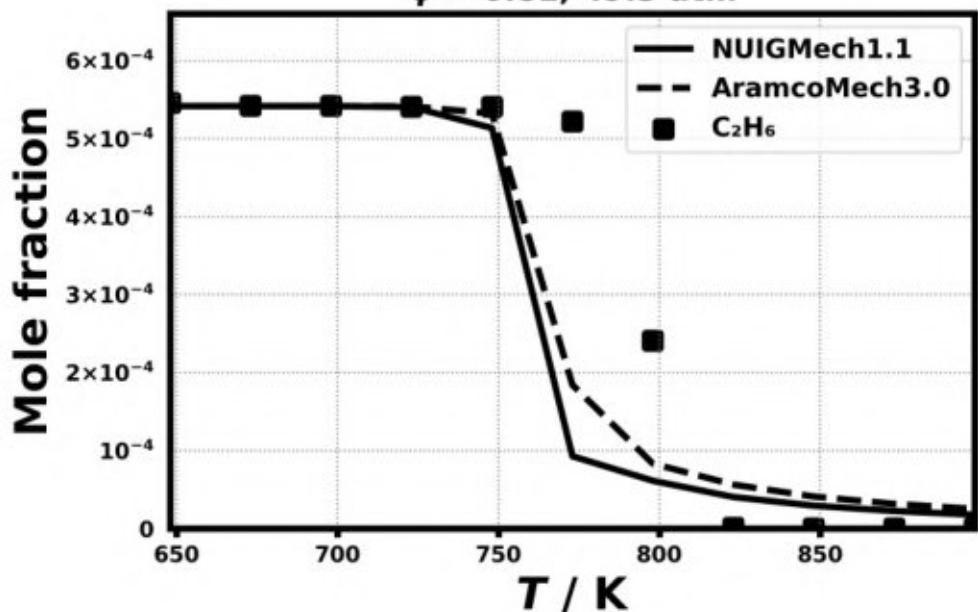
$0.053\% \text{ C}_2\text{H}_6$
 $5.481\% \text{ O}_2, 94.465\% \text{ N}_2$
 $\phi = 0.034, 49.3 \text{ atm}$



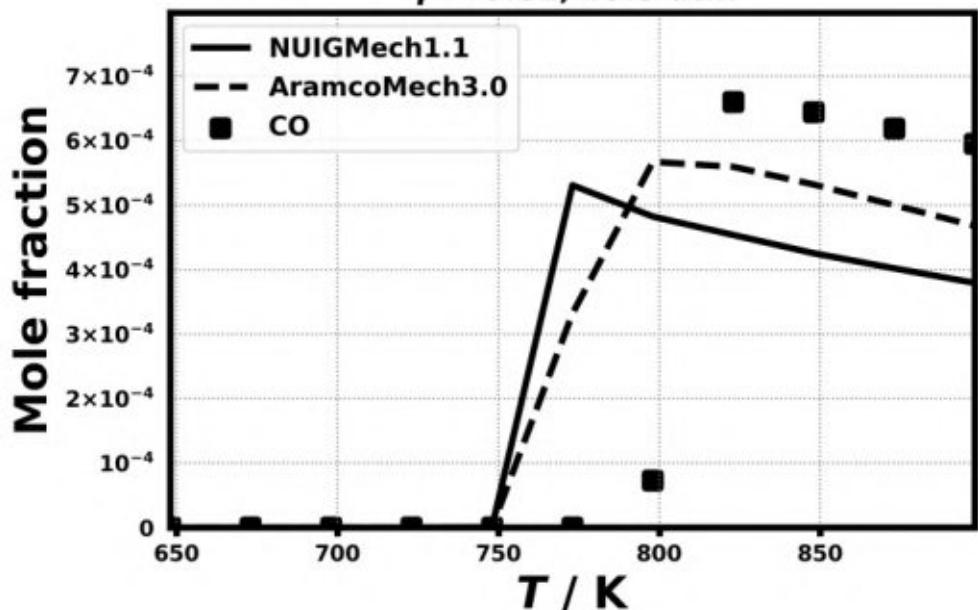
$0.054\% \text{ C}_2\text{H}_6$
 $0.233\% \text{ O}_2, 99.713\% \text{ N}_2$
 $\phi = 0.81, 49.3 \text{ atm}$



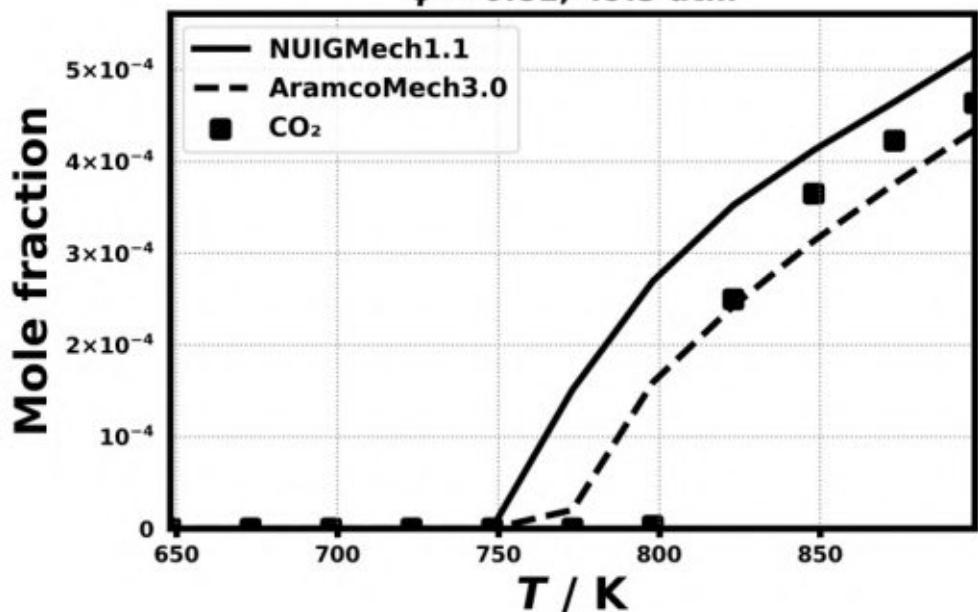
$0.054\% \text{ C}_2\text{H}_6$
 $0.233\% \text{ O}_2, 99.713\% \text{ N}_2$
 $\phi = 0.81, 49.3 \text{ atm}$

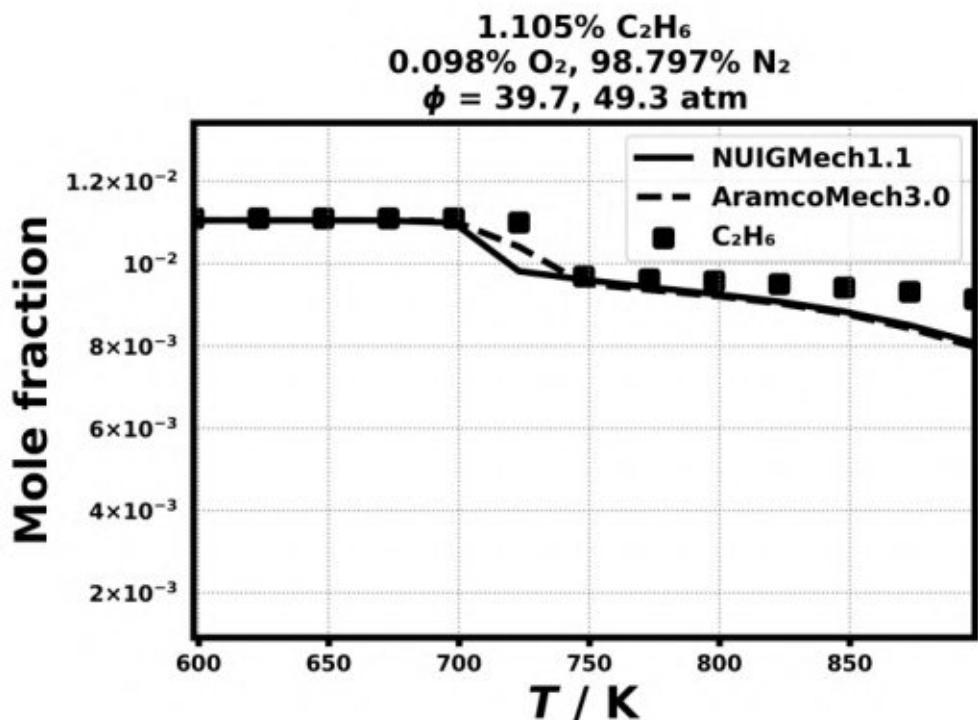
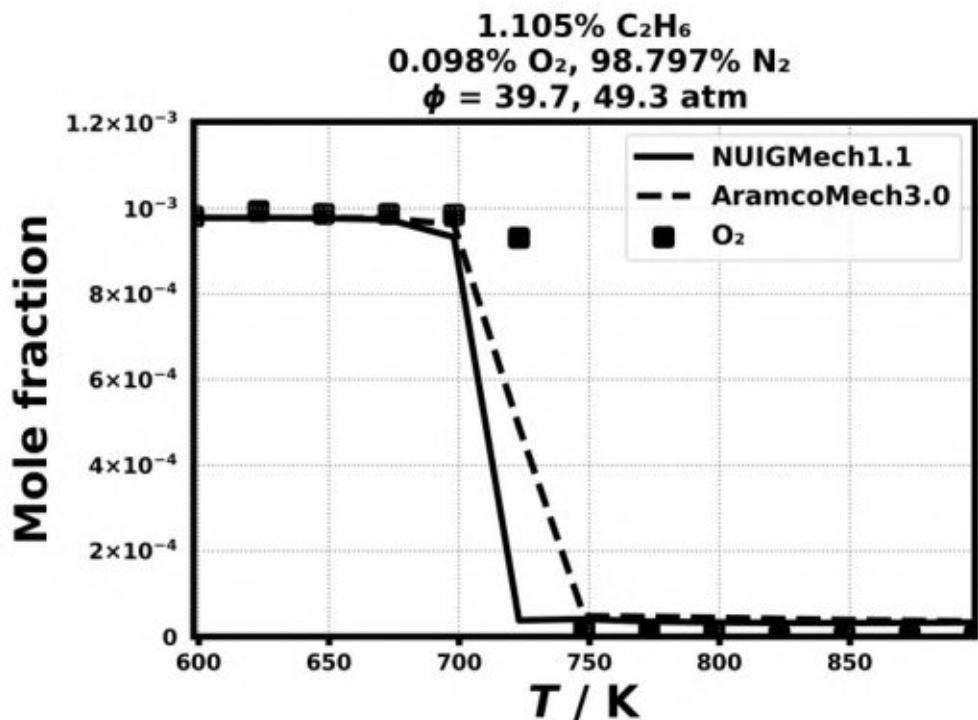


$0.054\% \text{ C}_2\text{H}_6$
 $0.233\% \text{ O}_2, 99.713\% \text{ N}_2$
 $\phi = 0.81, 49.3 \text{ atm}$

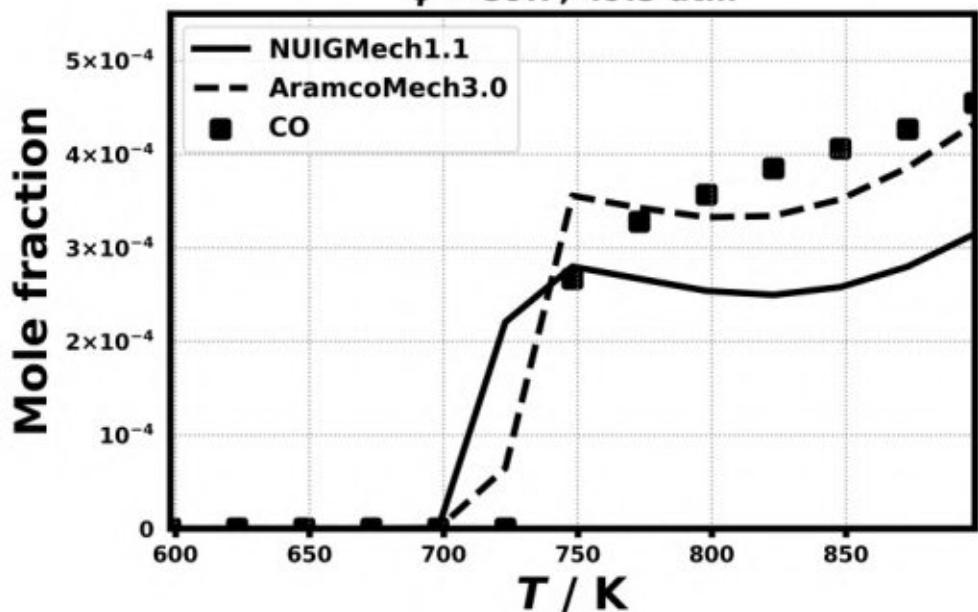


$0.054\% \text{ C}_2\text{H}_6$
 $0.233\% \text{ O}_2, 99.713\% \text{ N}_2$
 $\phi = 0.81, 49.3 \text{ atm}$

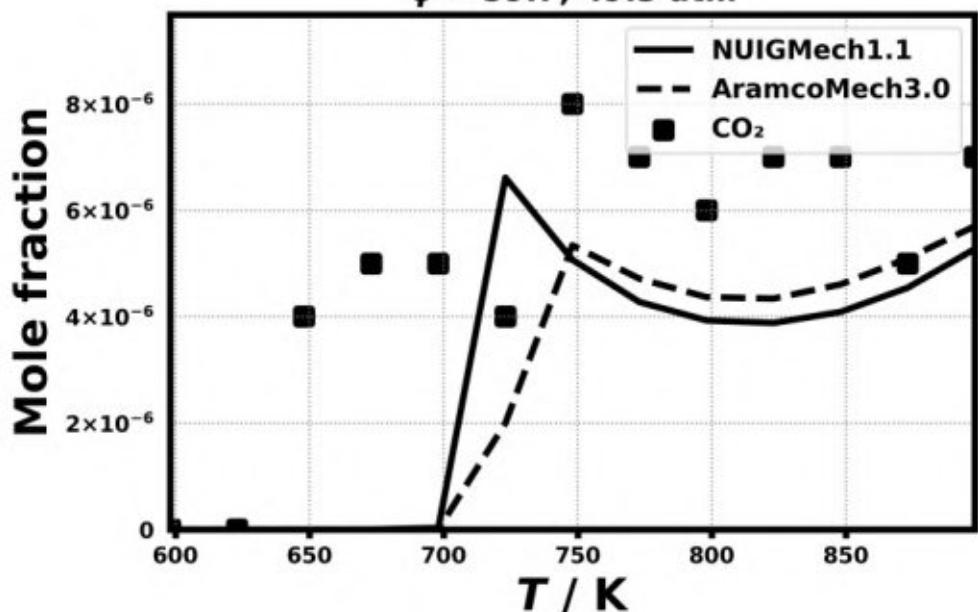




1.105% C₂H₆
0.098% O₂, 98.797% N₂
 $\phi = 39.7, 49.3 \text{ atm}$

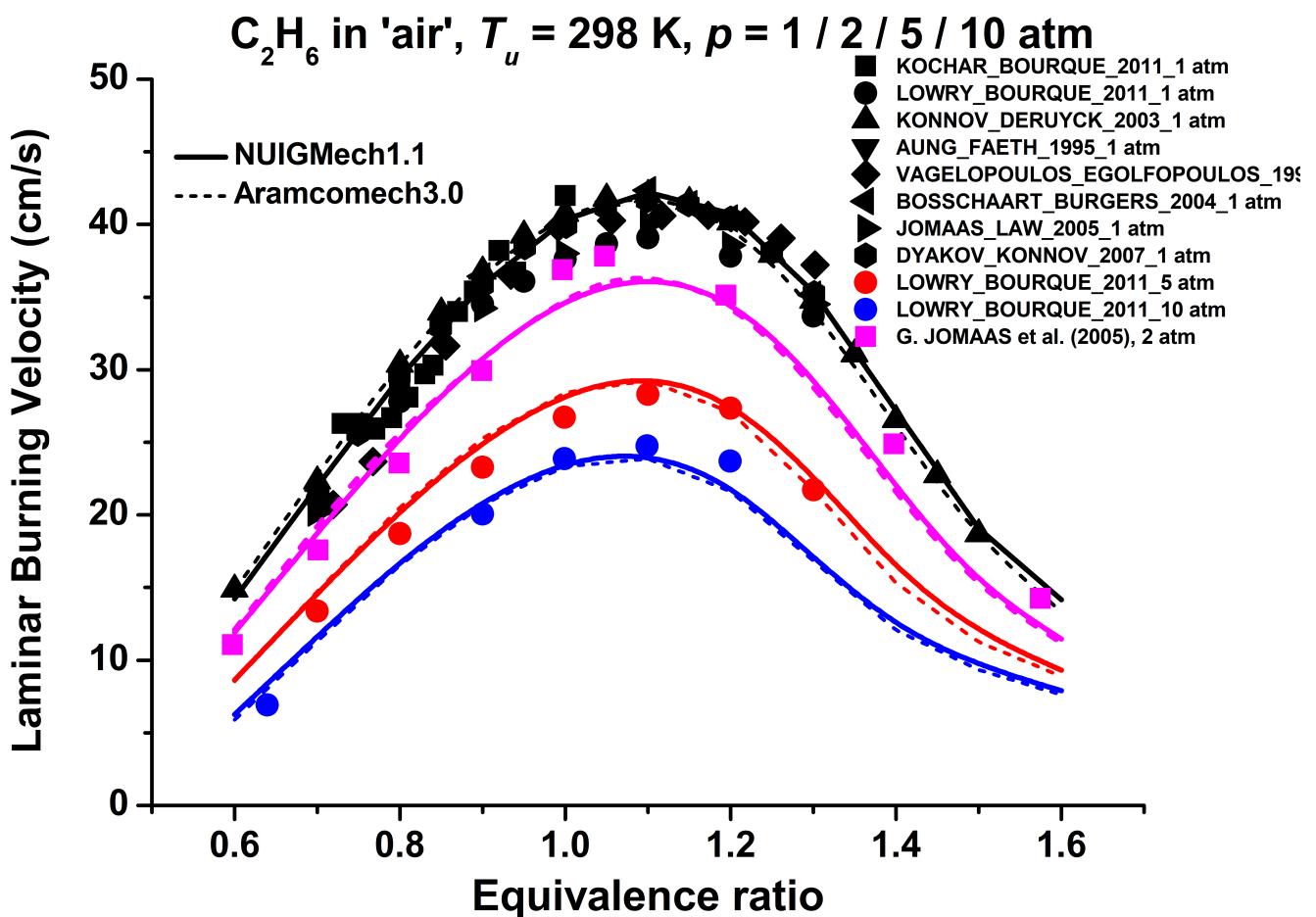


1.105% C₂H₆
0.098% O₂, 98.797% N₂
 $\phi = 39.7, 49.3 \text{ atm}$



Laminar flame speed

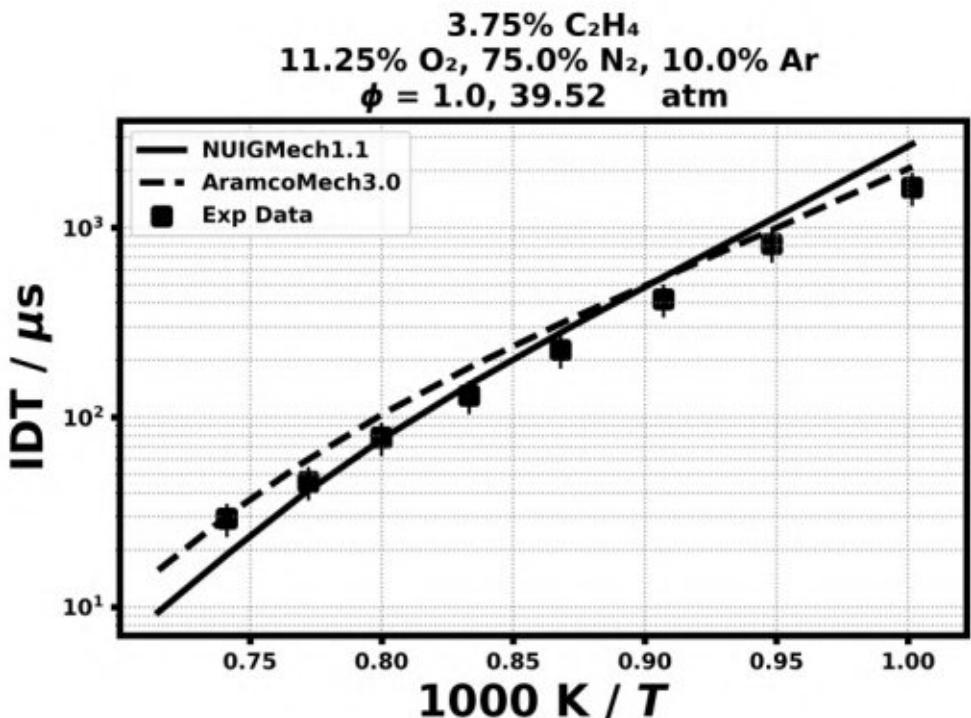
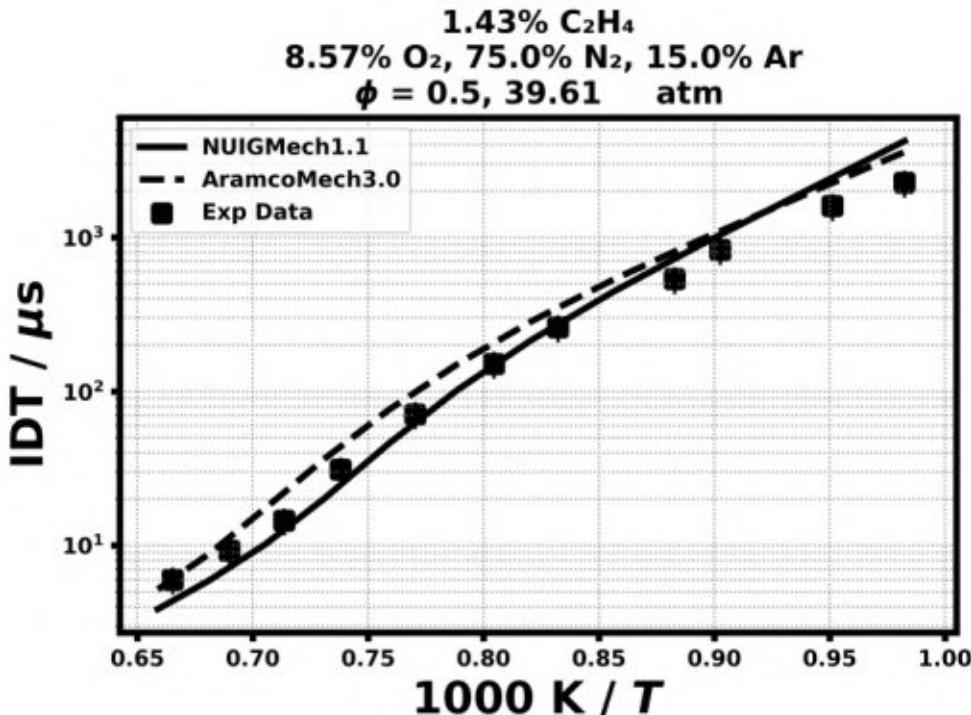
- 5.8) F. N. Egolfopoulos, D. L. Zhu, C. K. Law, Proceedings of the Combustion Institute 23 (1990) 471-478.
 5.9) K.J. Bosschaart, L.P.H. de Goey, Combustion and Flame 136 (2004) 261–269.
 5.10) G. Jomaas, X. L. Zheng, D. L. Zhu, C. K. Law, Proceedings of the Combustion Institute 30 (2005) 193–200.
 5.11) C. M. Vagelopoulos, F. N. Egolfopoulos, Proceedings of the Combustion Institute 27 (1998) 513-519.
 5.12) Konnov, A. A., Dyakov, I. V., & De Ruyck, J. Experimental thermal and fluid science, 27(4) (2003) 379-384.
 5.13) Kochar, Y., Seitzman, J., Lieuwen, T., Metcalfe, W., Burke, S. A., Curran, H., & Bourque, G, In Turbo Expo: Power for Land, Sea, and Air, 54624 (2011, January) 129-140.
 5.14) Lowry, W., de Vries, J., Krejci, M., Petersen, E., Serinyel, Z., Metcalfe, W., ... & Bourque, G., Journal of Engineering for Gas Turbines and Power, 133(9) (2011).



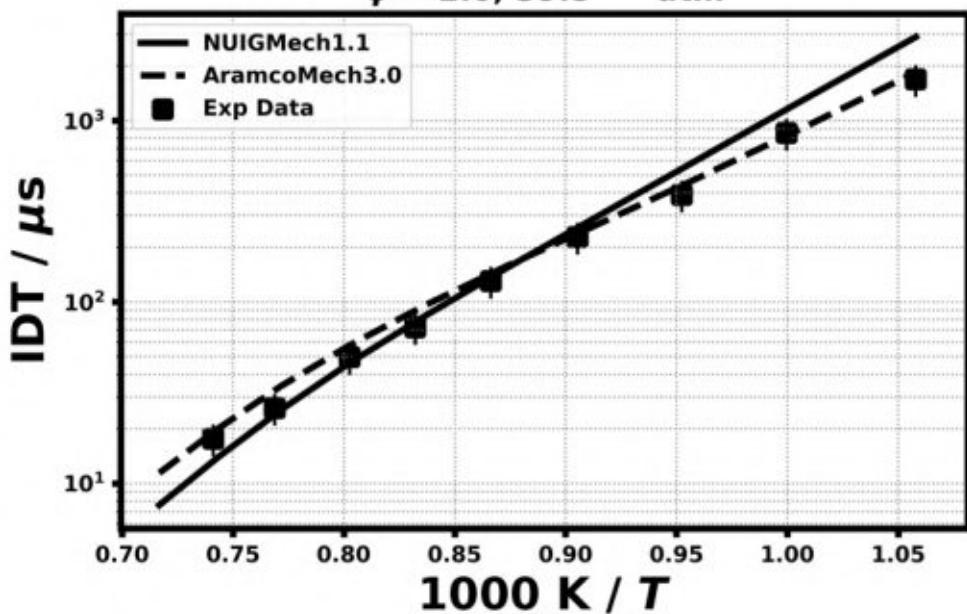
6. Validation for C₂H₄

Shock tube ignition delay time

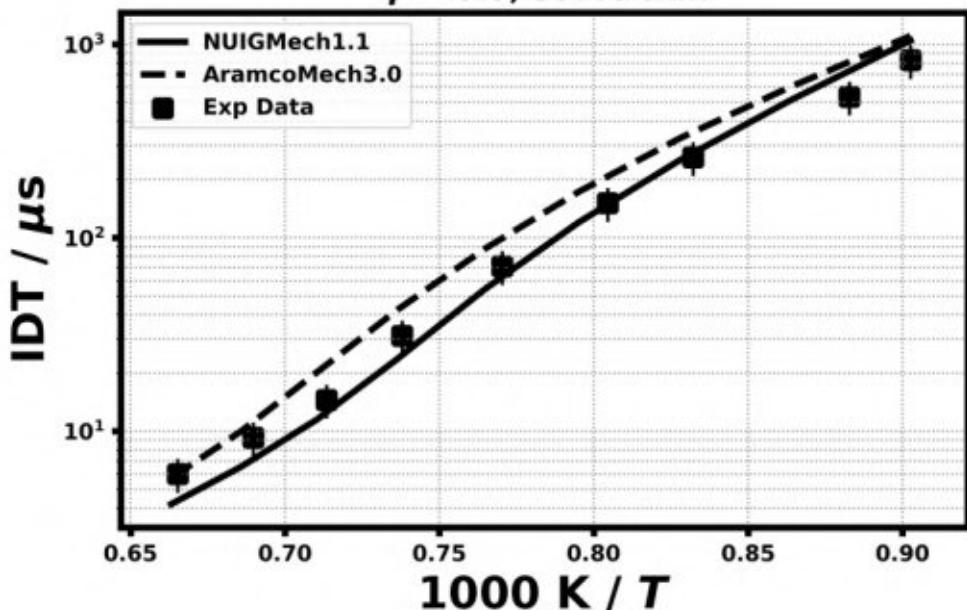
6.1) Baigmohammadi, M., Patel, V., Martinez, S., Panigrahy, S., Ramalingam, A., Burke, U., ... & Curran, H. J., Energy & Fuels, 34(3) (2020) 3755-3771.



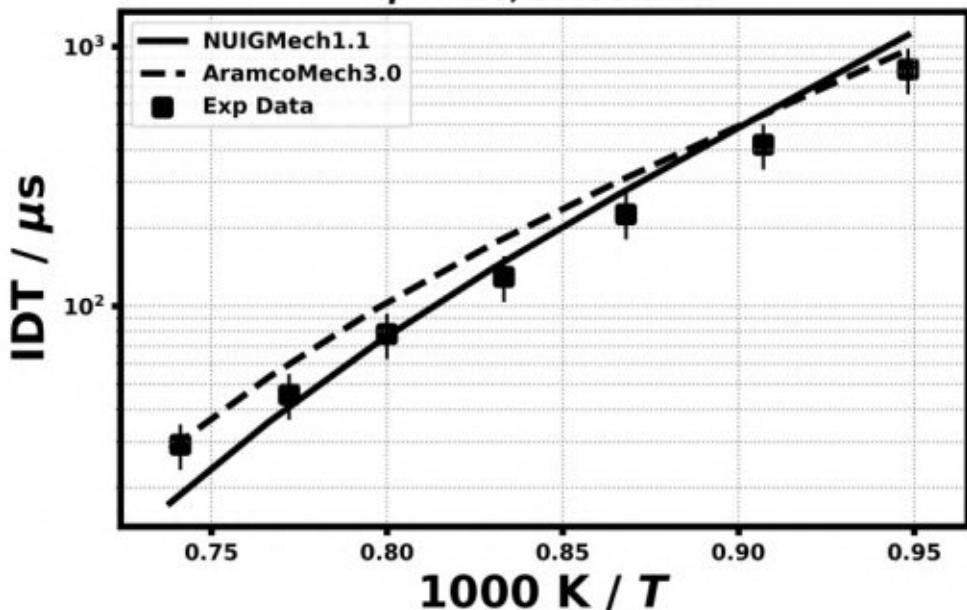
10.0% C₂H₄
15.0% O₂, 75.0% N₂
 $\phi = 2.0, 39.5$ atm



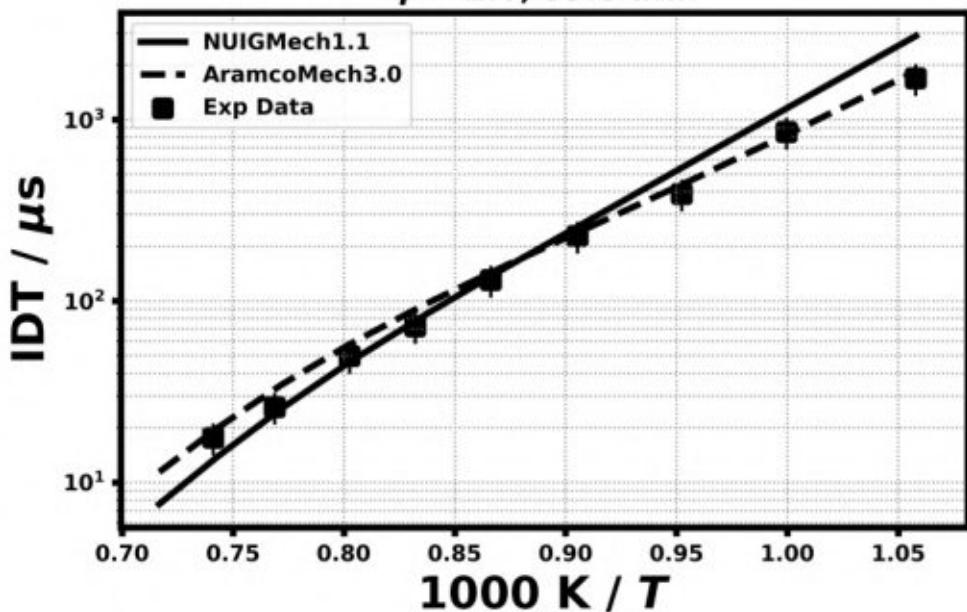
1.43% C₂H₄
8.57% O₂, 75.0% N₂, 15.0% Ar
 $\phi = 0.5, 39.46$ atm



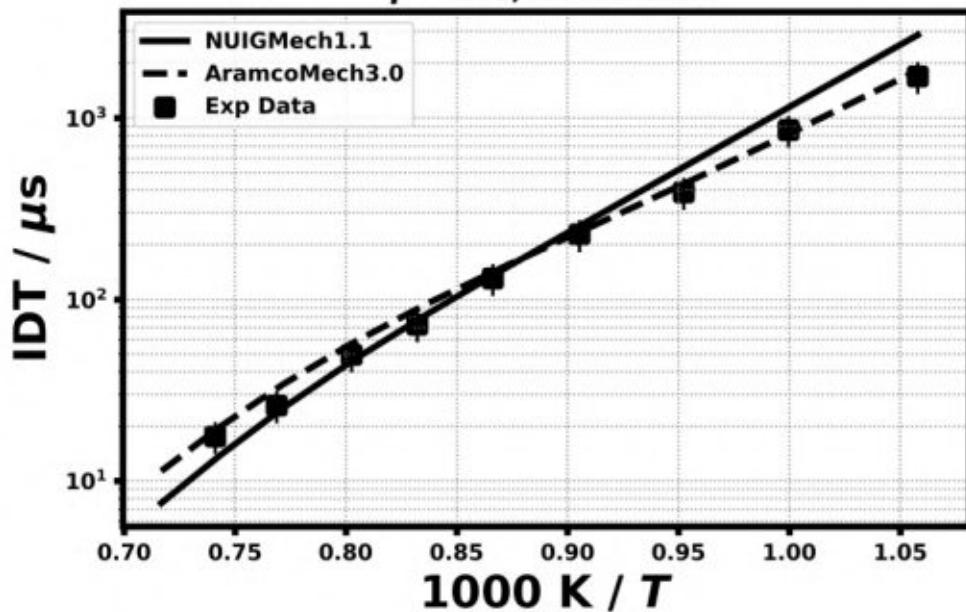
$3.75\% \text{ C}_2\text{H}_4$
 $11.25\% \text{ O}_2, 75.0\% \text{ N}_2, 10.0\% \text{ Ar}$
 $\phi = 1.0, 39.55 \text{ atm}$



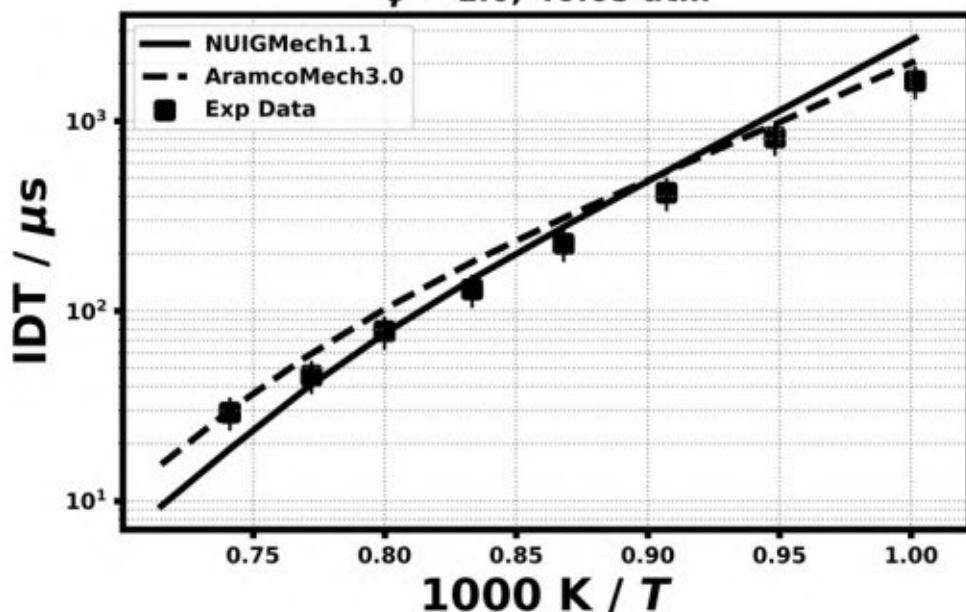
$10.0\% \text{ C}_2\text{H}_4$
 $15.0\% \text{ O}_2, 75.0\% \text{ N}_2$
 $\phi = 2.0, 39.5 \text{ atm}$



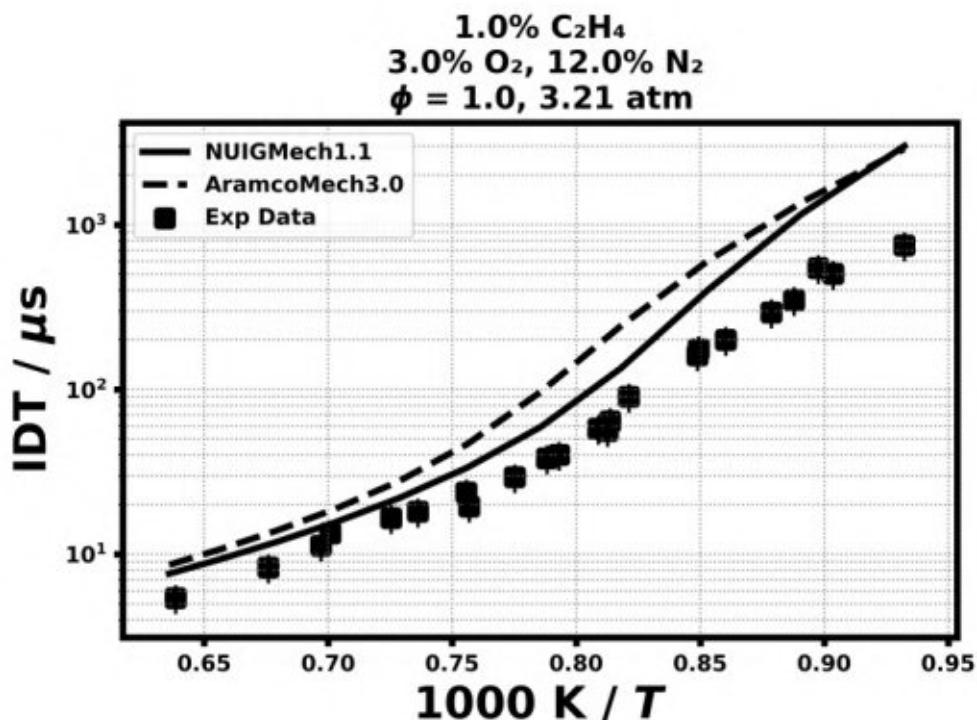
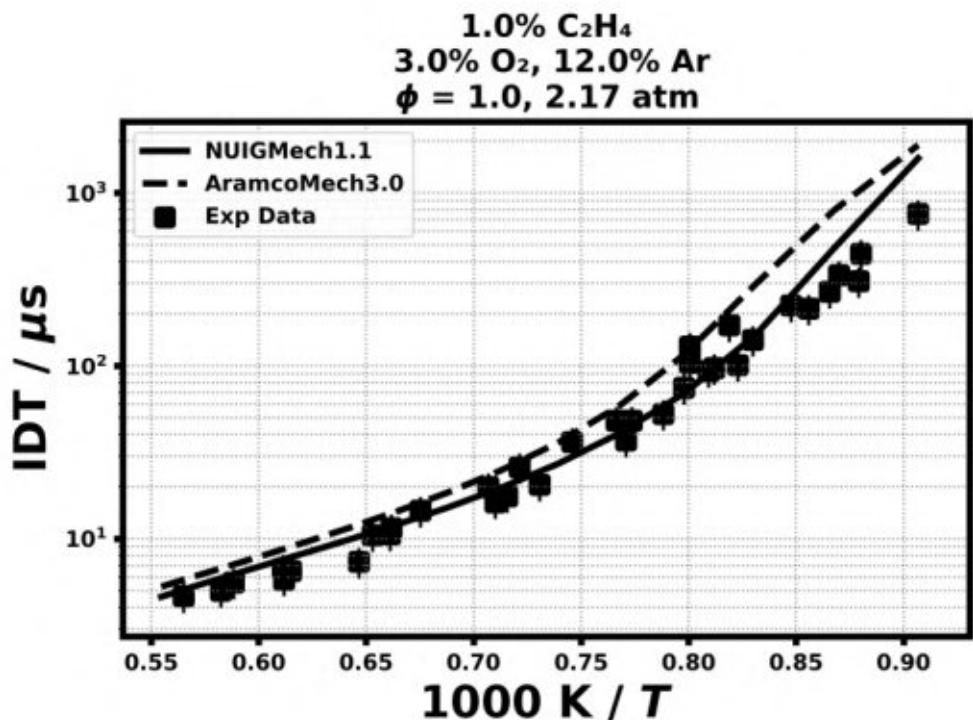
10.0% C₂H₄
15.0% O₂, 75.0% N₂
 $\phi = 2.0, 40.02 \text{ atm}$

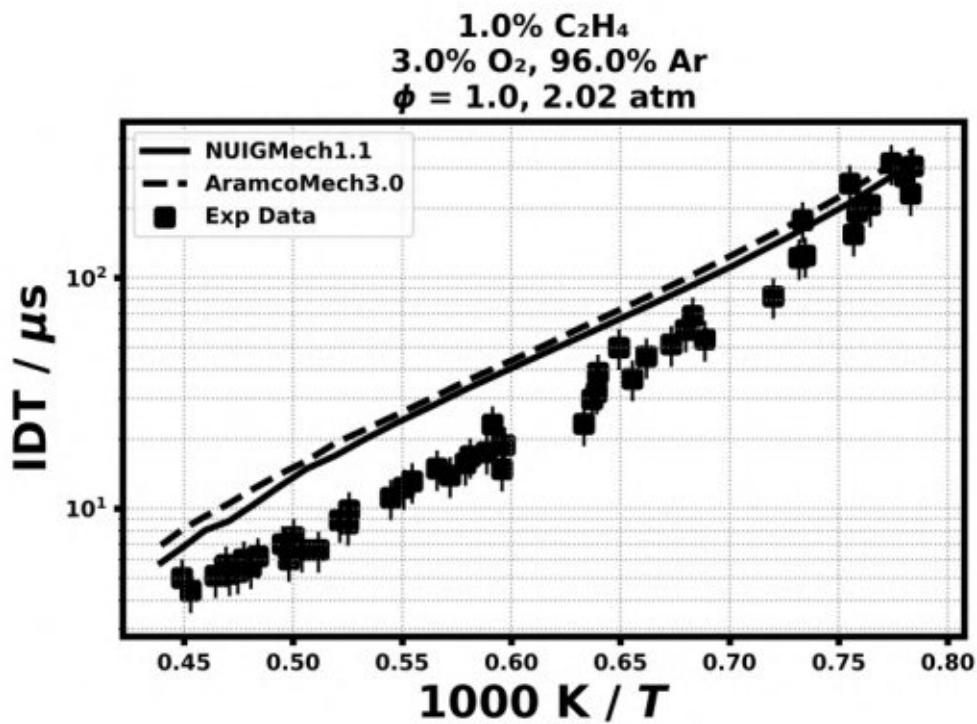


3.75% C₂H₄
11.25% O₂, 75.0% N₂, 10.0% Ar
 $\phi = 1.0, 40.05 \text{ atm}$

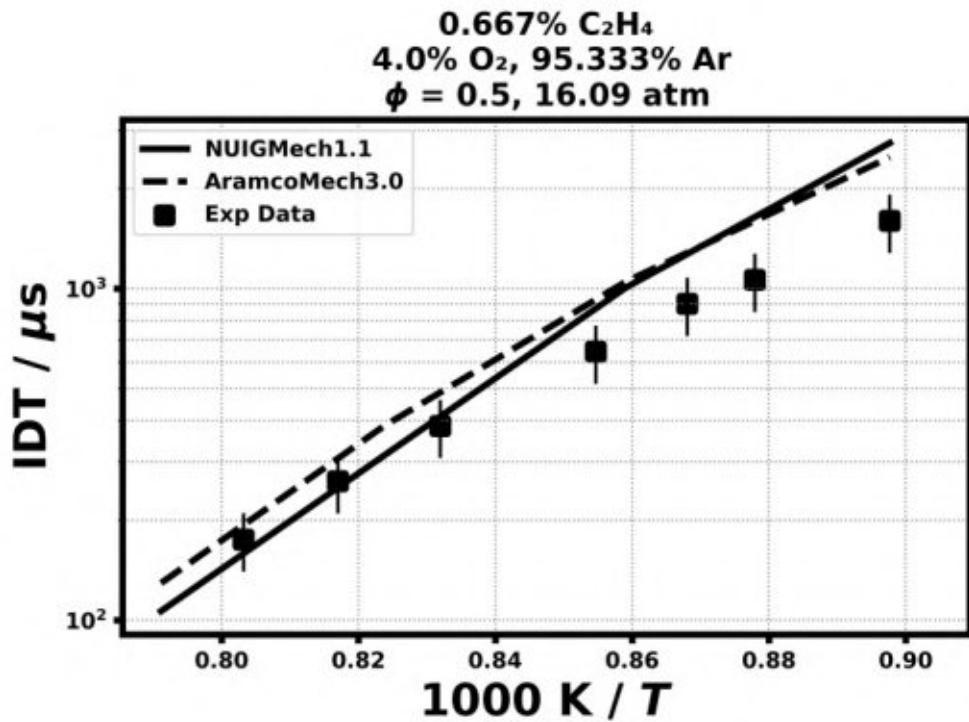


6.2) Brown, C. J., & Thomas, G. O., Combustion and Flame, 117(4) (1999) 861-870.

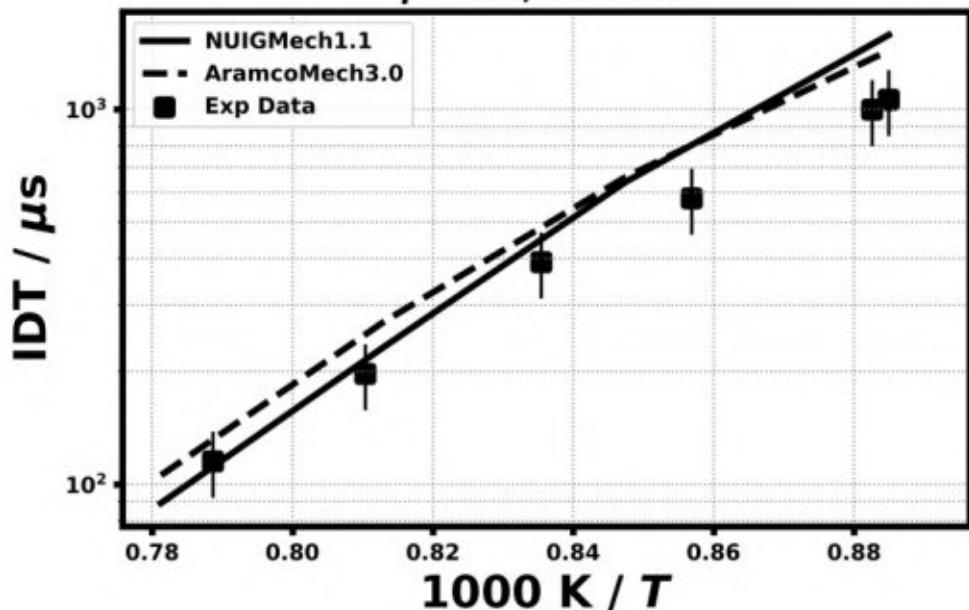




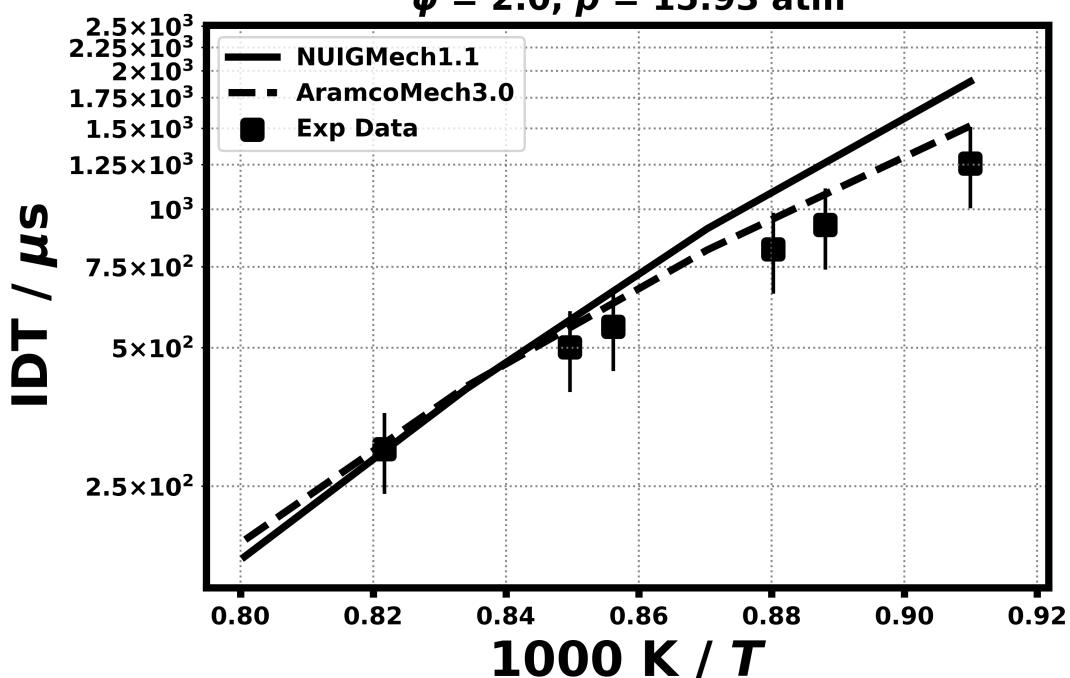
6.3) D.F.Davidson et al., 50th AIAA Aerospace Sciences Meeting, January 2012

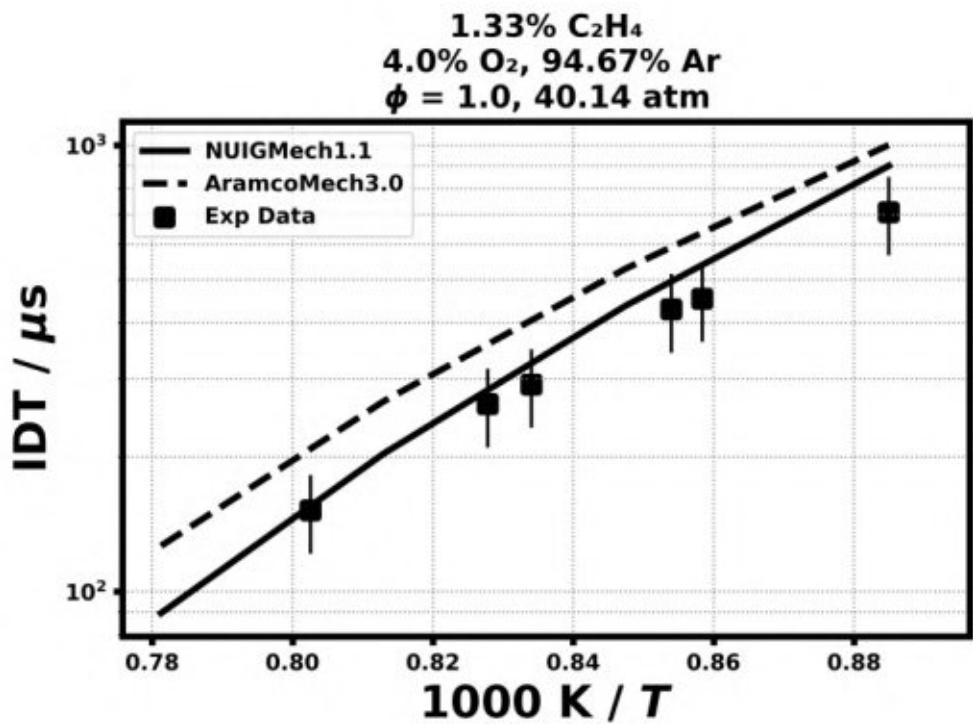


$1.33\% \text{ C}_2\text{H}_4$
 $4.0\% \text{ O}_2, 94.67\% \text{ Ar}$
 $\phi = 1.0, 16.0 \text{ atm}$

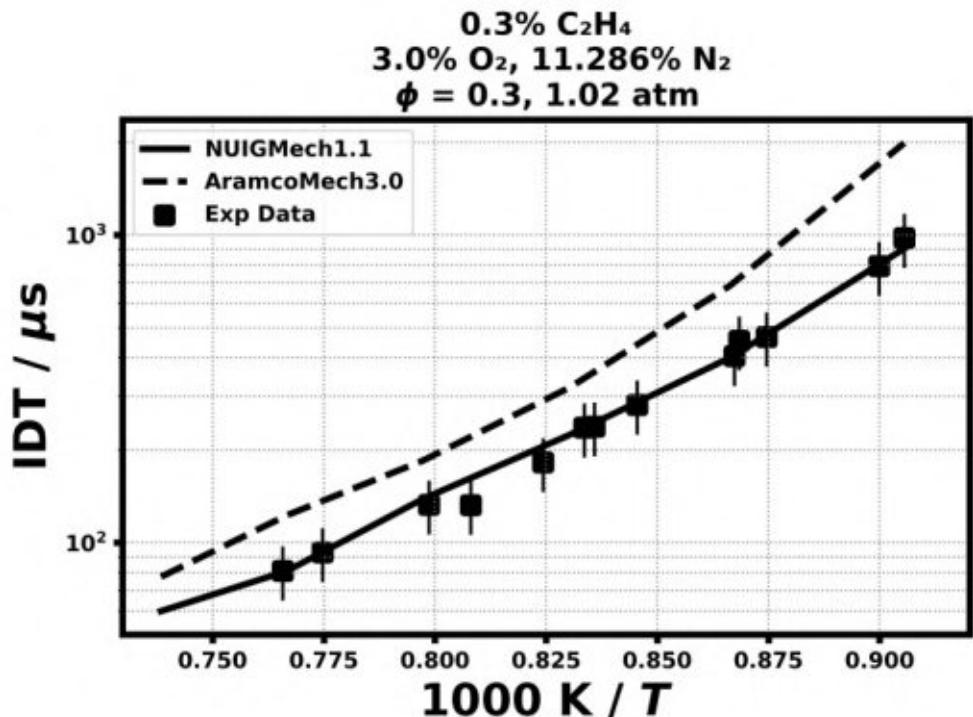


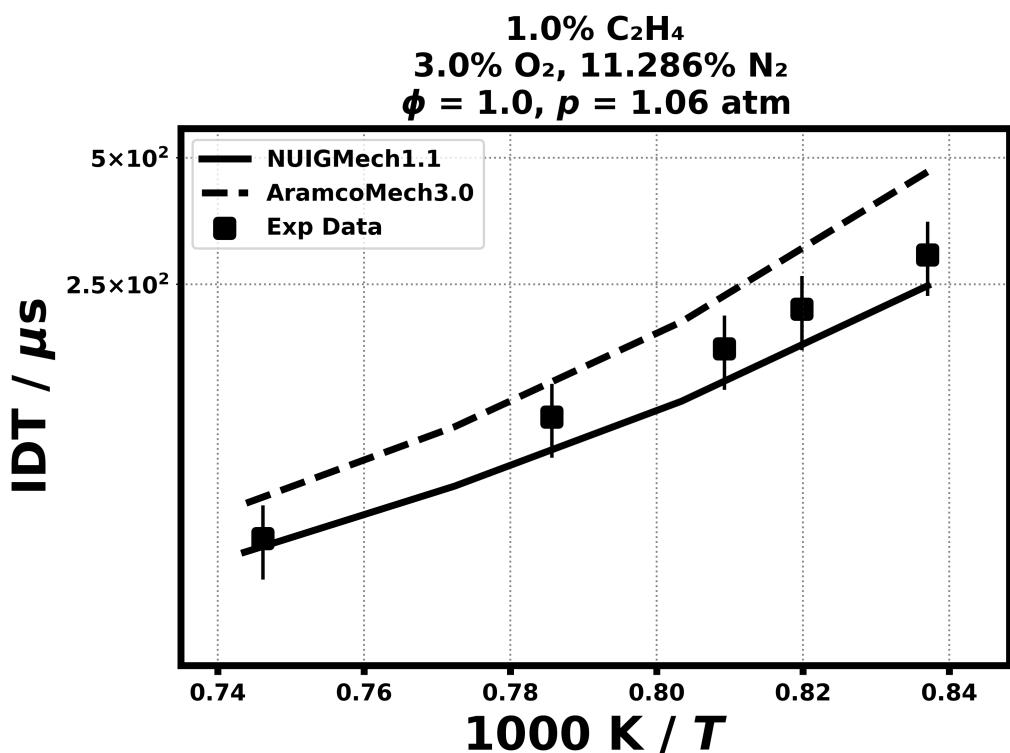
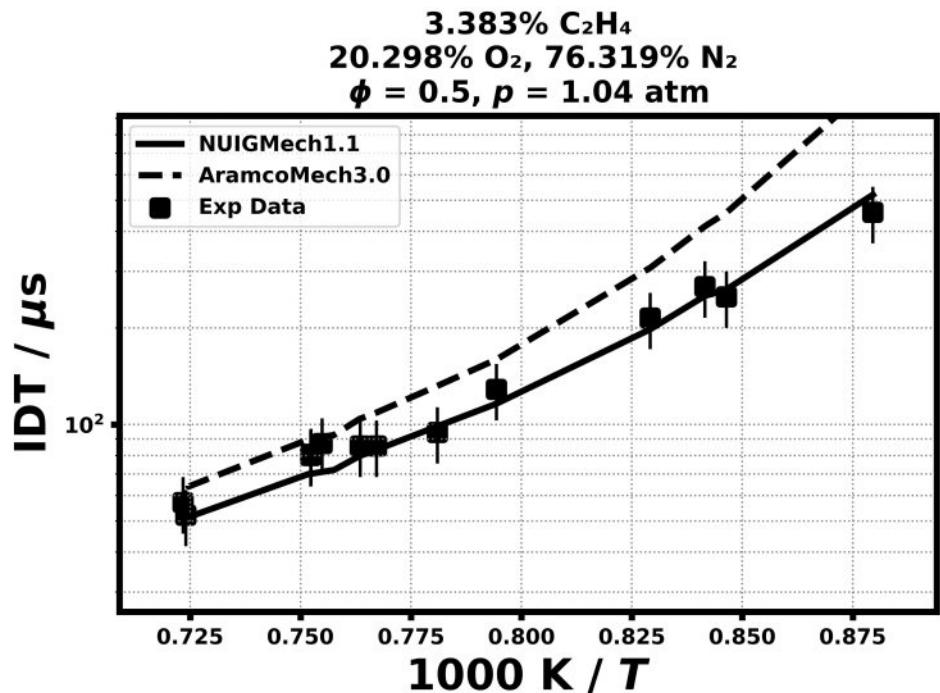
$2.667\% \text{ C}_2\text{H}_4$
 $4.0\% \text{ O}_2, 93.333\% \text{ Ar}$
 $\phi = 2.0, p = 15.93 \text{ atm}$

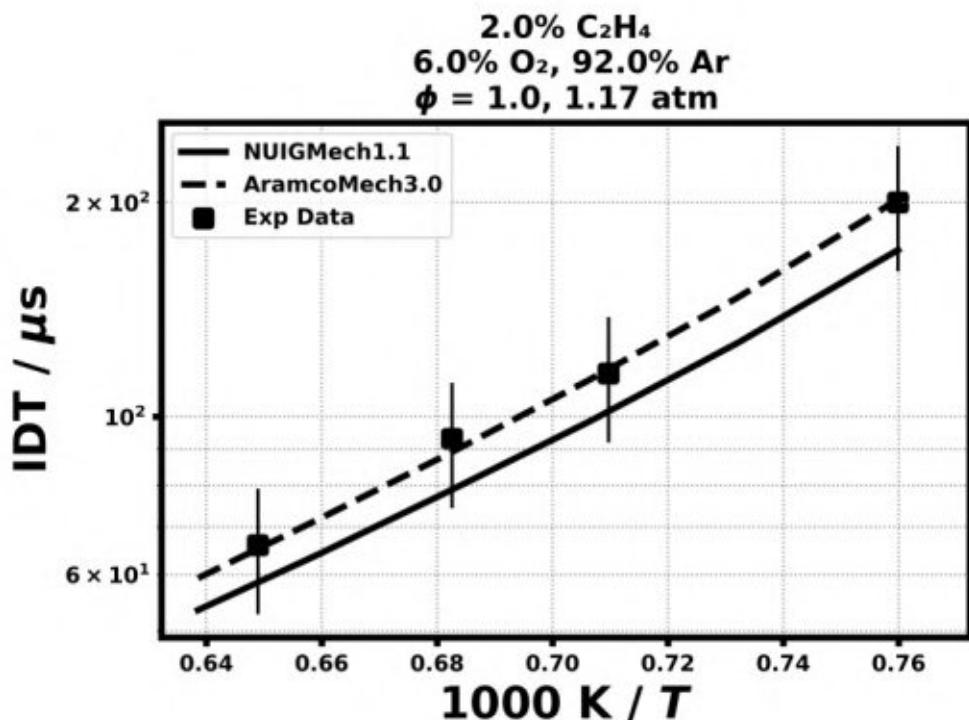
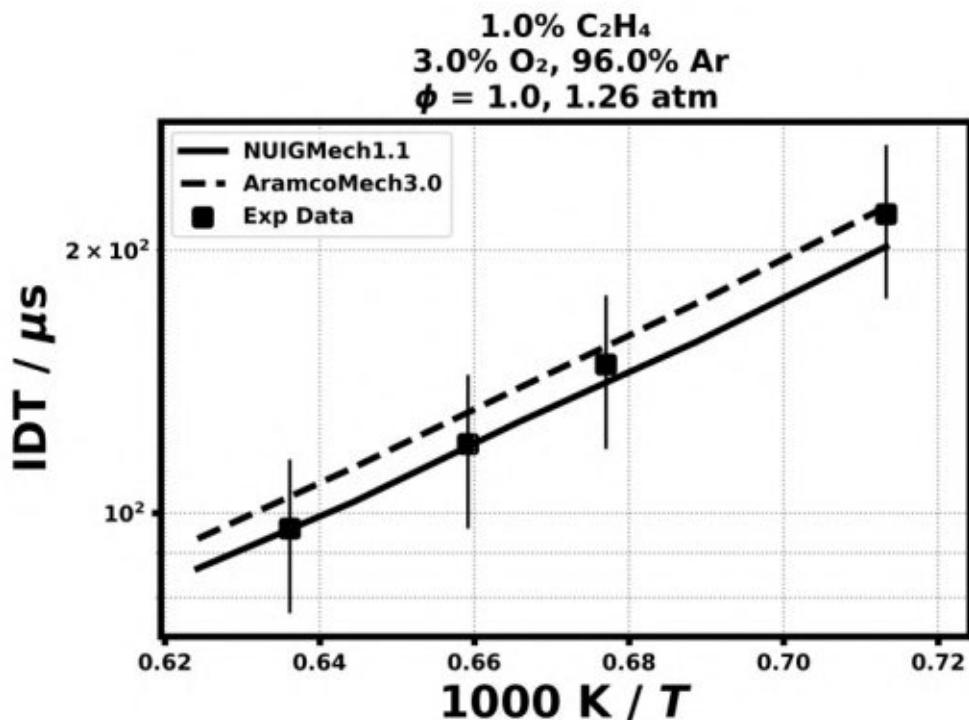


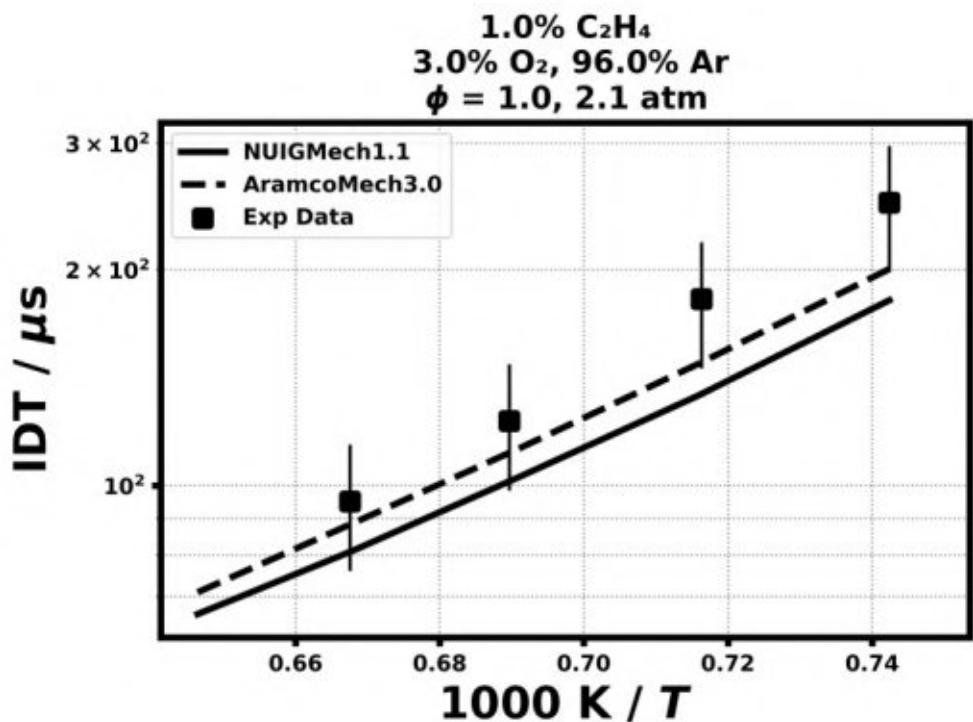
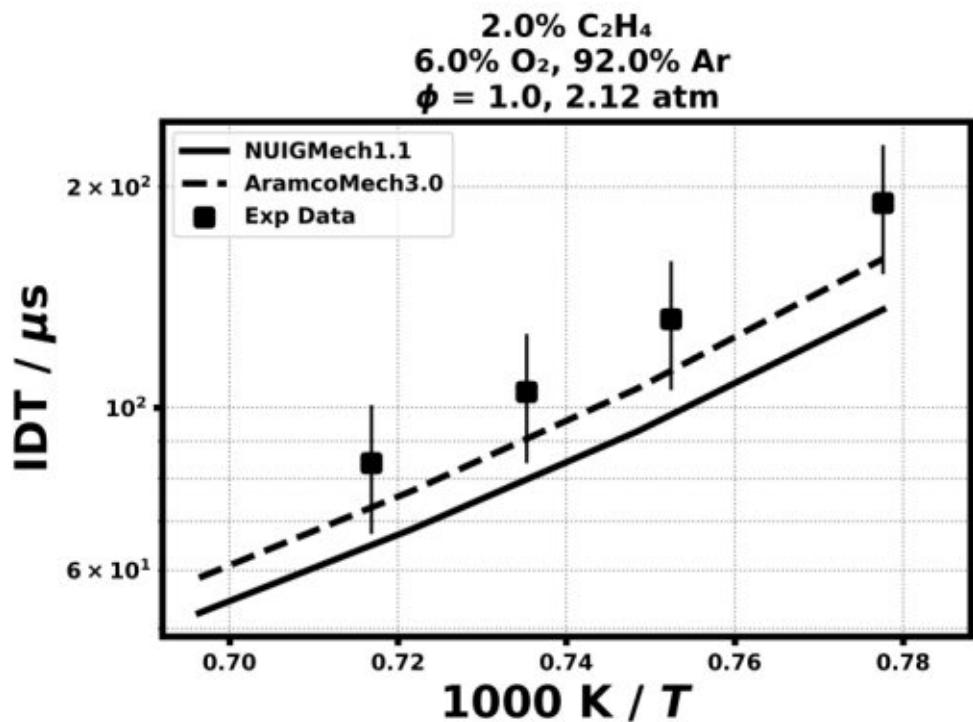


6.4) F.R. Gillespie et al., Phd Thesis, National Univ. Ire. Galway, 2010

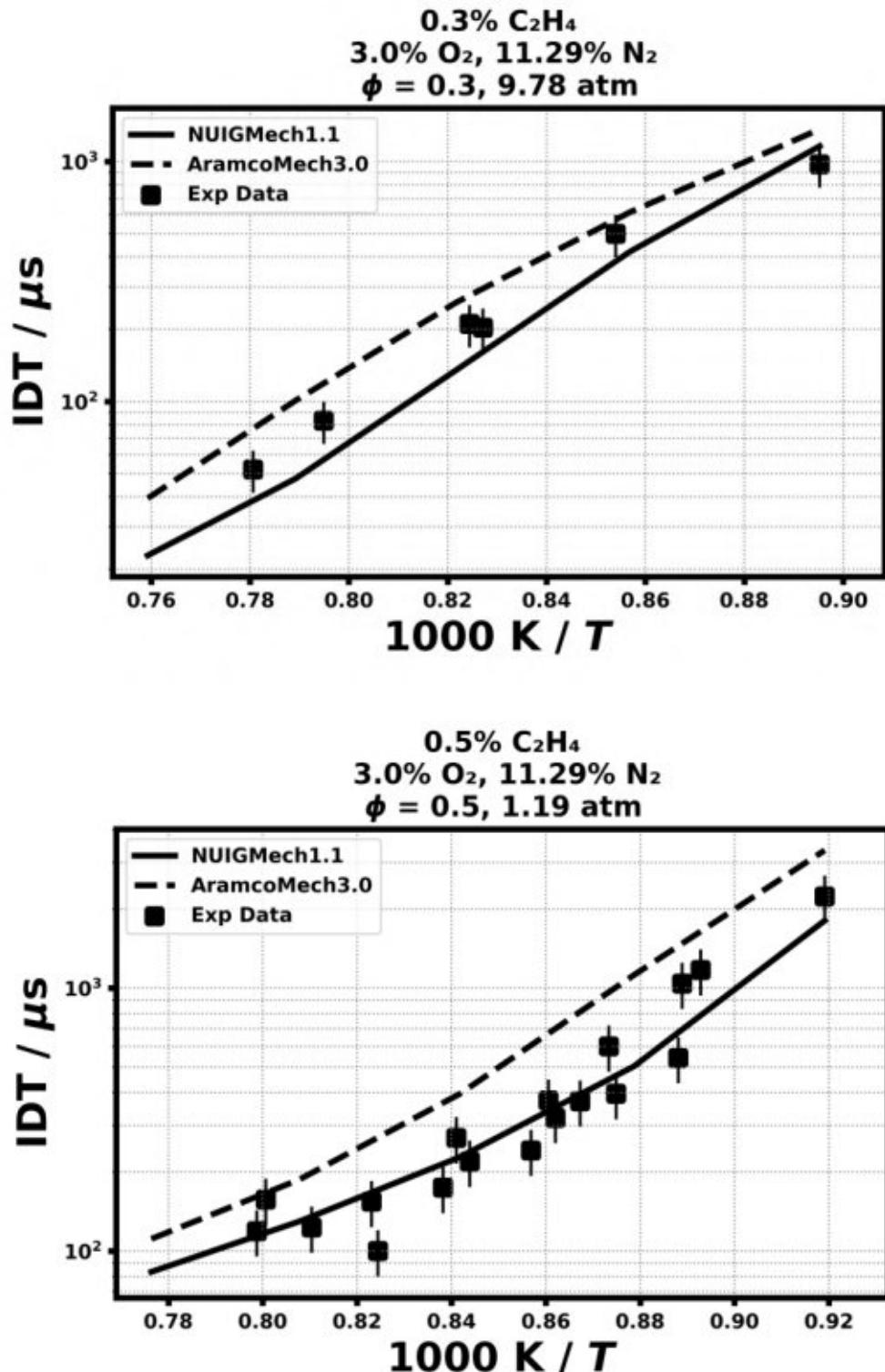




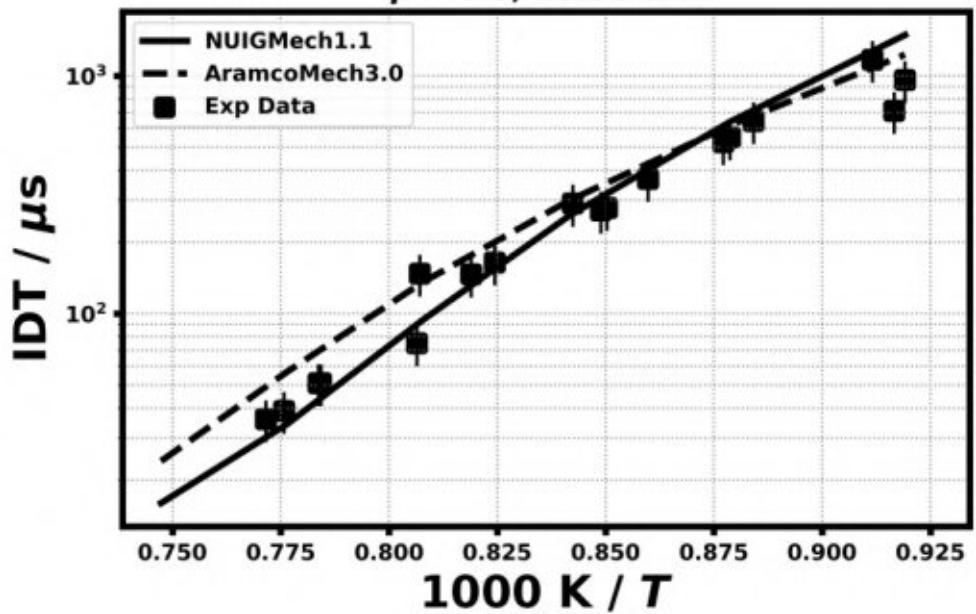




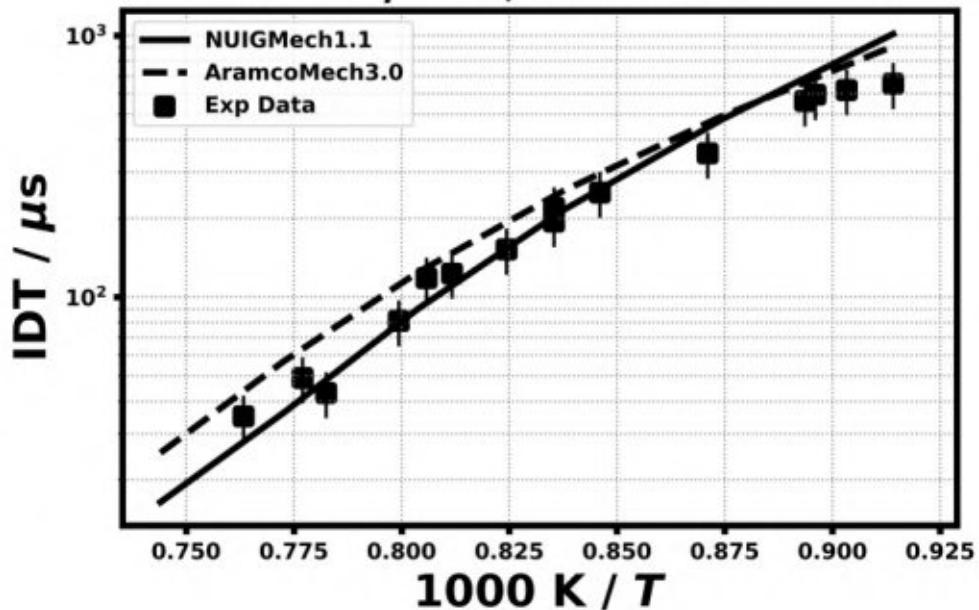
6.6) Kopp, M. M., Donato, N. S., Petersen, E. L., Metcalfe, W. K., Burke, S. M., & Curran, H. J. Journal of Propulsion and Power, 30(3) (2014) 790-798.



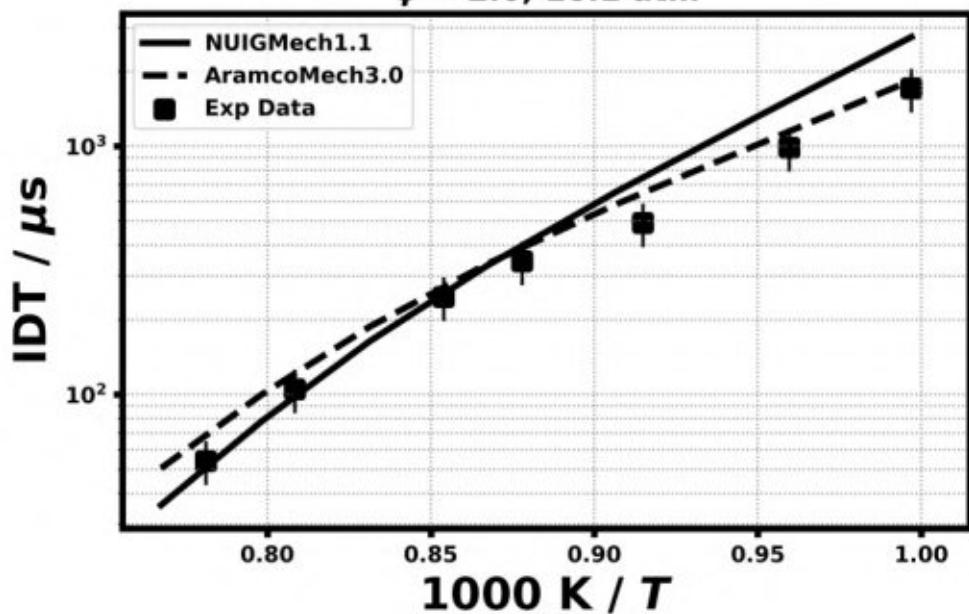
0.5% C₂H₄
3.0% O₂, 11.29% N₂
 $\phi = 0.5, 10.93 \text{ atm}$



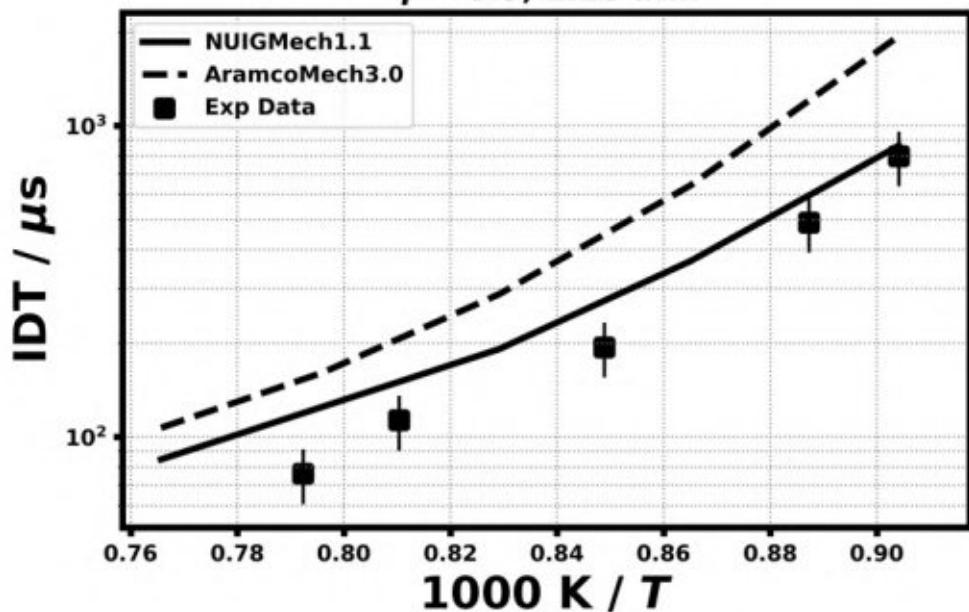
1.0% C₂H₄
3.0% O₂, 11.29% N₂
 $\phi = 1.0, 10.27 \text{ atm}$



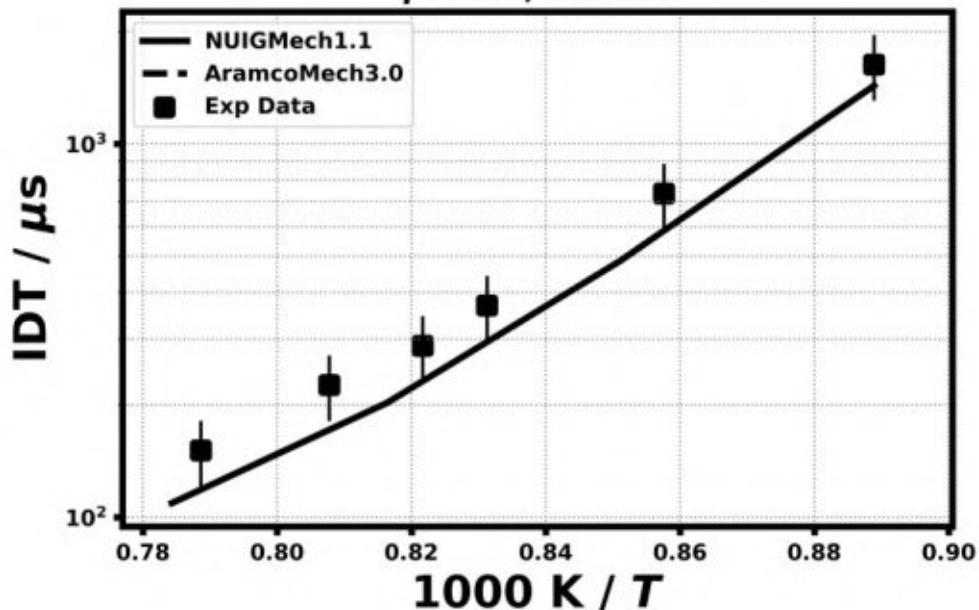
$2.0\% \text{C}_2\text{H}_4$
 $3.0\% \text{O}_2, 11.29\% \text{N}_2$
 $\phi = 2.0, 10.1 \text{ atm}$



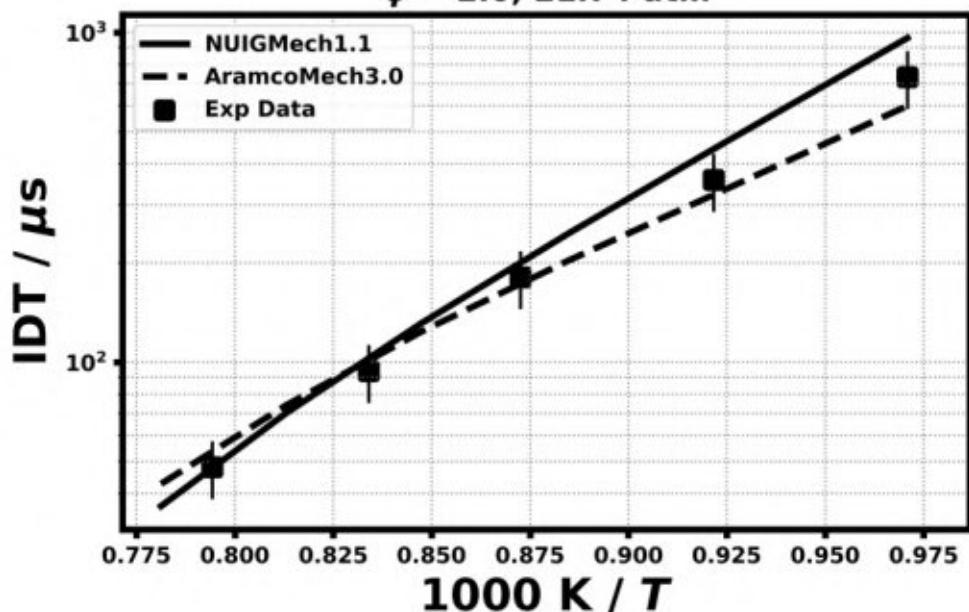
$0.3\% \text{C}_2\text{H}_4$
 $3.0\% \text{O}_2, 11.29\% \text{N}_2$
 $\phi = 0.3, 1.18 \text{ atm}$



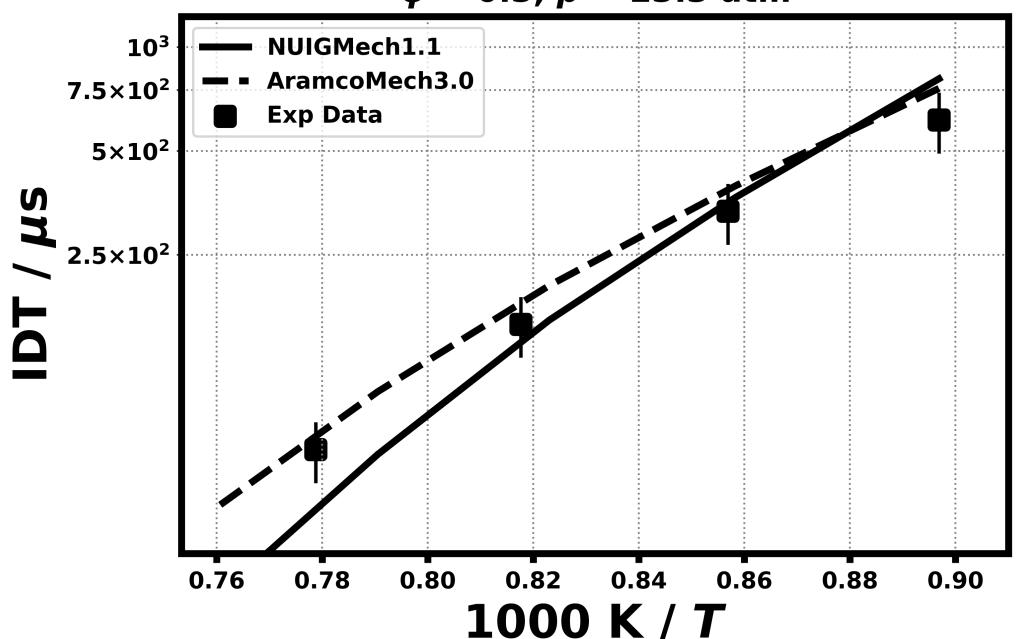
12.285% C₂H₄
18.428% O₂, 69.287% N₂
 $\phi = 2.0, 1.1 \text{ atm}$



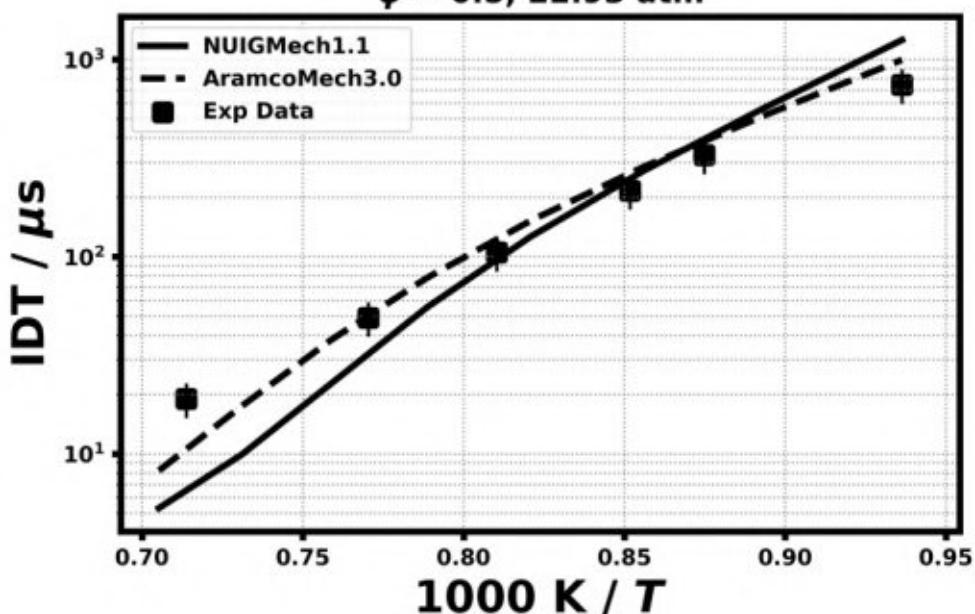
2.0% C₂H₄
3.0% O₂, 11.29% N₂
 $\phi = 2.0, 21.74 \text{ atm}$



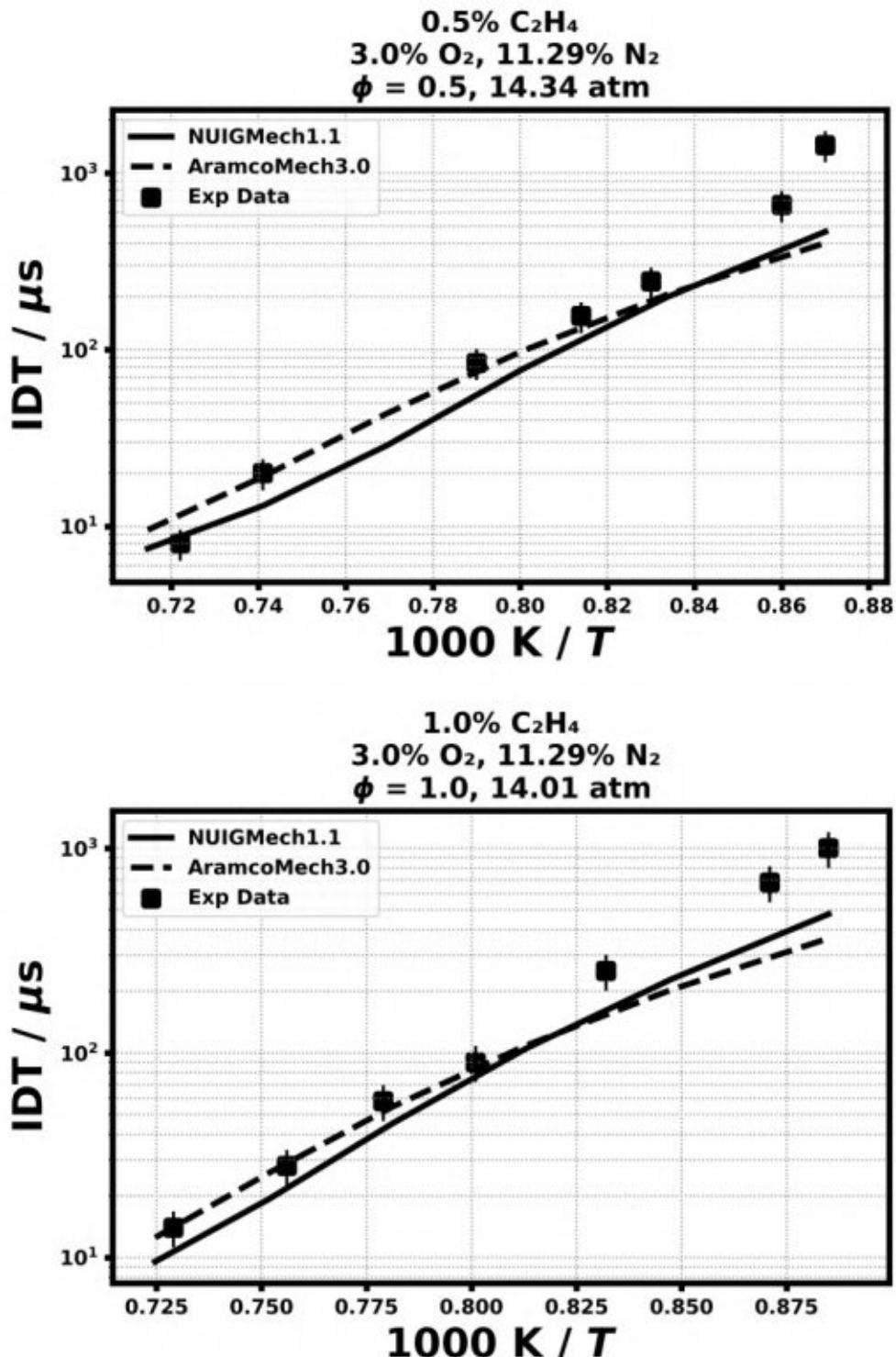
$0.3\% \text{ C}_2\text{H}_4$
 $3.0\% \text{ O}_2, 11.29\% \text{ N}_2$
 $\phi = 0.3, p = 23.3 \text{ atm}$

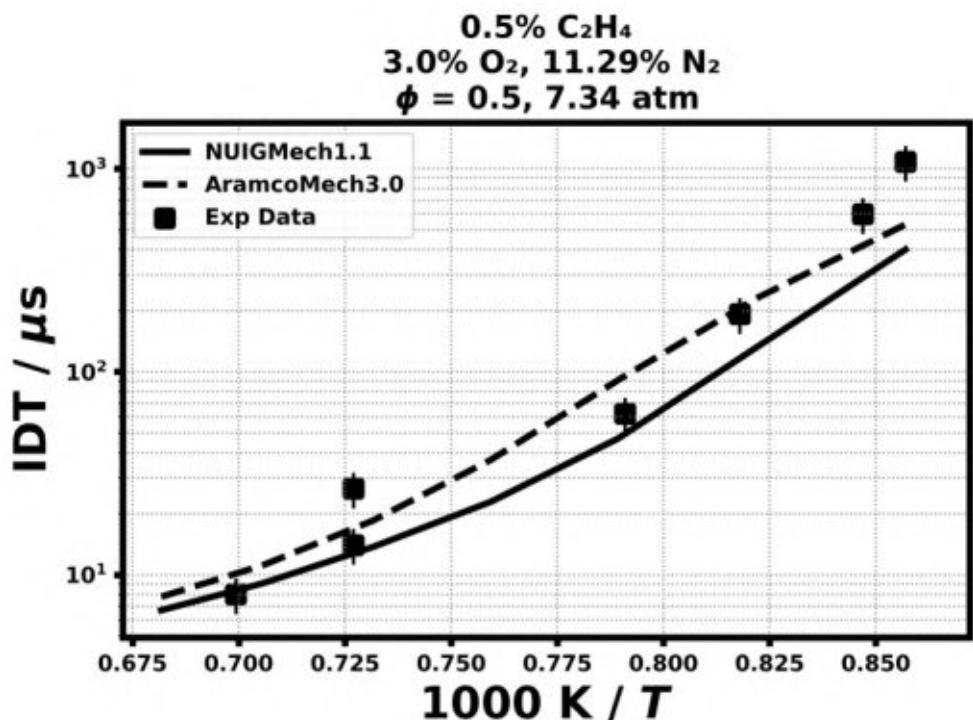
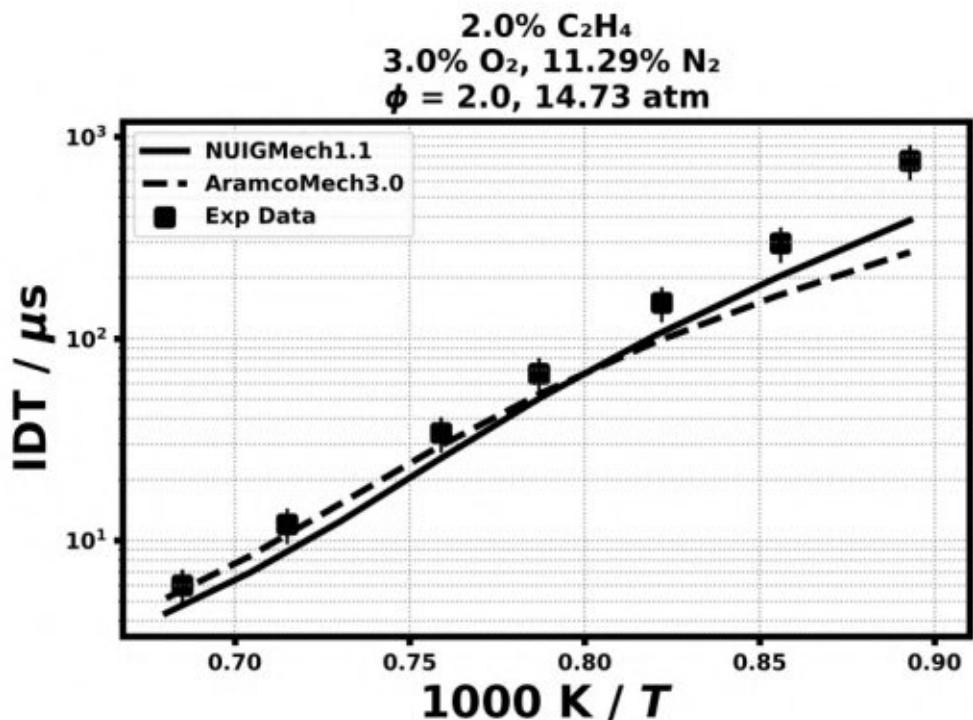


$3.383\% \text{ C}_2\text{H}_4$
 $20.298\% \text{ O}_2, 76.319\% \text{ N}_2$
 $\phi = 0.5, 22.93 \text{ atm}$

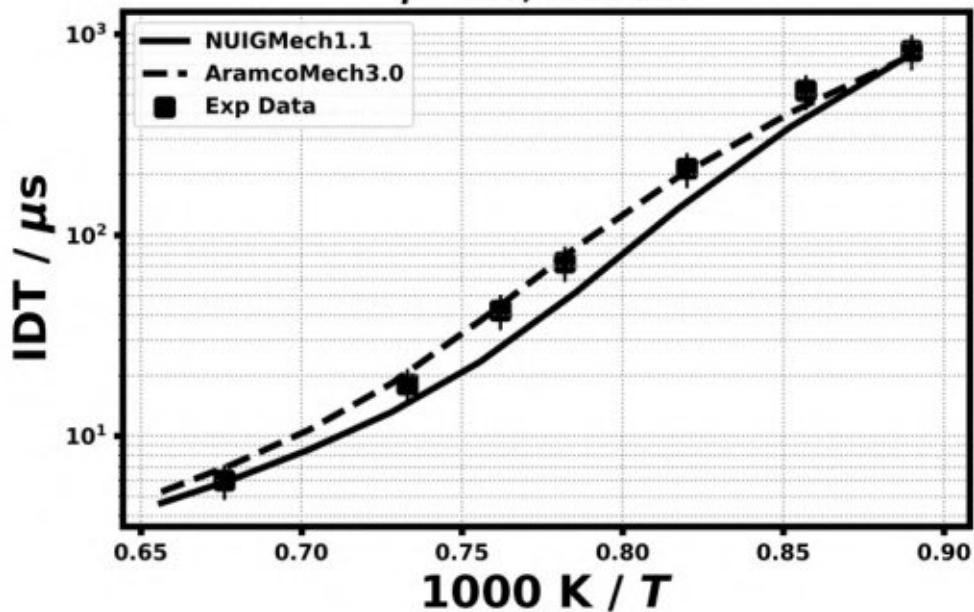


6.7) Penyazkov, O. G., Sevrouk, K. L., Tangirala, V., & Joshi, N., Proceedings of the Combustion Institute, 32(2) (2009) 2421-2428.

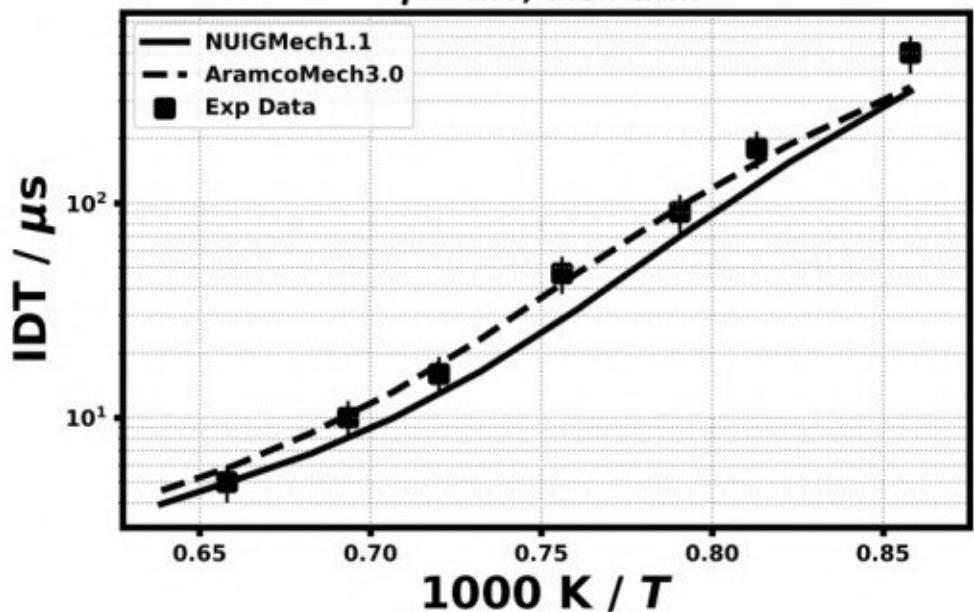




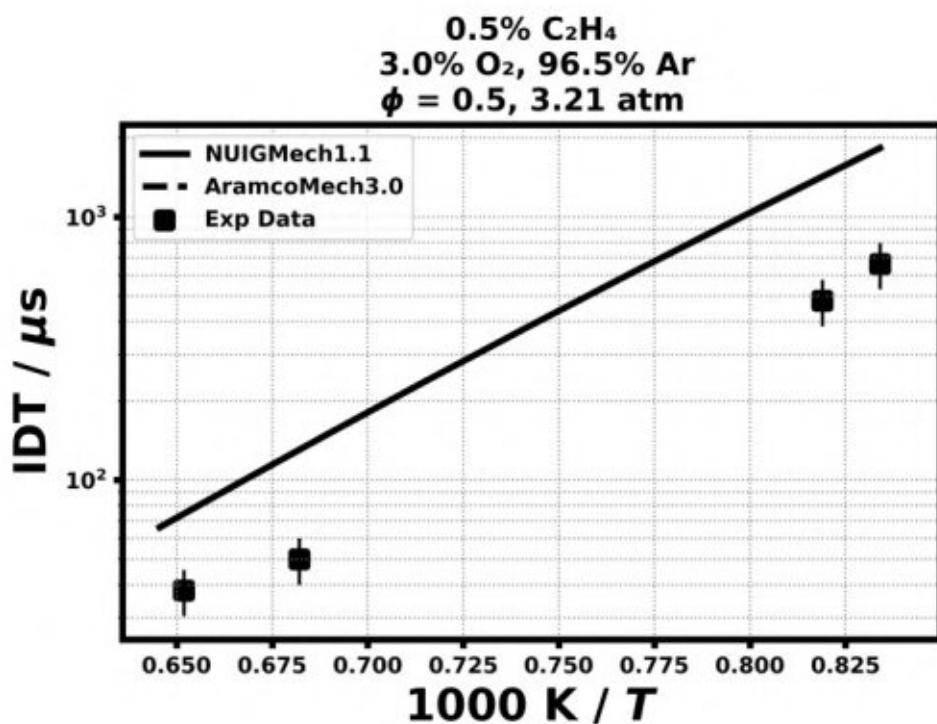
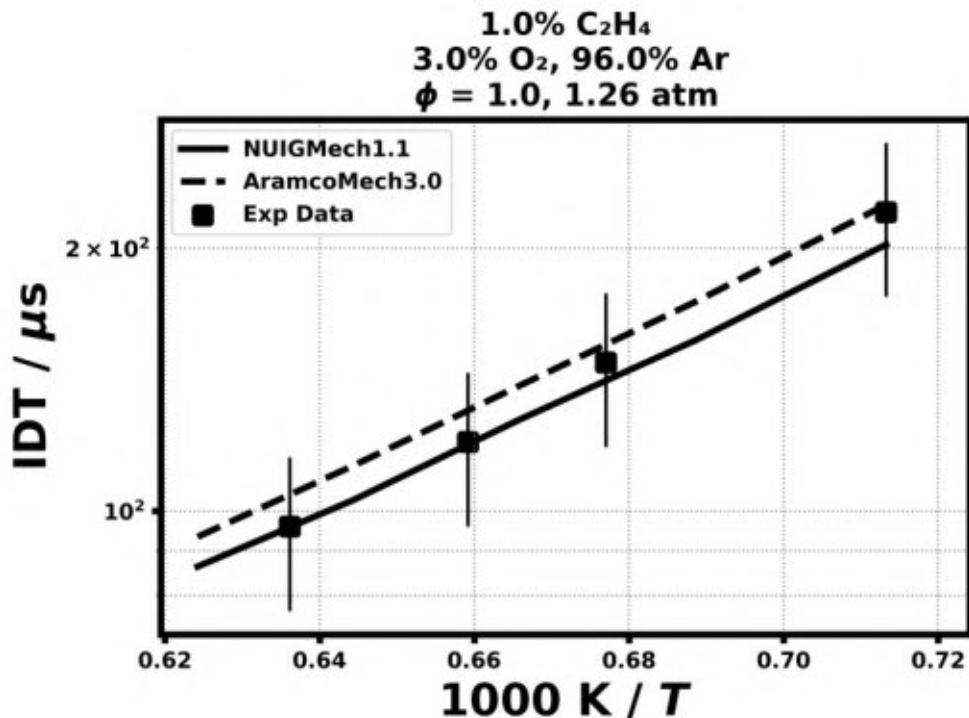
1.0% C₂H₄
3.0% O₂, 11.29% N₂
 $\phi = 1.0, 7.11 \text{ atm}$

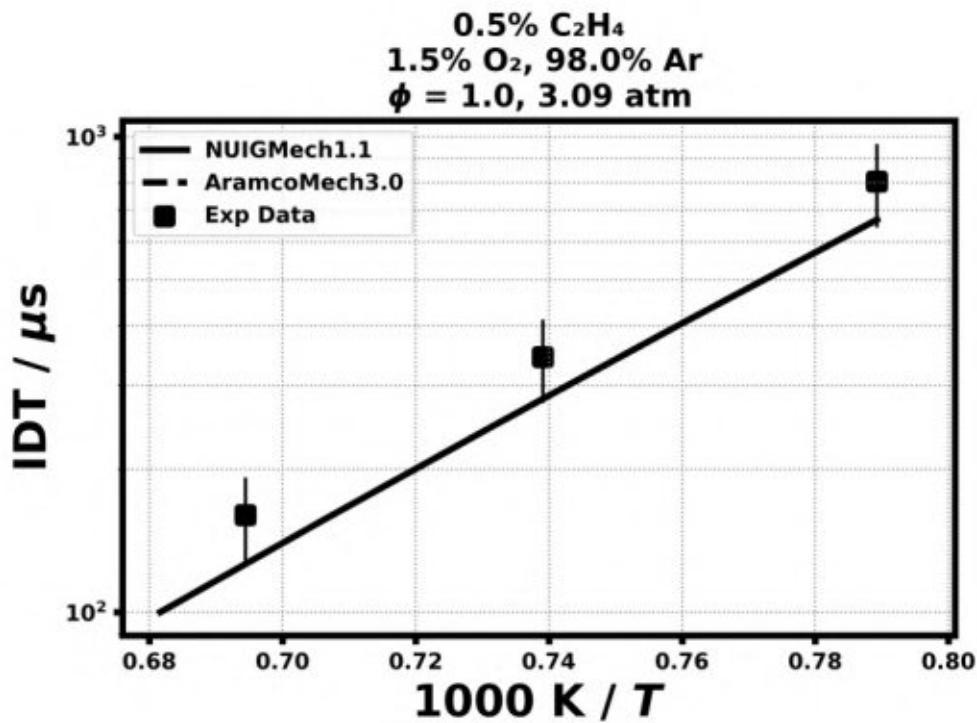


2.0% C₂H₄
3.0% O₂, 11.29% N₂
 $\phi = 2.0, 7.54 \text{ atm}$

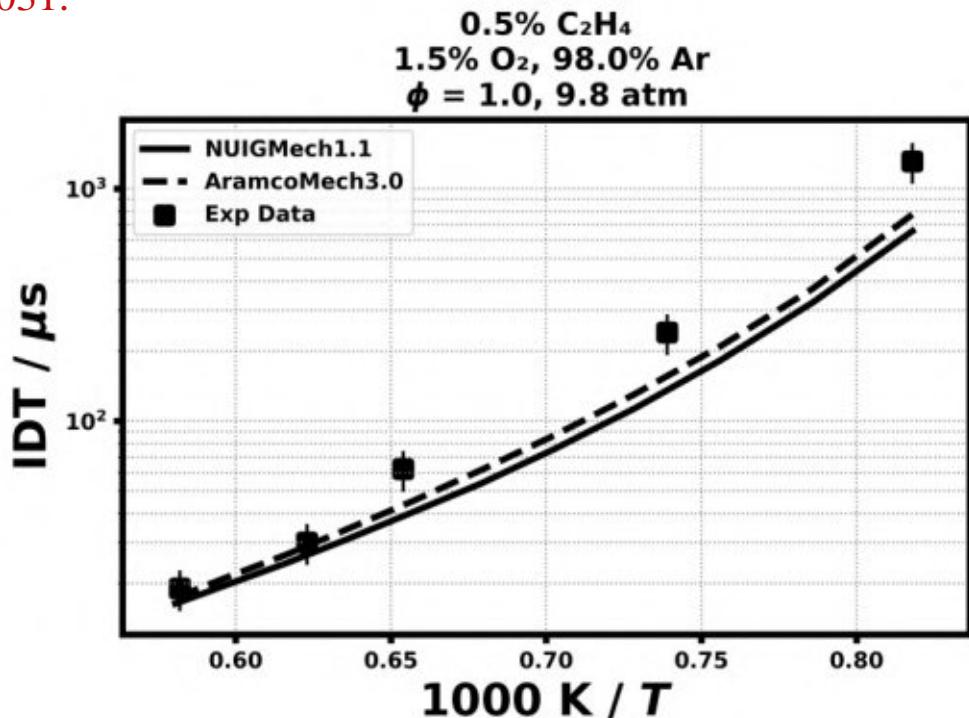


6.8) Ren, W., Davidson, D. F., & Hanson, R. K. International Journal of Chemical Kinetics, 44(6) (2012) 423-432.

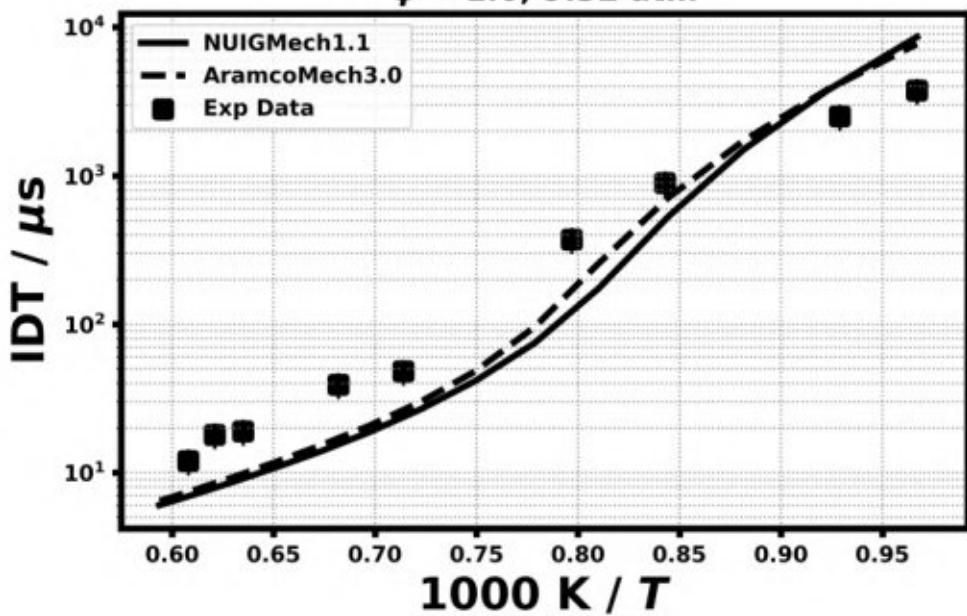




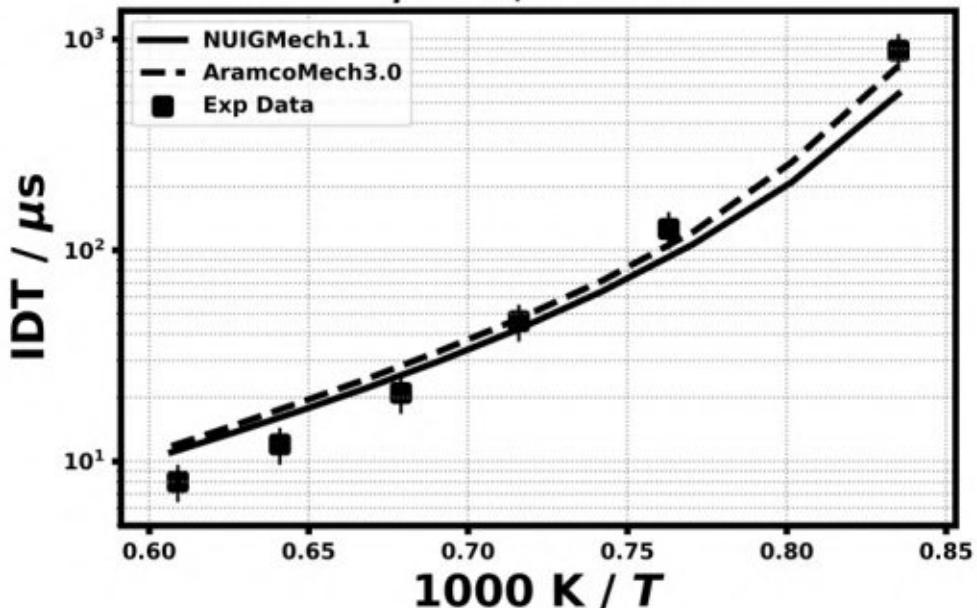
6.9) Saxena, S., Kahandawala, M. S. P., & Sidhu, S. S. Combustion and flame, 158(6) (2011) 1019-1031.



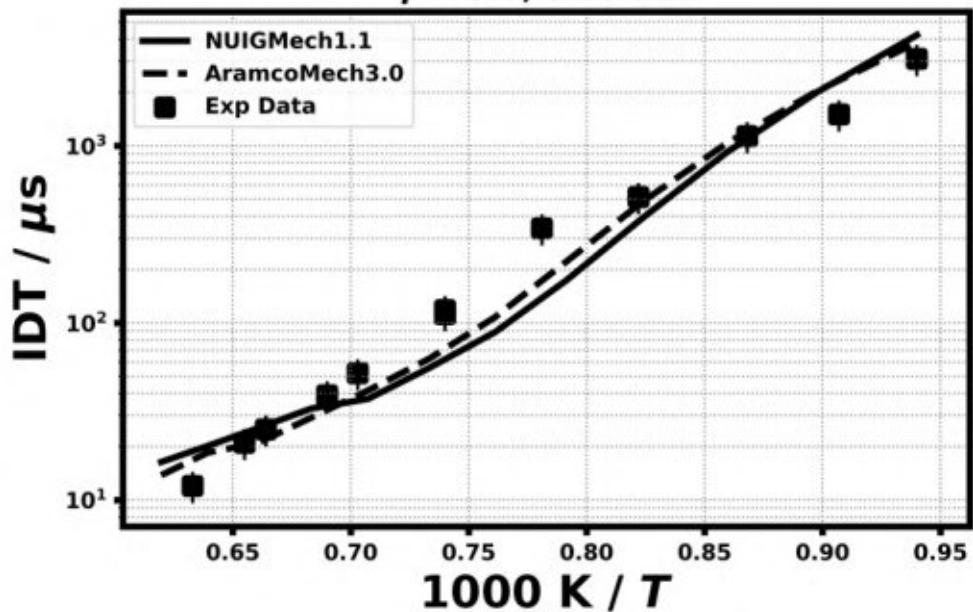
1.75% C₂H₄
5.25% O₂, 93.0% Ar
 $\phi = 1.0, 9.32 \text{ atm}$



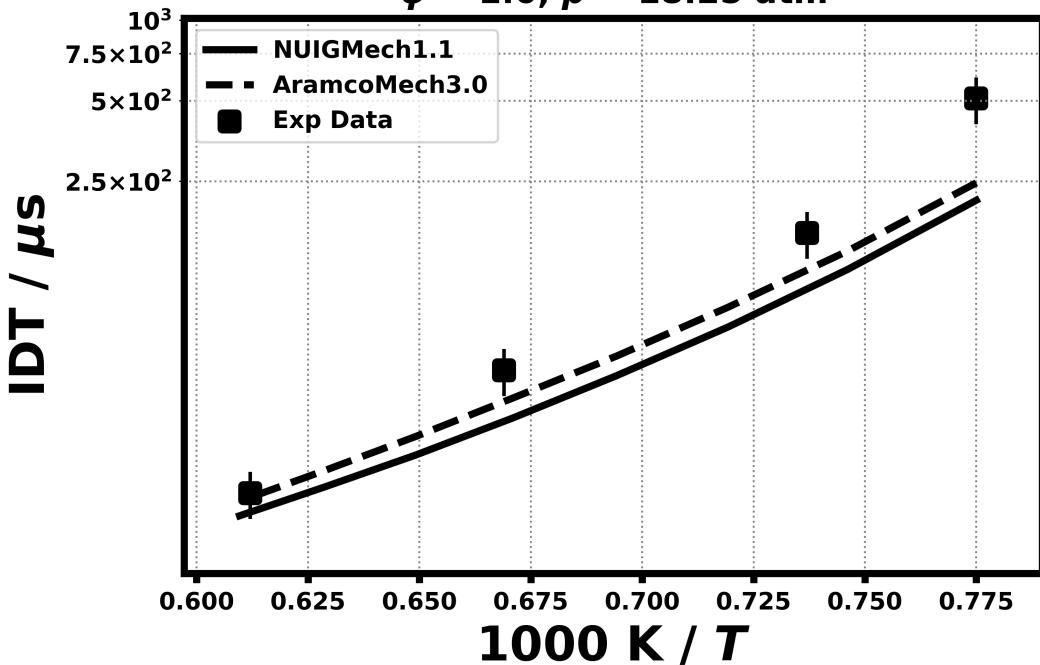
1.0% C₂H₄
3.0% O₂, 96.0% Ar
 $\phi = 1.0, 9.85 \text{ atm}$



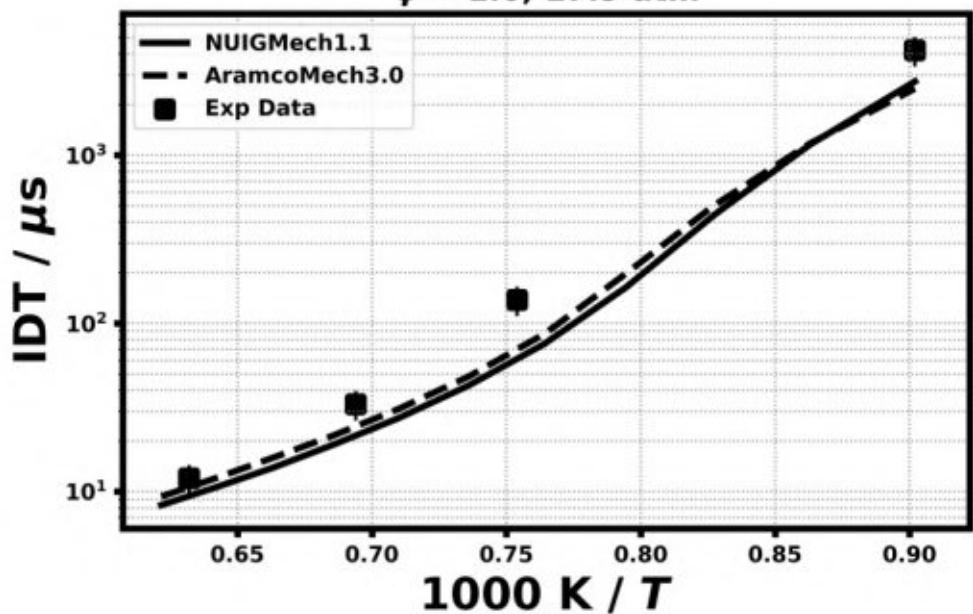
$3.5\% \text{ C}_2\text{H}_4$
 $3.5\% \text{ O}_2, 93.0\% \text{ Ar}$
 $\phi = 3.0, 9.89 \text{ atm}$



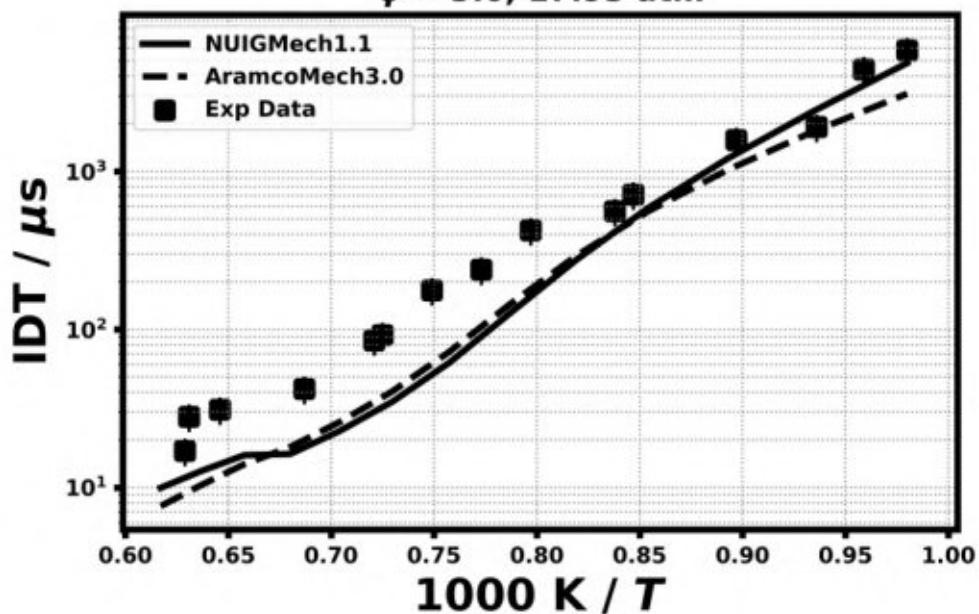
$0.5\% \text{ C}_2\text{H}_4$
 $1.5\% \text{ O}_2, 98.0\% \text{ Ar}$
 $\phi = 1.0, p = 18.25 \text{ atm}$



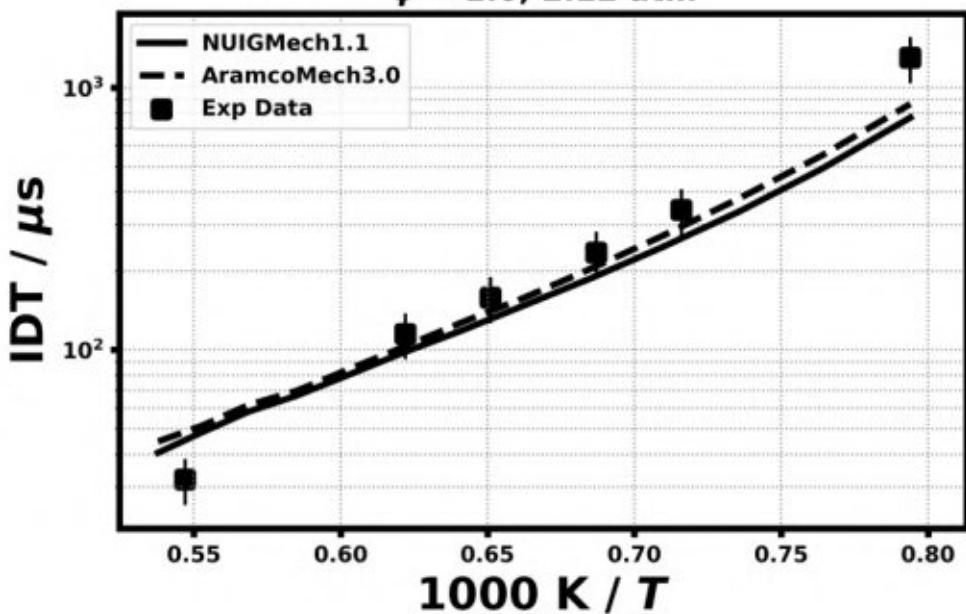
1.0% C₂H₄
3.0% O₂, 96.0% Ar
 $\phi = 1.0, 17.9 \text{ atm}$



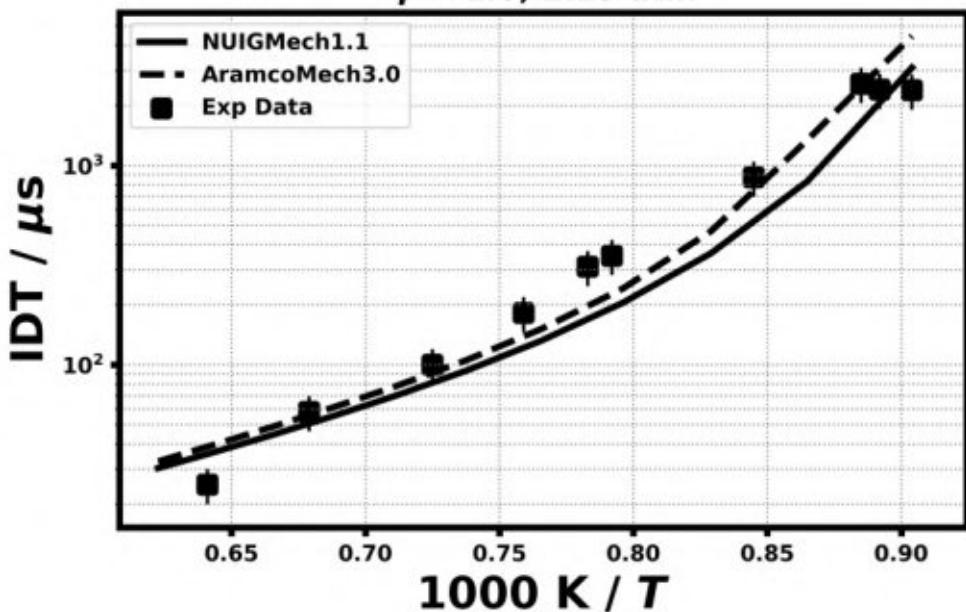
3.5% C₂H₄
3.5% O₂, 93.0% Ar
 $\phi = 3.0, 17.93 \text{ atm}$

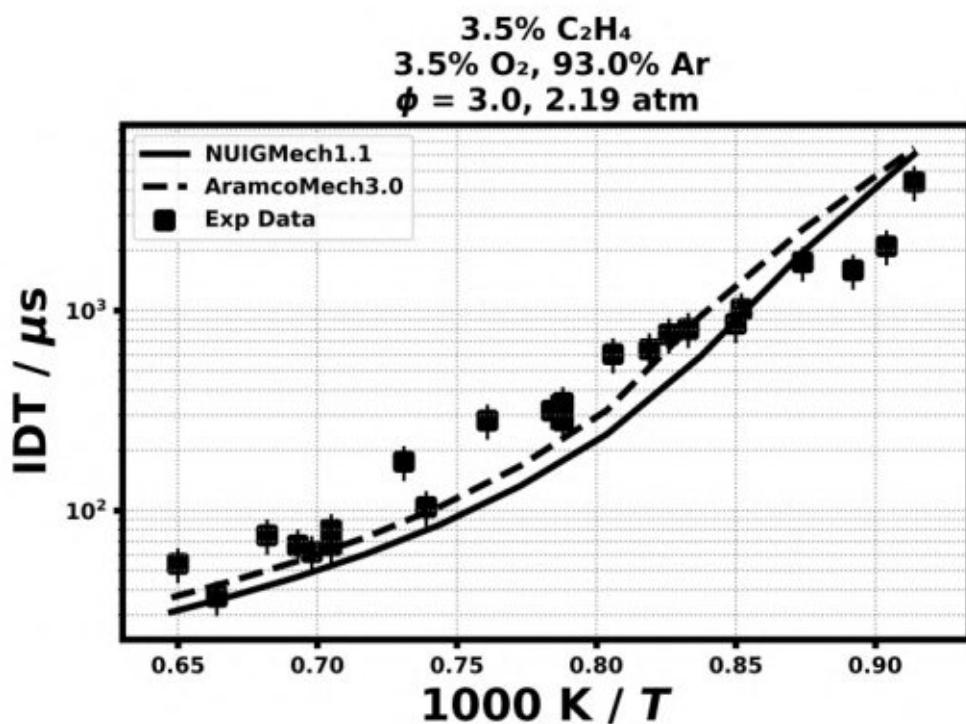
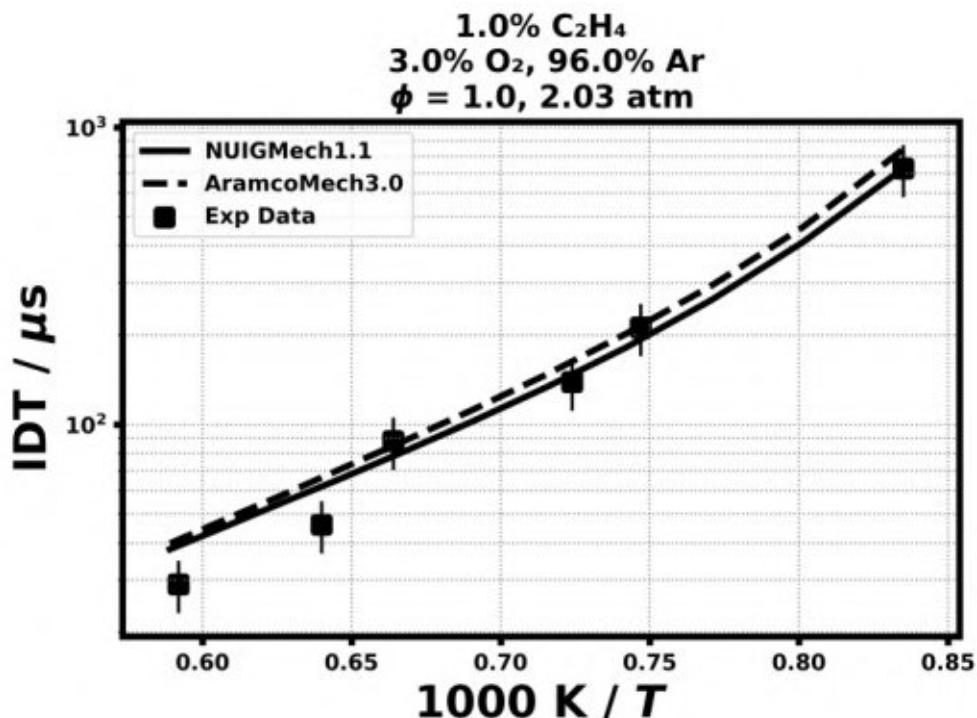


0.5% C₂H₄
1.5% O₂, 98.0% Ar
 $\phi = 1.0, 2.12 \text{ atm}$



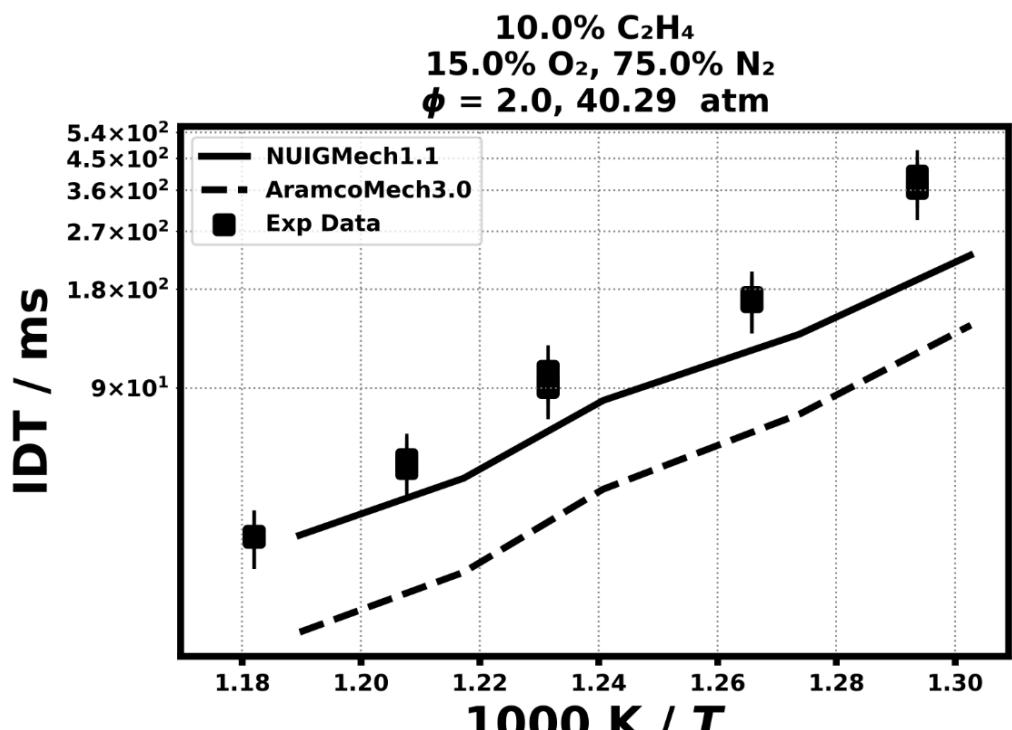
1.75% C₂H₄
5.25% O₂, 93.0% Ar
 $\phi = 1.0, 2.13 \text{ atm}$



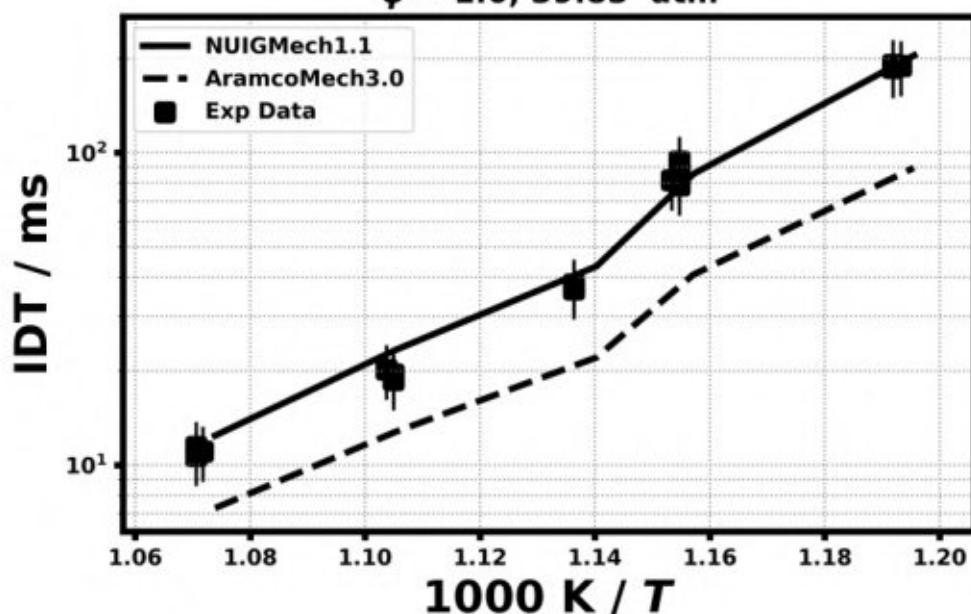


RCM Ignition delay time

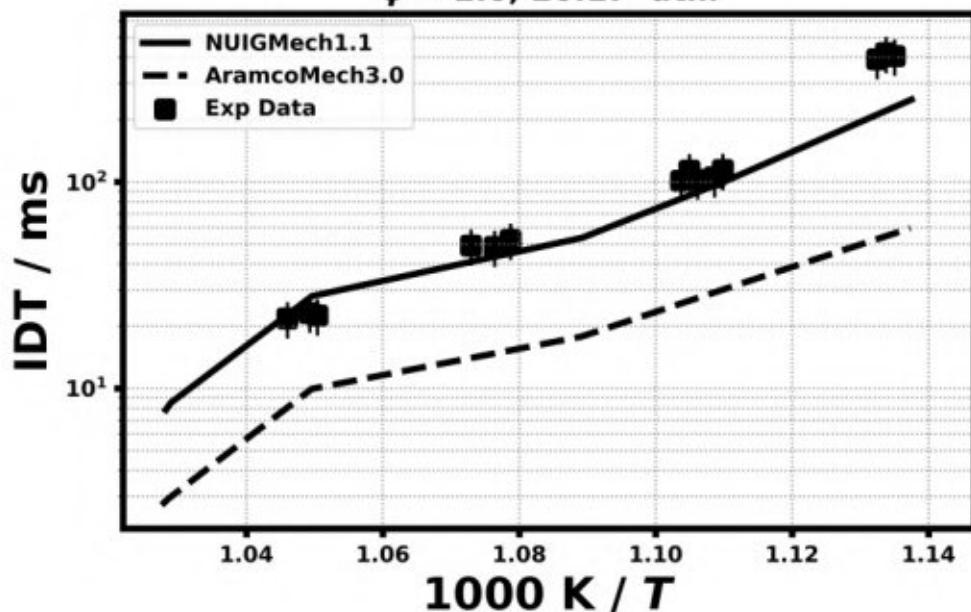
6.10) Baigmohammadi, M., Patel, V., Martinez, S., Panigrahy, S., Ramalingam, A., Burke, U., ... & Curran, H. J., Energy & Fuels, 34(3) (2020) 3755-3771.



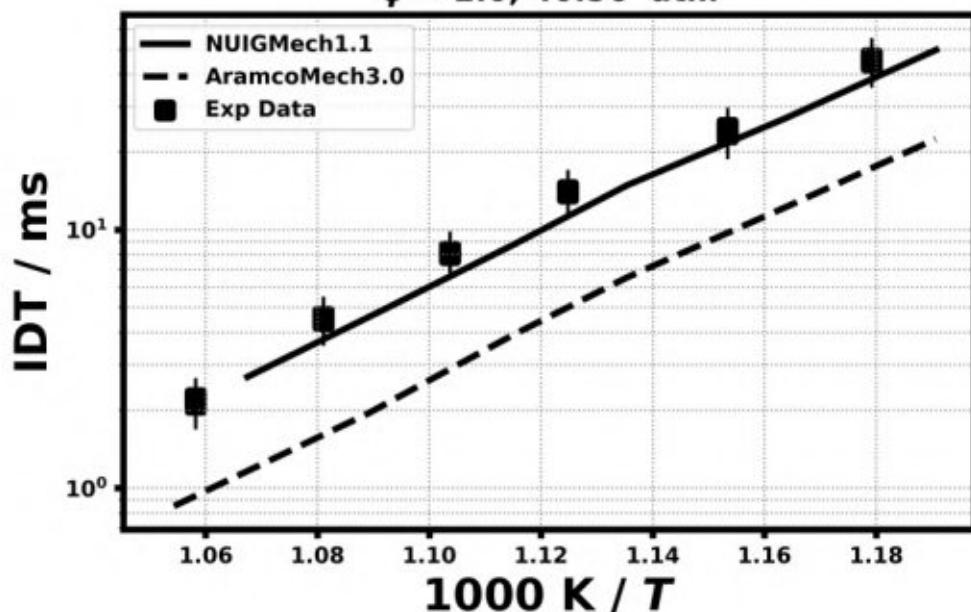
3.75% C₂H₄
11.25% O₂, 55.0% N₂, 30.0% Ar
 $\phi = 1.0, 39.83 \text{ atm}$



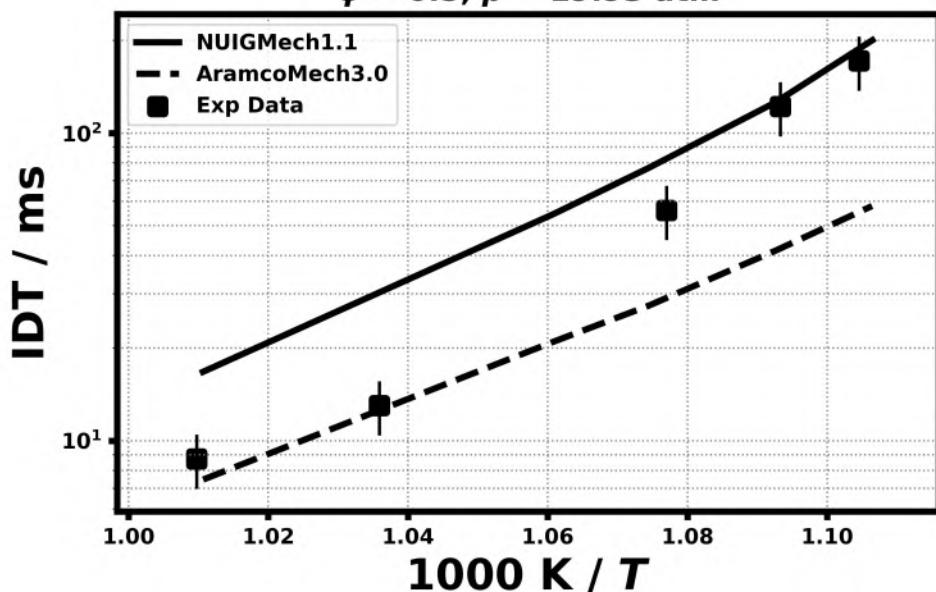
4.0% C₂H₄
6.0% O₂, 45.0% N₂, 45.0% Ar
 $\phi = 2.0, 20.17 \text{ atm}$



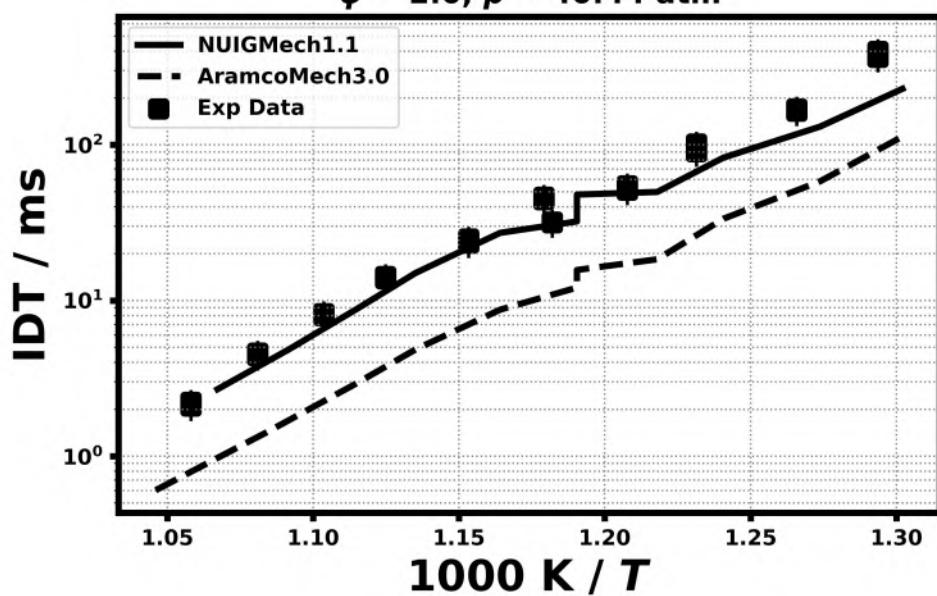
10.0% C₂H₄
15.0% O₂, 30.0% N₂, 45.0% Ar
 $\phi = 2.0, 40.56 \text{ atm}$



$2.143\% \text{ C}_2\text{H}_4$
 $12.857\% \text{ O}_2, 48.0\% \text{ N}_2, 37.0\% \text{ Ar}$
 $\phi = 0.5, p = 19.93 \text{ atm}$

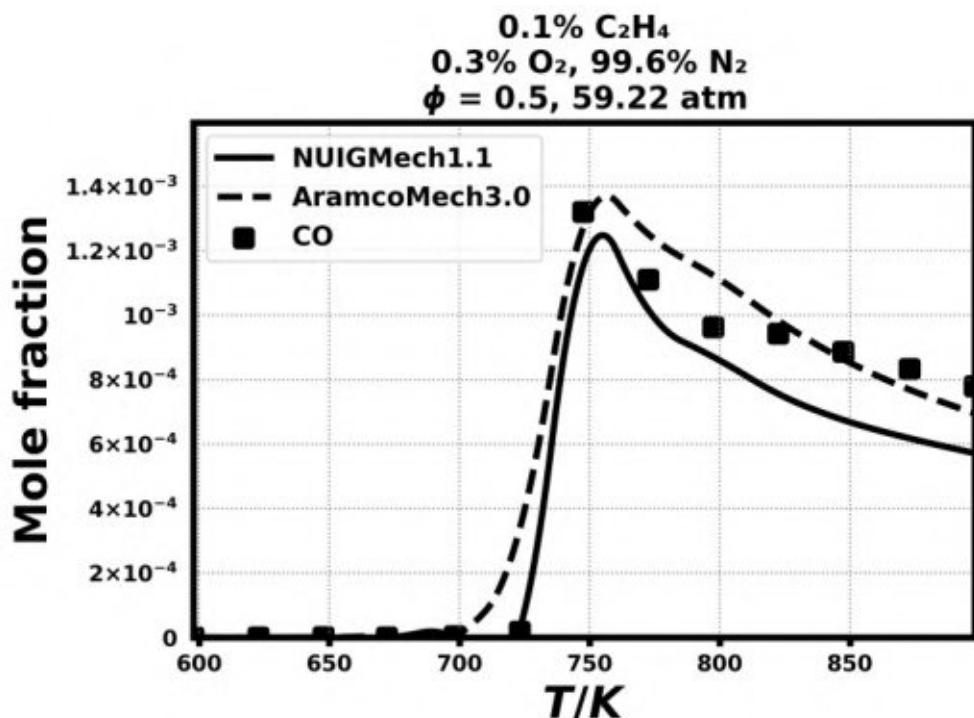
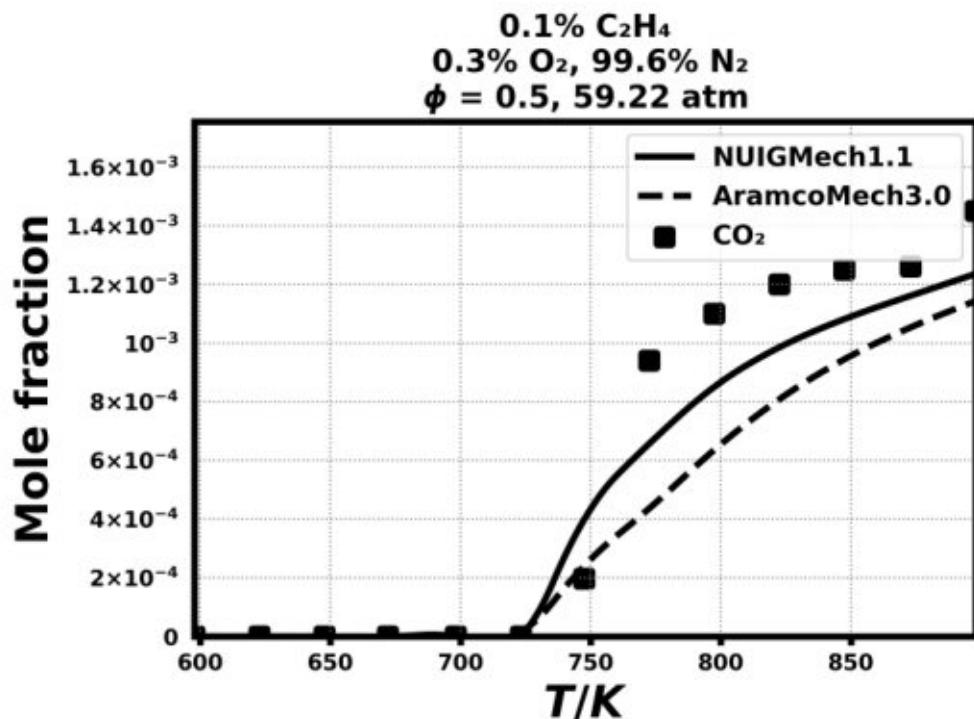


$10.0\% \text{ C}_2\text{H}_4$
 $15.0\% \text{ O}_2, 75.0\% \text{ N}_2$
 $\phi = 2.0, p = 40.44 \text{ atm}$

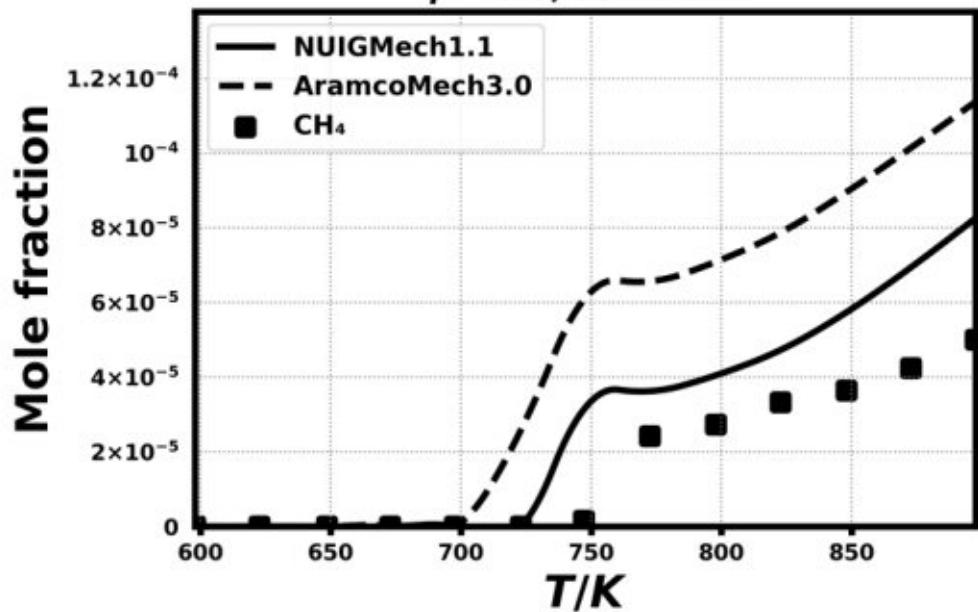


Speciation in Jet-stirred reactor

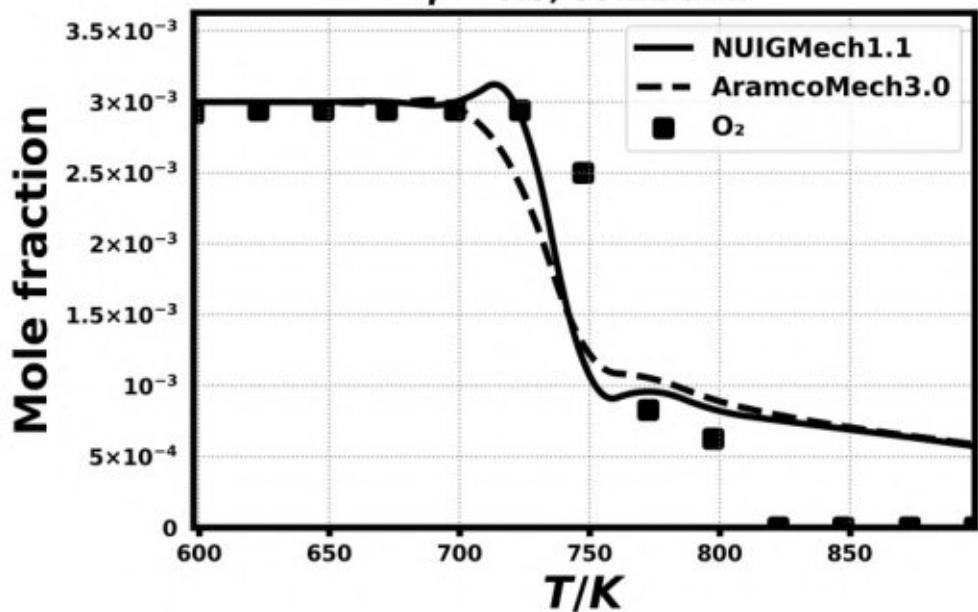
6.11) Lopez, J. G., Rasmussen, C. L., Alzueta, M. U., Gao, Y., Marshall, P., & Glarborg, P. Proceedings of the Combustion Institute, 32(1) (2009) 367-375.

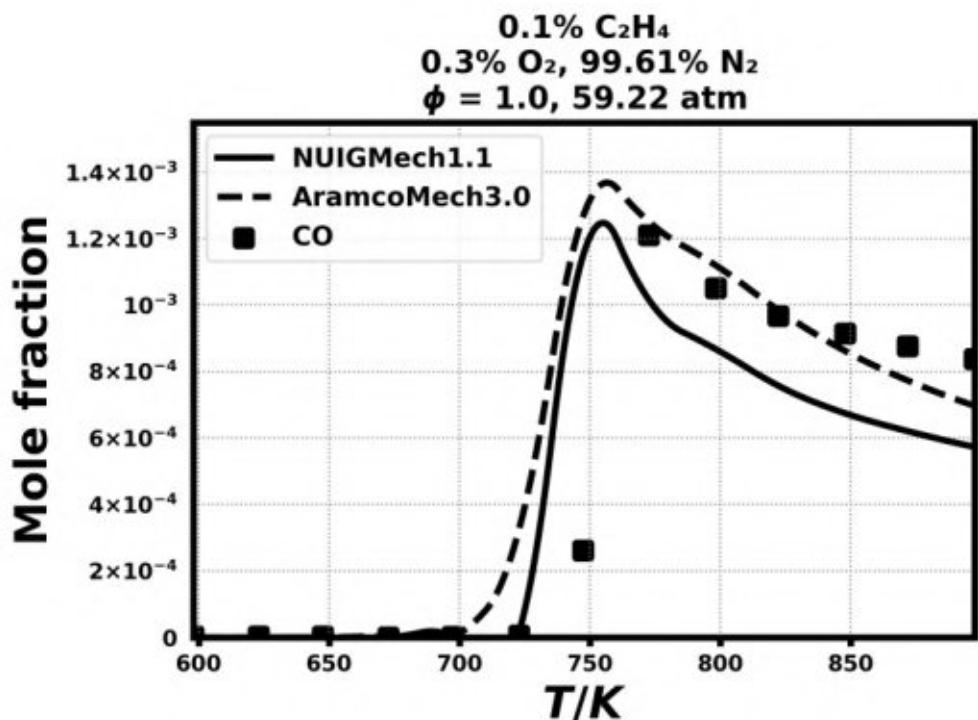
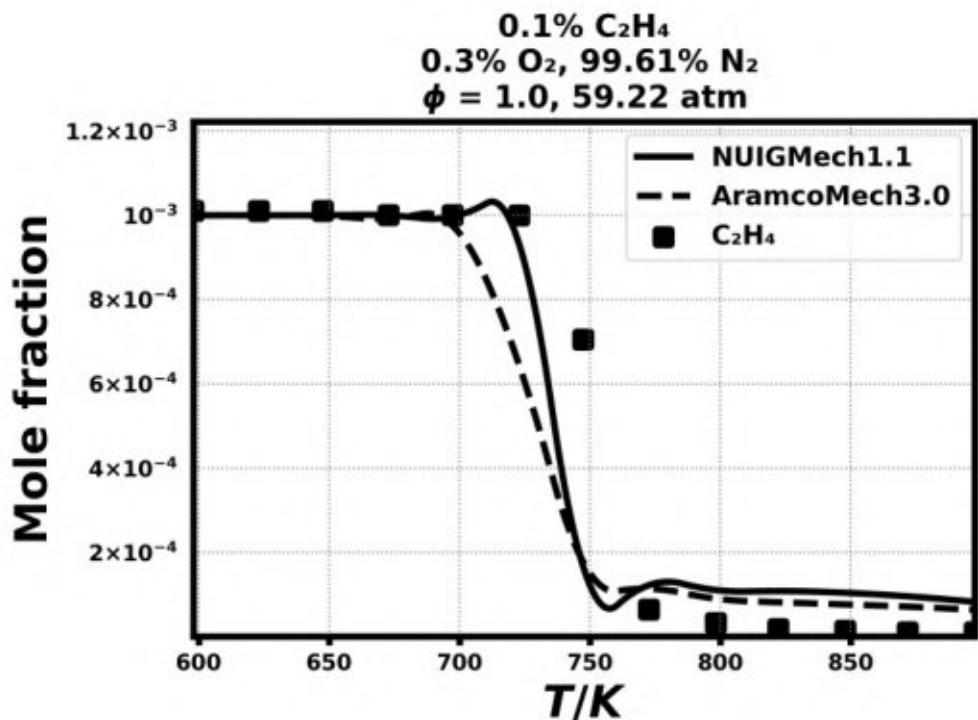


$0.1\% \text{C}_2\text{H}_4$
 $0.06\% \text{O}_2, 99.84\% \text{N}_2$
 $\phi = 5.0, 59.22 \text{ atm}$

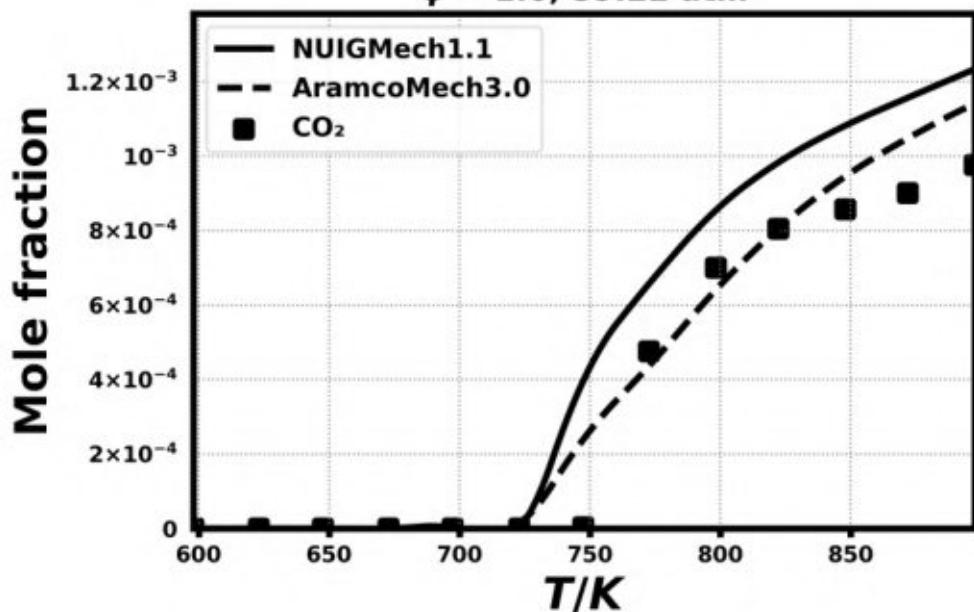


$0.1\% \text{C}_2\text{H}_4$
 $0.3\% \text{O}_2, 99.6\% \text{N}_2$
 $\phi = 0.5, 59.22 \text{ atm}$

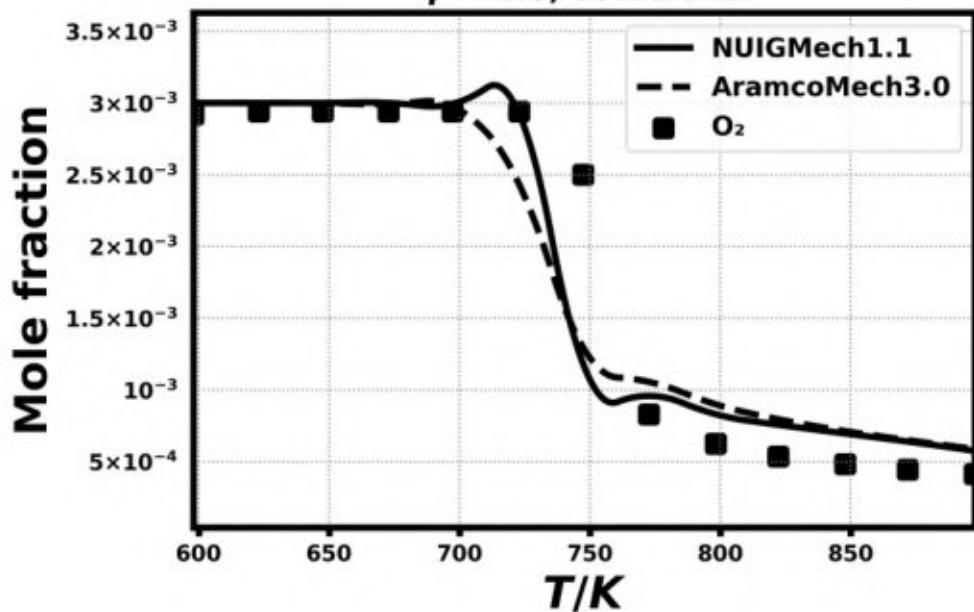


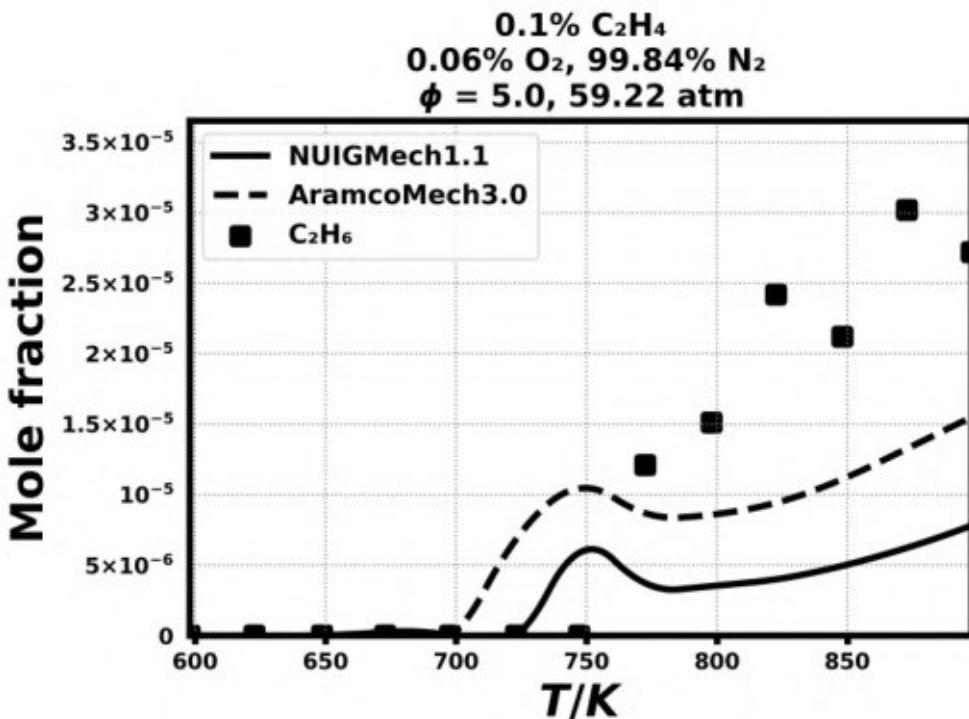


$0.1\% \text{C}_2\text{H}_4$
 $0.3\% \text{O}_2, 99.61\% \text{N}_2$
 $\phi = 1.0, 59.22 \text{ atm}$

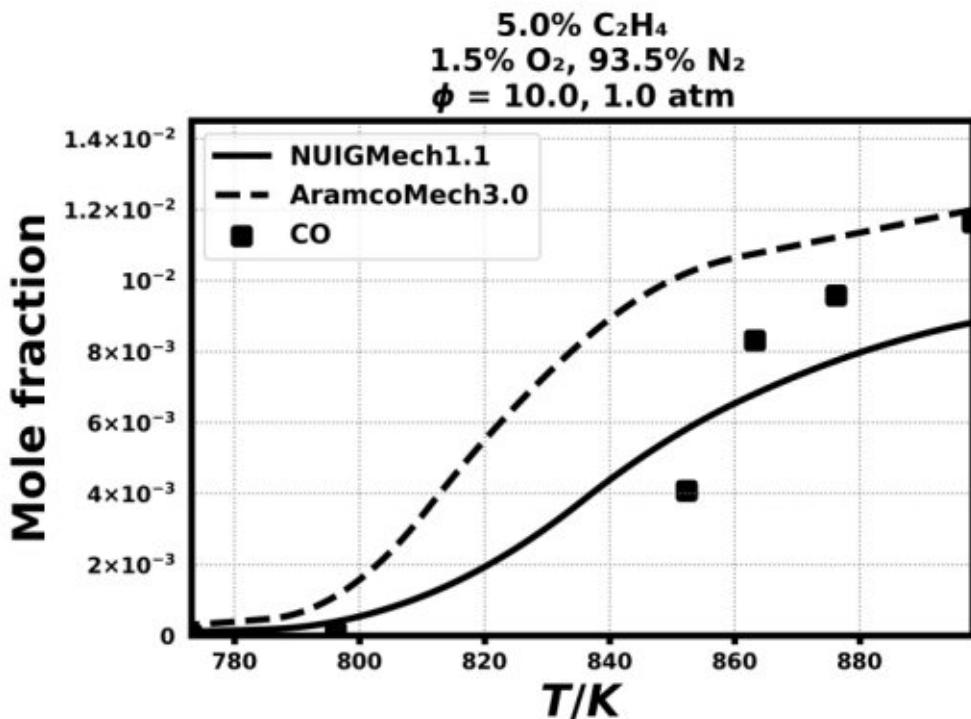


$0.1\% \text{C}_2\text{H}_4$
 $0.3\% \text{O}_2, 99.61\% \text{N}_2$
 $\phi = 1.0, 59.22 \text{ atm}$

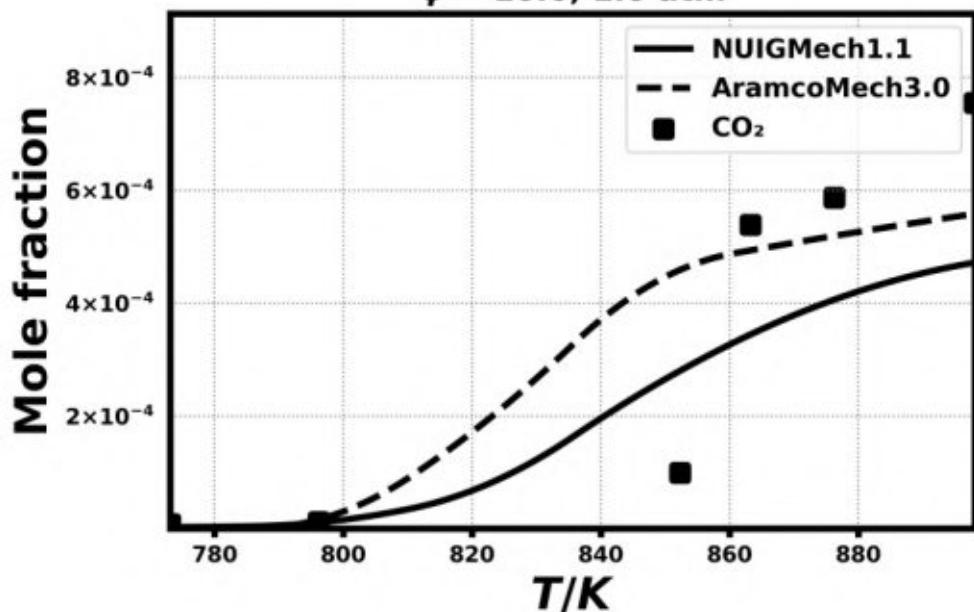




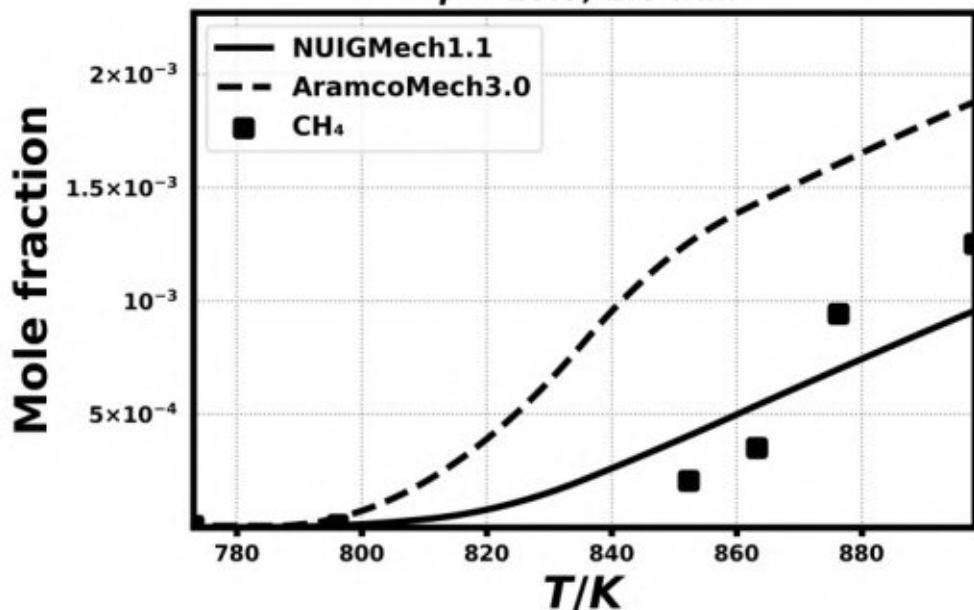
6.12) Jallais, S., Bonneau, L., Auzanneau, M., Naudet, V., & Bockel-Macal, S, Industrial & engineering chemistry research, 41(23) (2002) 5659-5667.

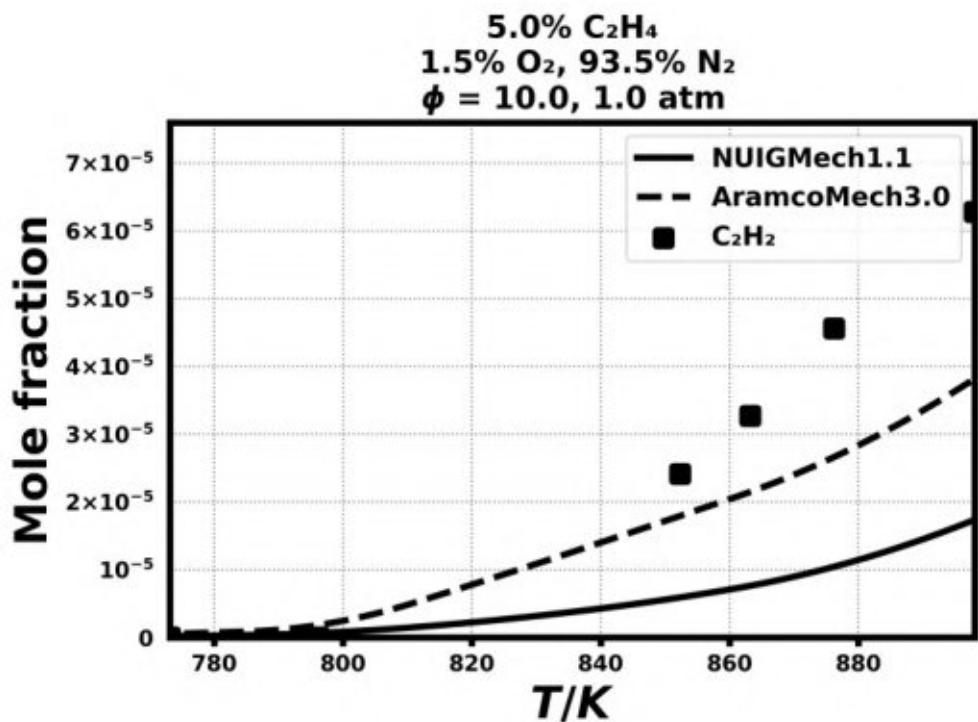
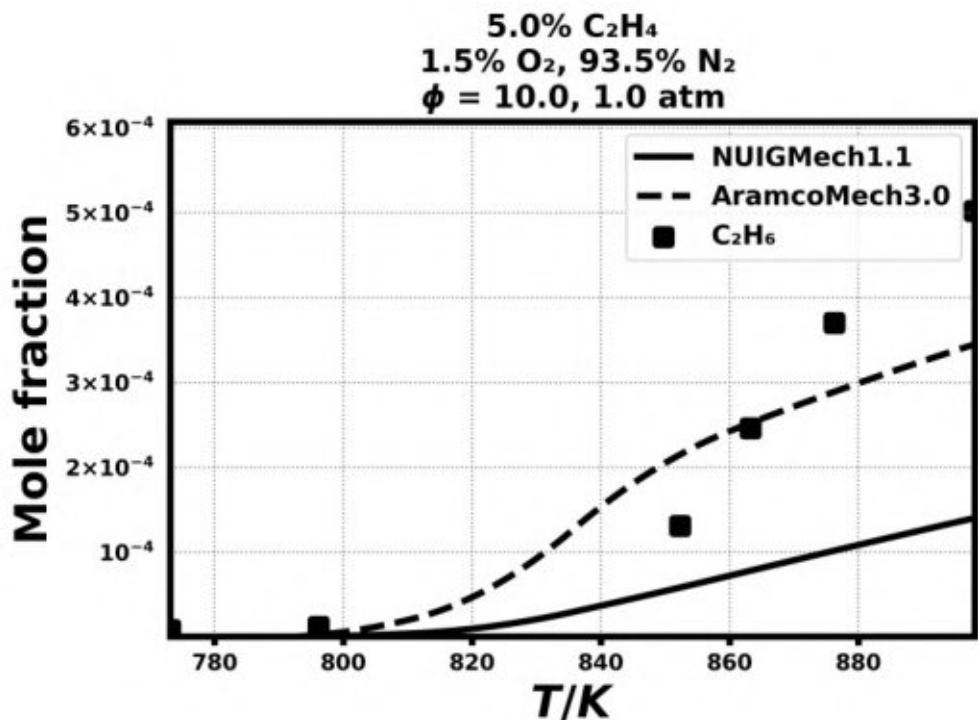


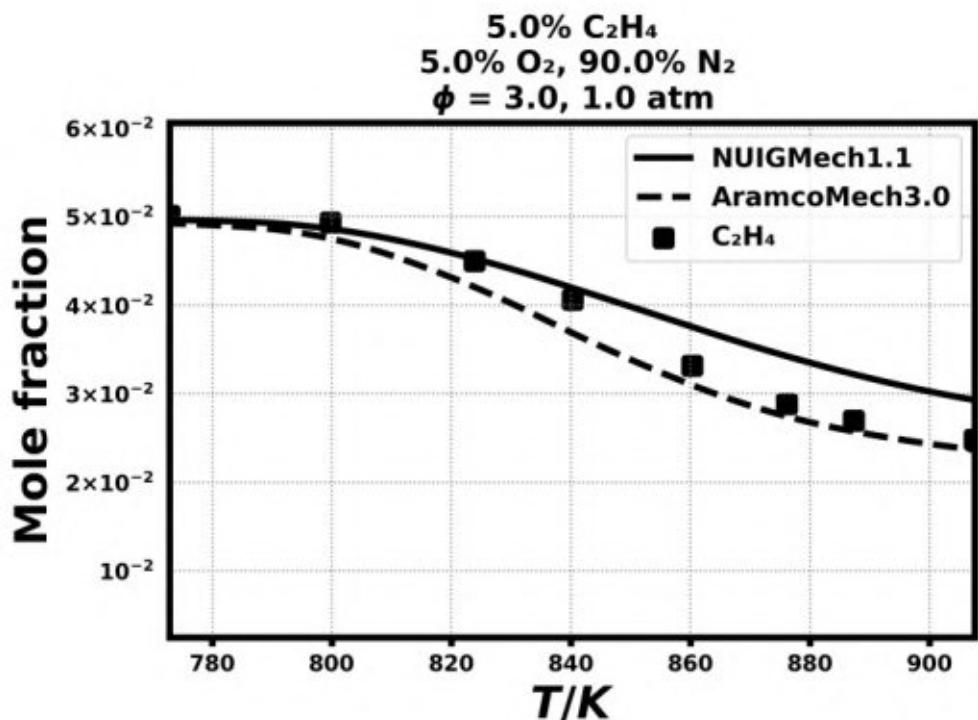
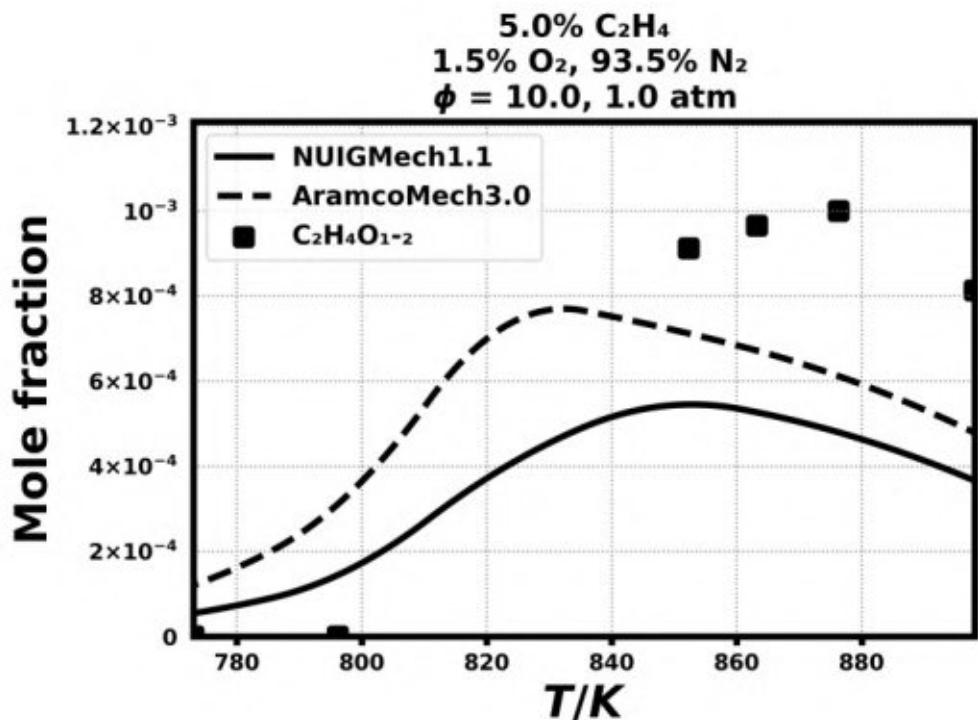
$5.0\% \text{ C}_2\text{H}_4$
 $1.5\% \text{ O}_2, 93.5\% \text{ N}_2$
 $\phi = 10.0, 1.0 \text{ atm}$

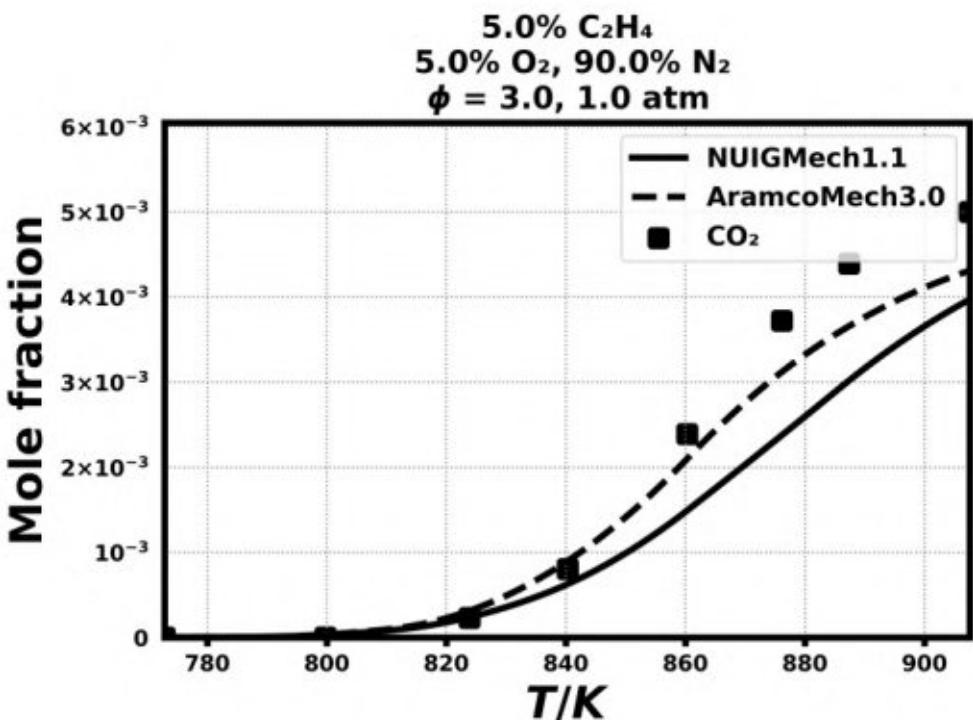
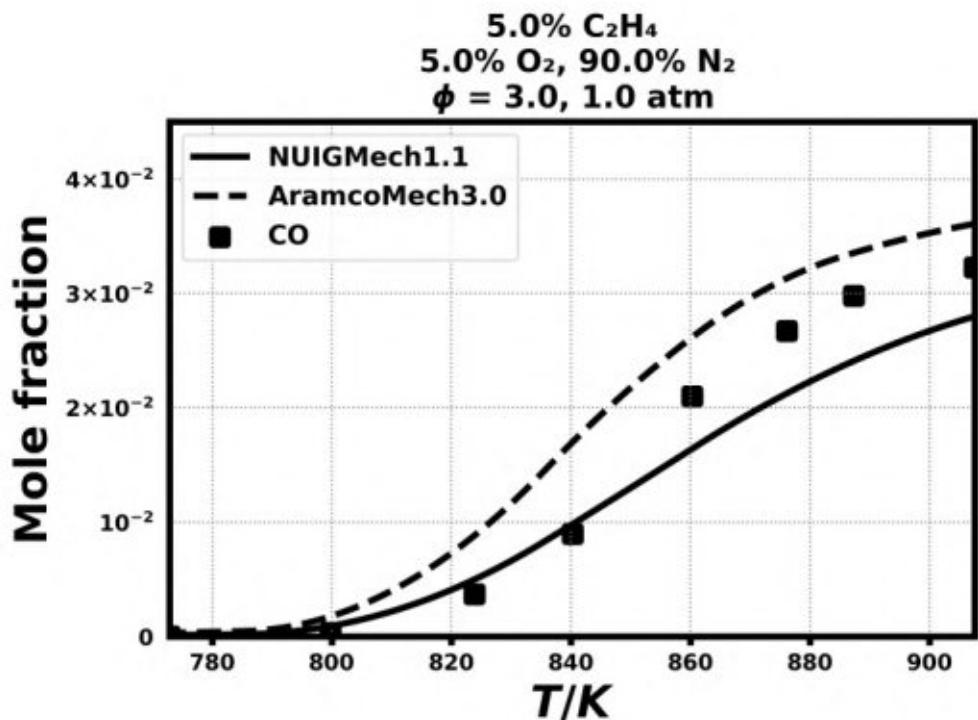


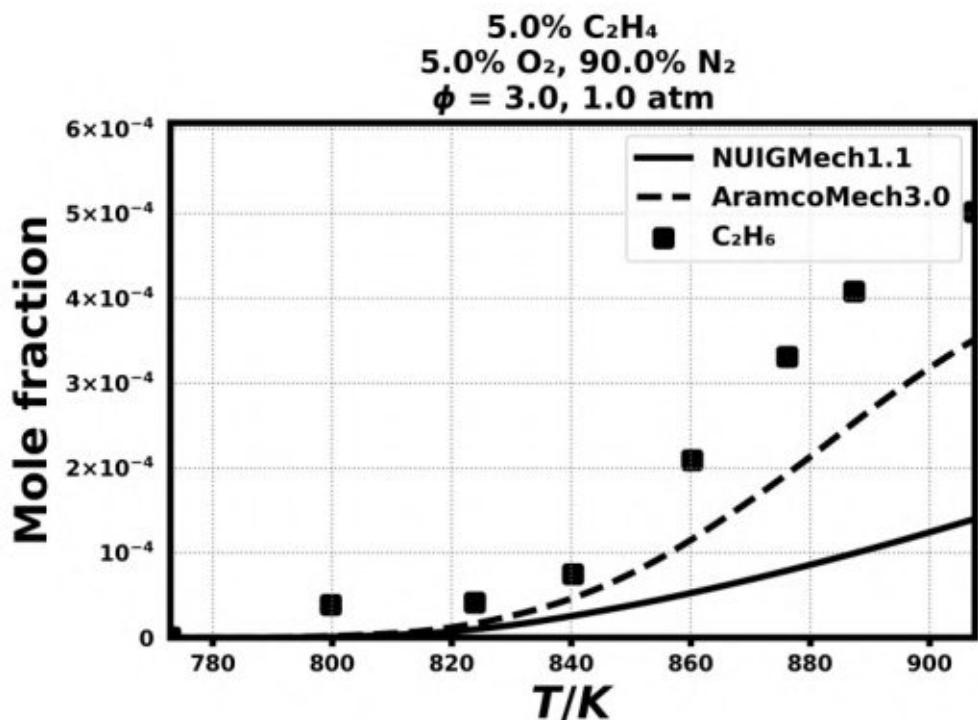
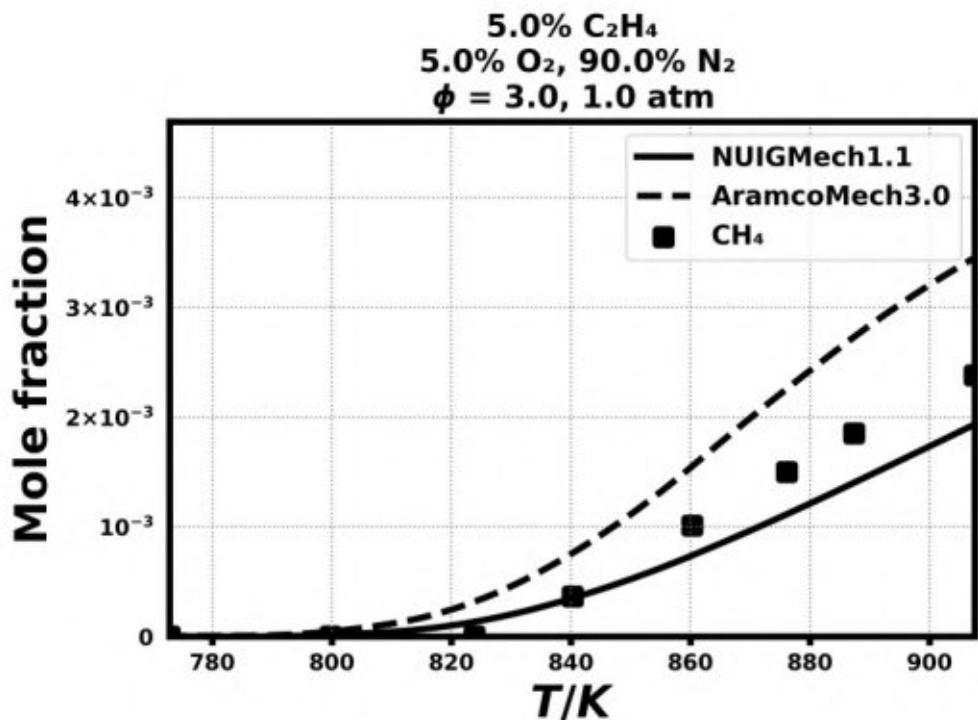
$5.0\% \text{ C}_2\text{H}_4$
 $1.5\% \text{ O}_2, 93.5\% \text{ N}_2$
 $\phi = 10.0, 1.0 \text{ atm}$

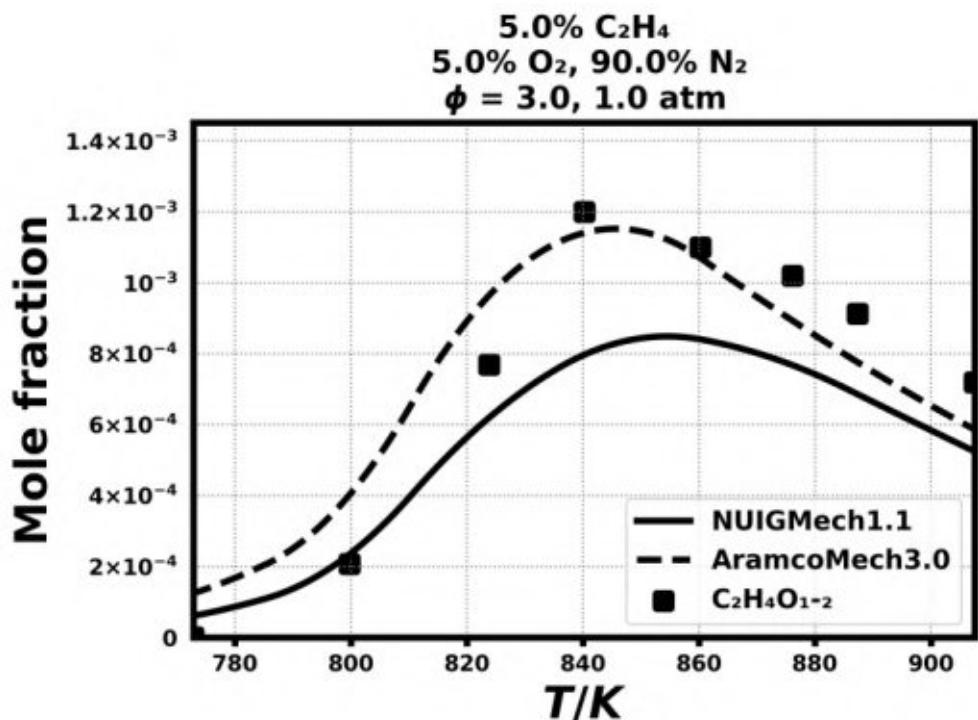
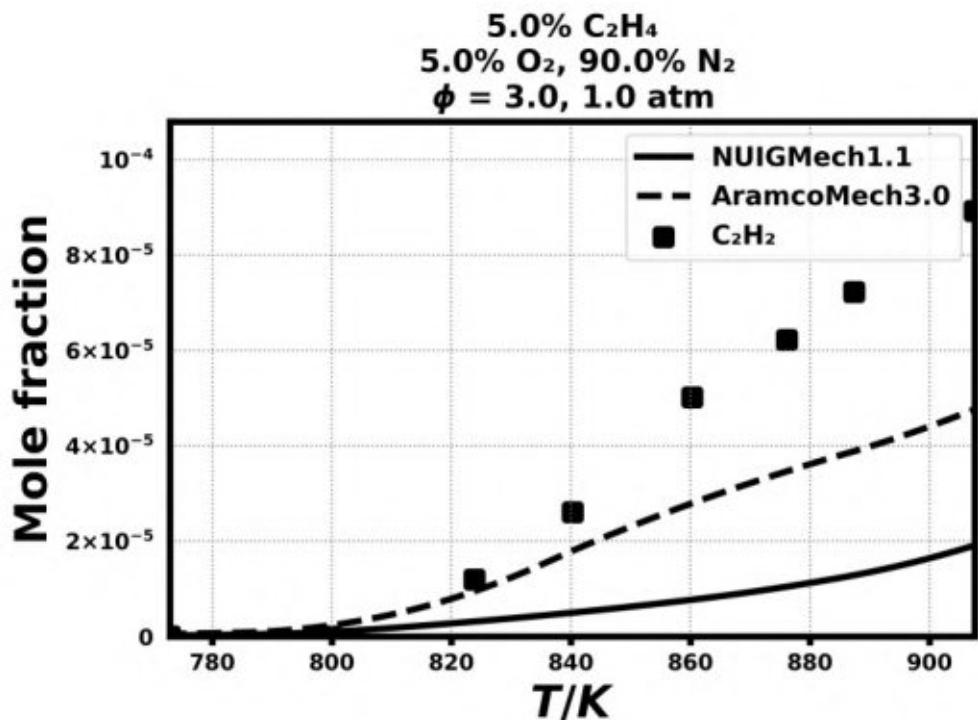


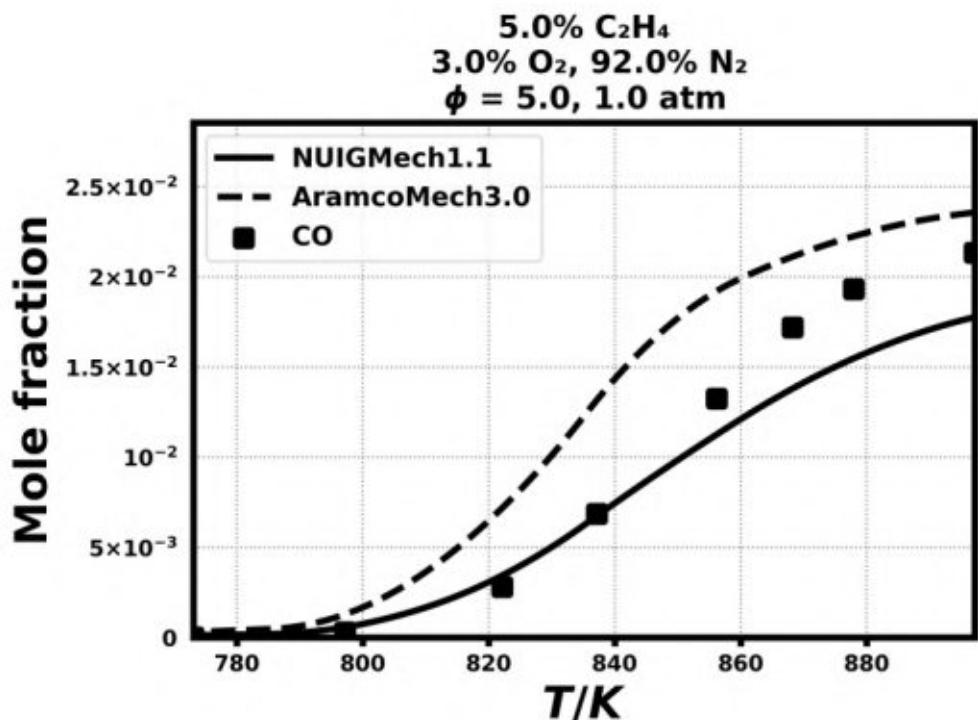
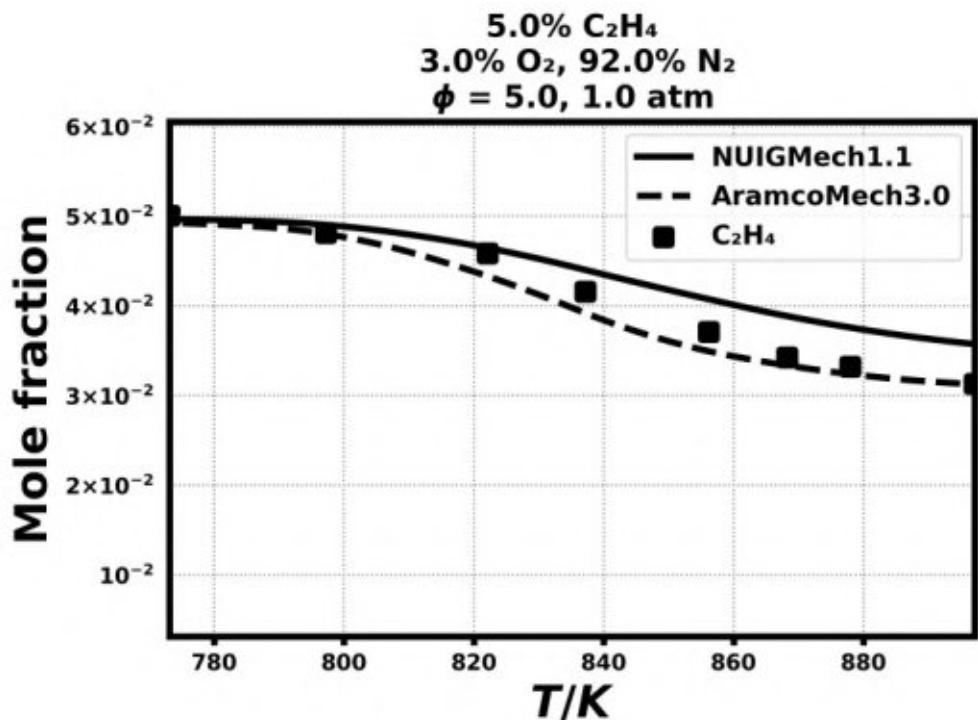


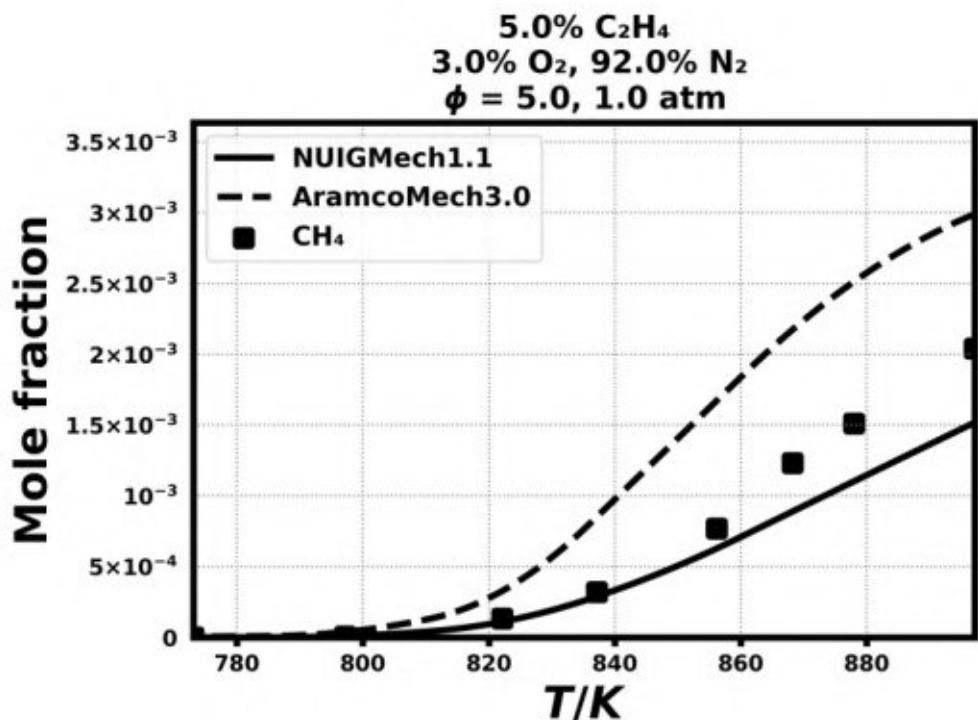
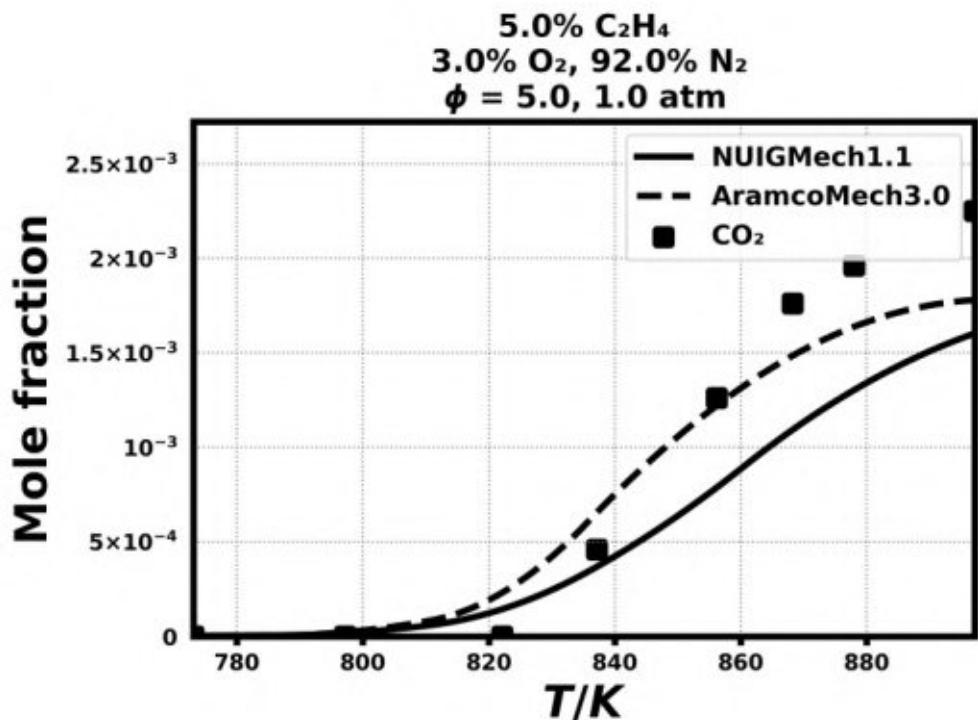


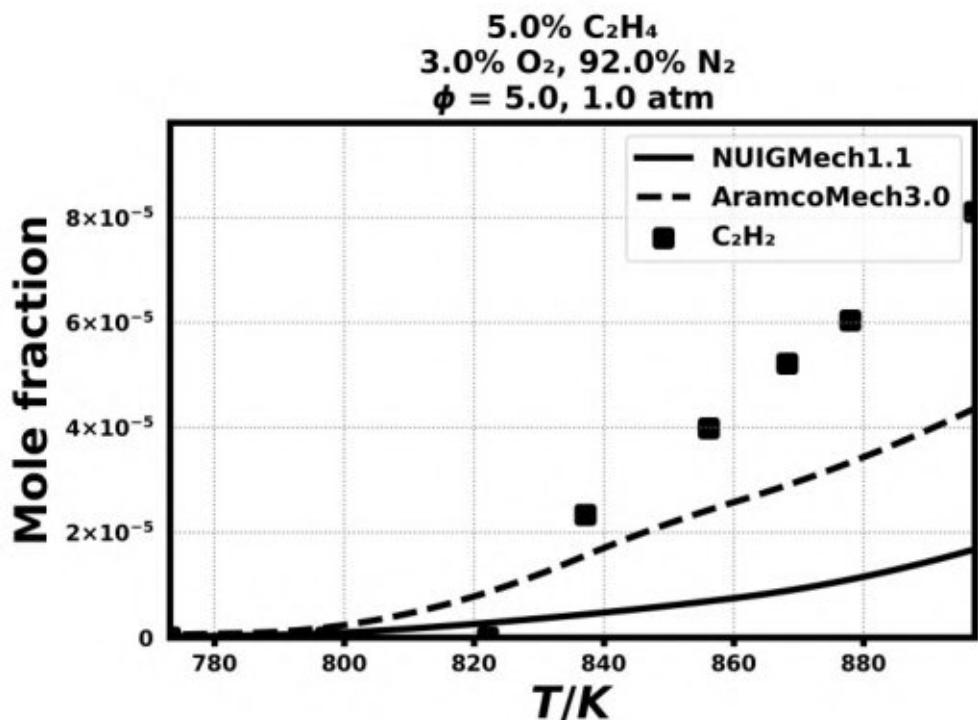
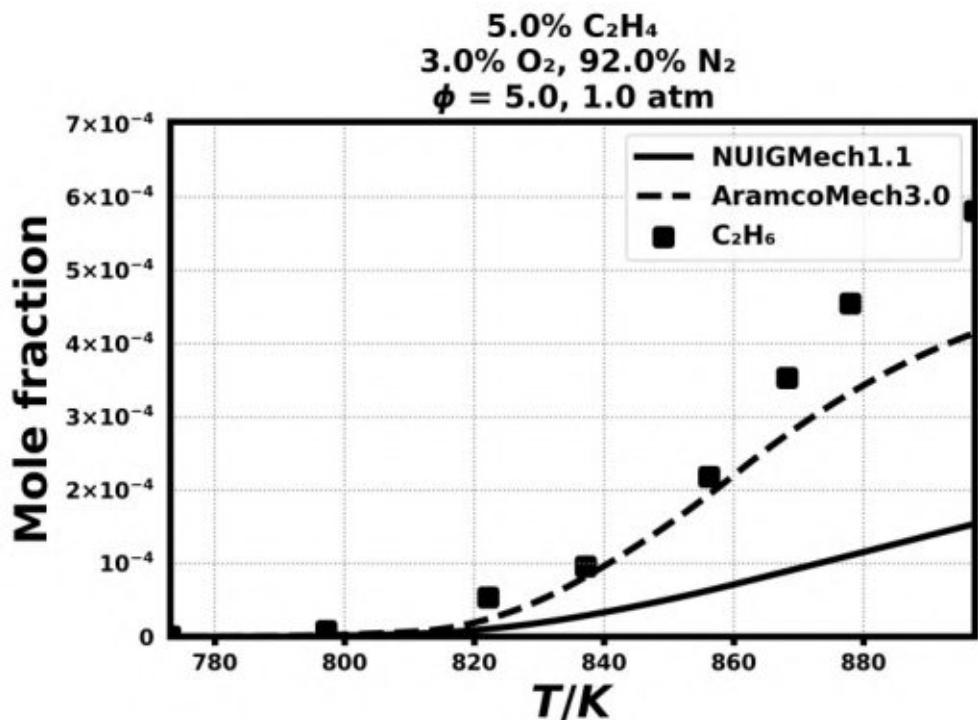


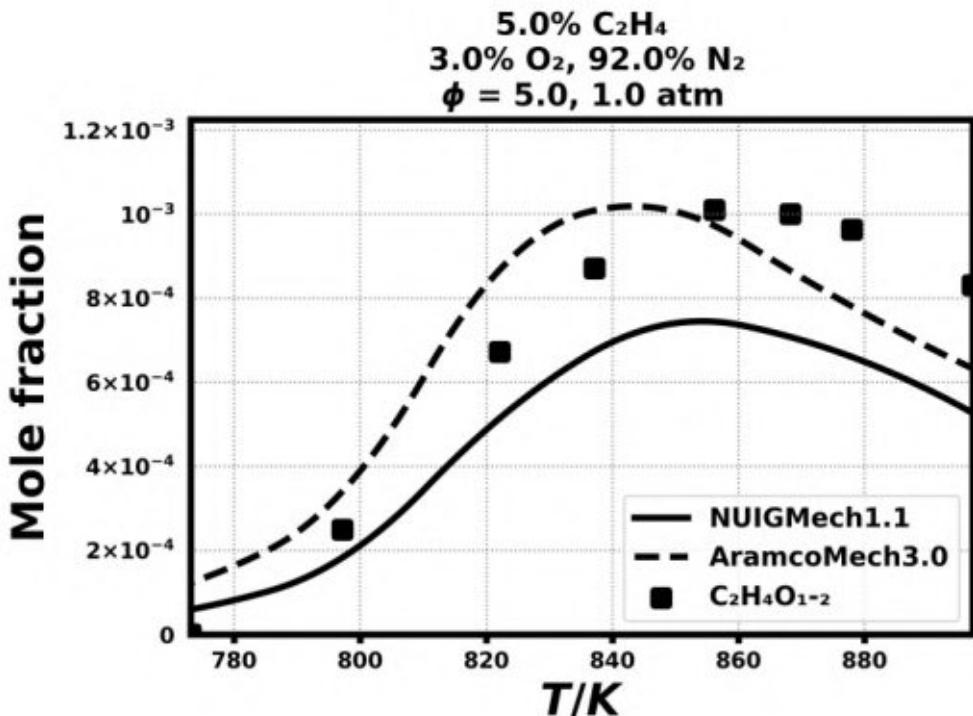




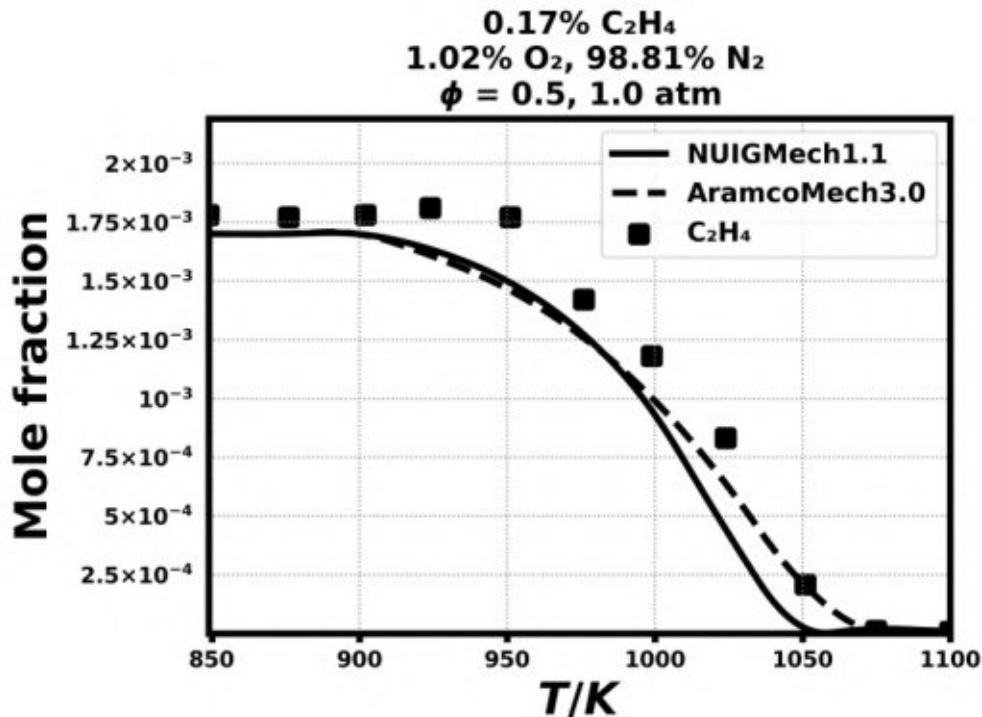


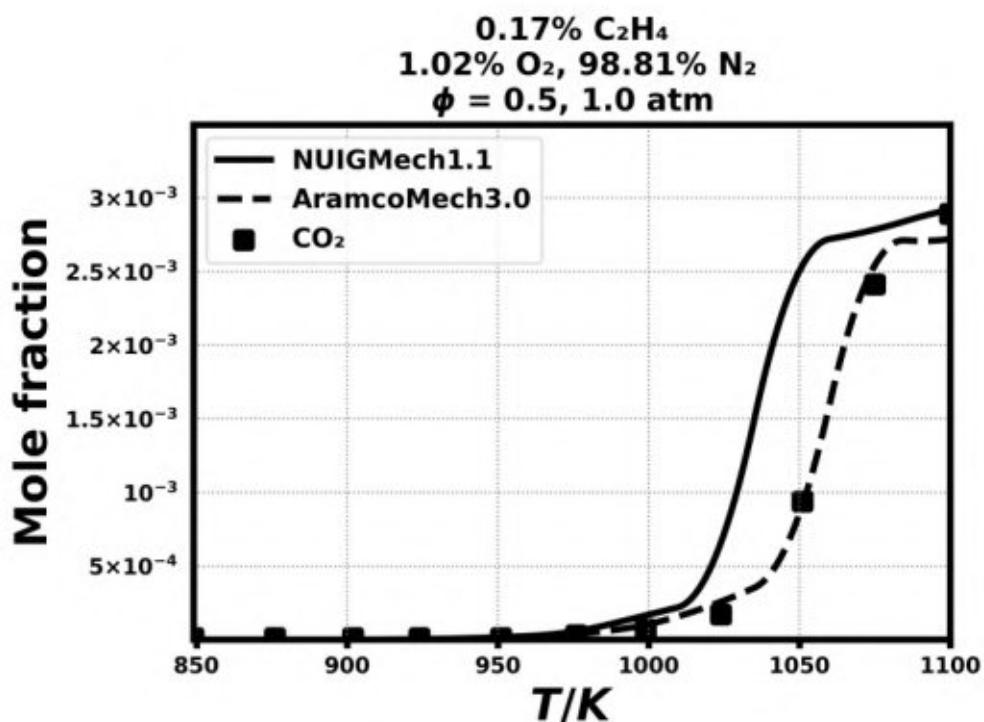
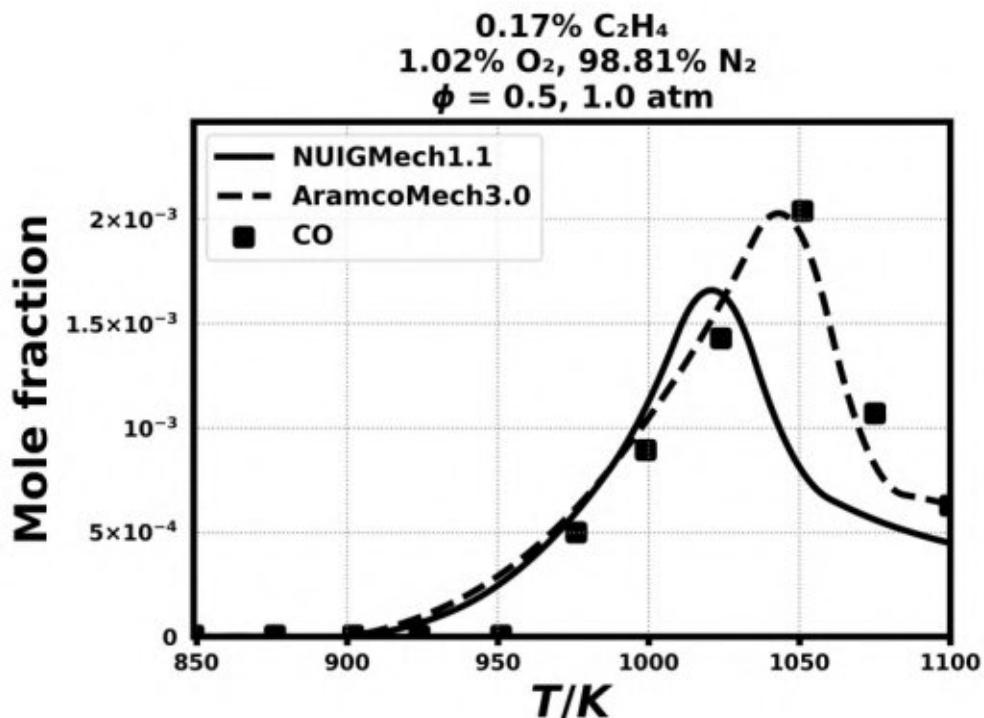




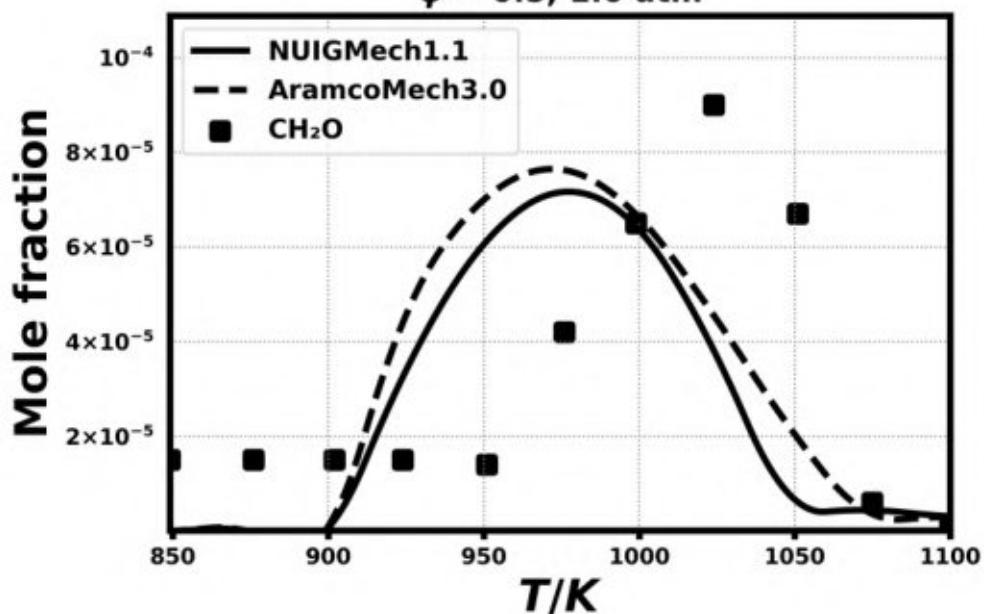


6.13) Cong, T. L., Bedjanian, E., & Dagaut, P., Combustion science and technology, 182 (4-6) (2010) 333-349.

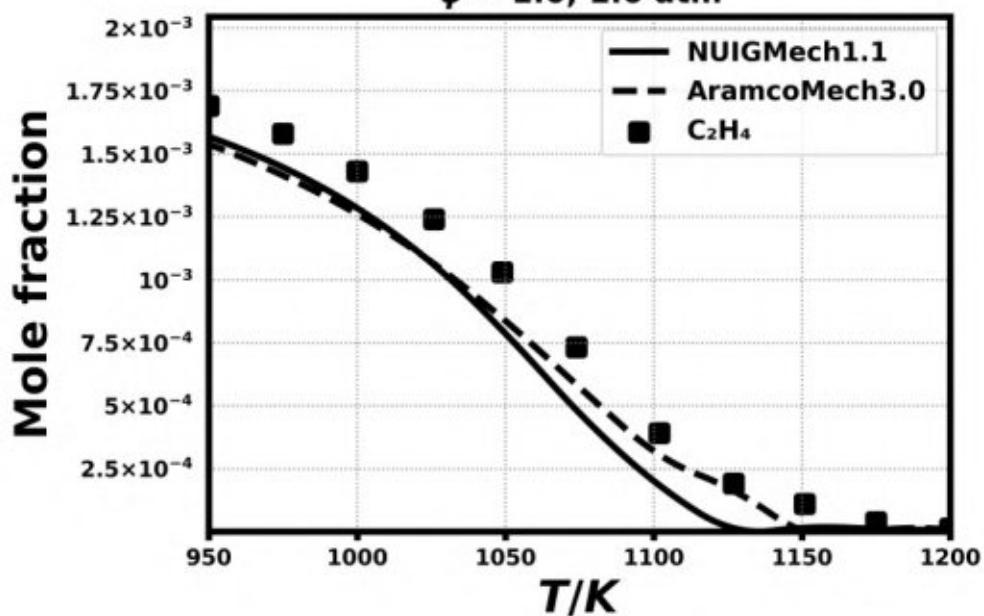


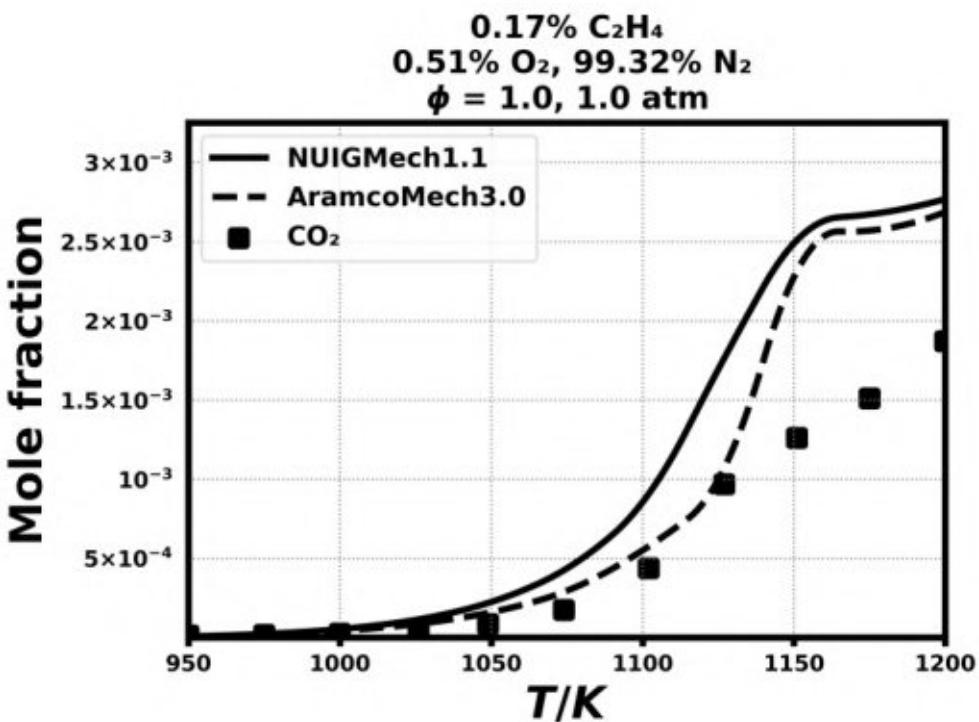
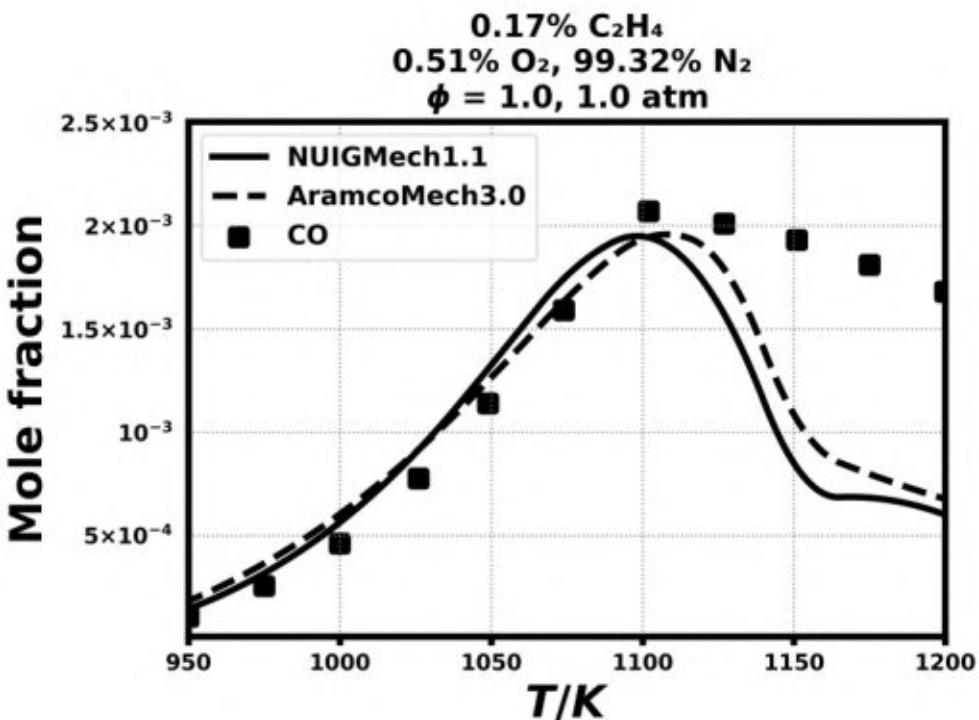


$0.17\% \text{ C}_2\text{H}_4$
 $1.02\% \text{ O}_2, 98.81\% \text{ N}_2$
 $\phi = 0.5, 1.0 \text{ atm}$

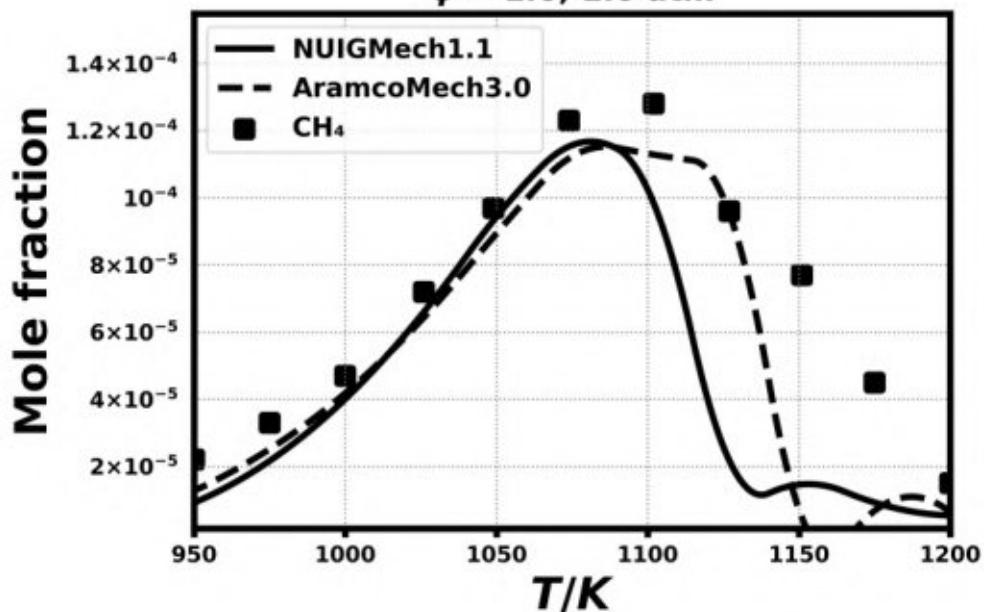


$0.17\% \text{ C}_2\text{H}_4$
 $0.51\% \text{ O}_2, 99.32\% \text{ N}_2$
 $\phi = 1.0, 1.0 \text{ atm}$

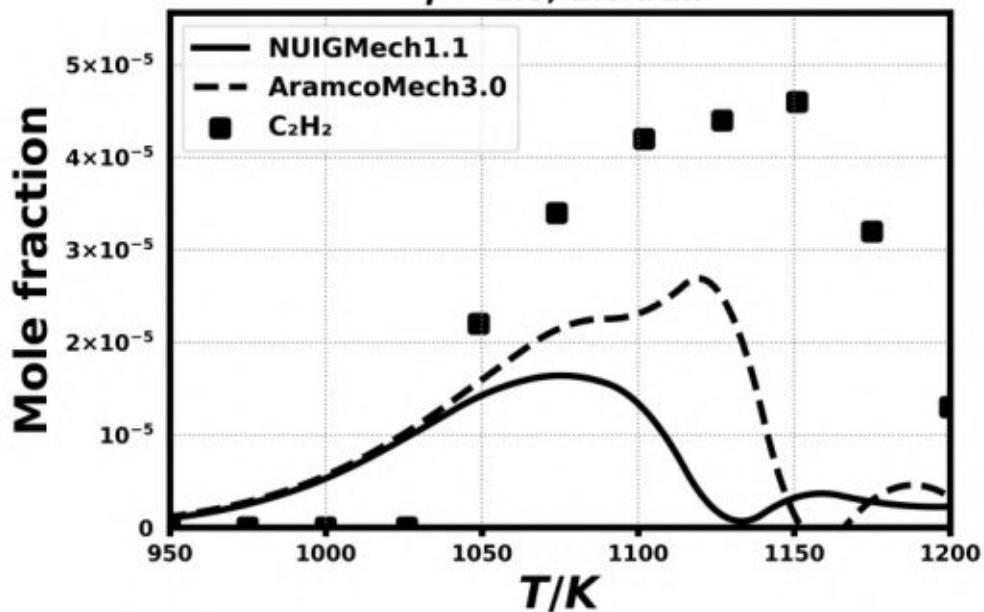




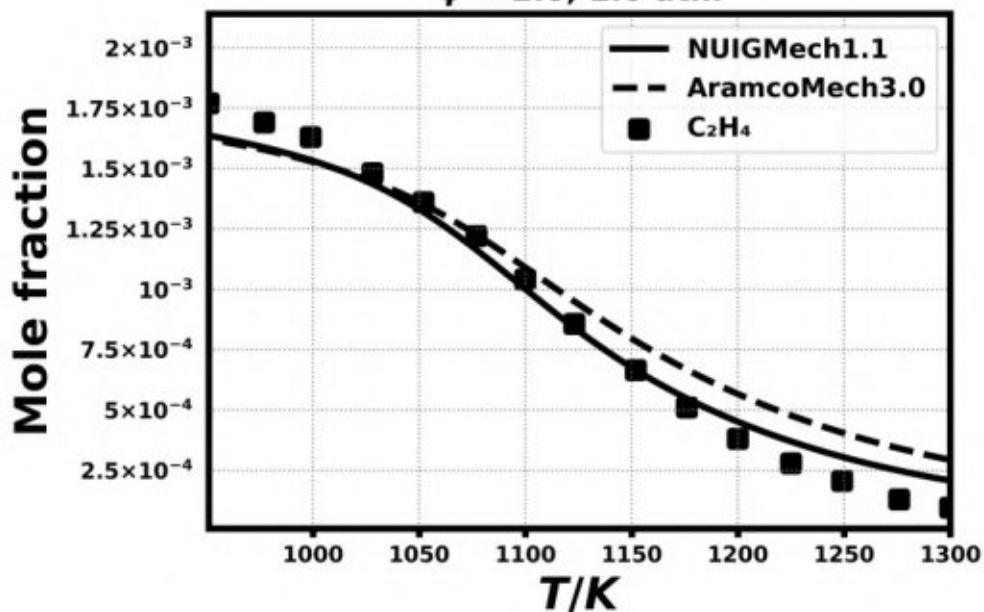
$0.17\% \text{ C}_2\text{H}_4$
 $0.51\% \text{ O}_2, 99.32\% \text{ N}_2$
 $\phi = 1.0, 1.0 \text{ atm}$



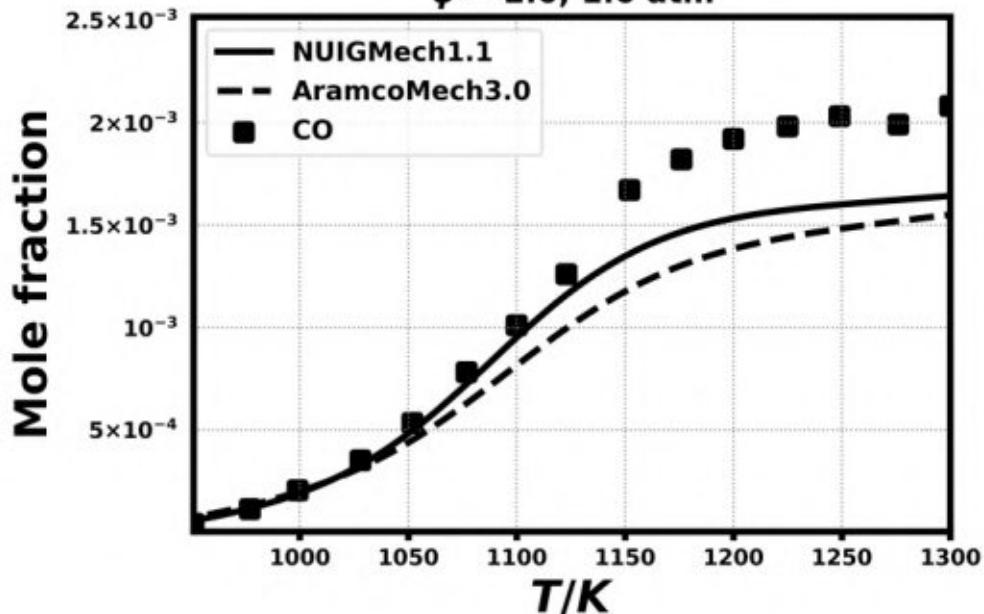
$0.17\% \text{ C}_2\text{H}_4$
 $0.51\% \text{ O}_2, 99.32\% \text{ N}_2$
 $\phi = 1.0, 1.0 \text{ atm}$



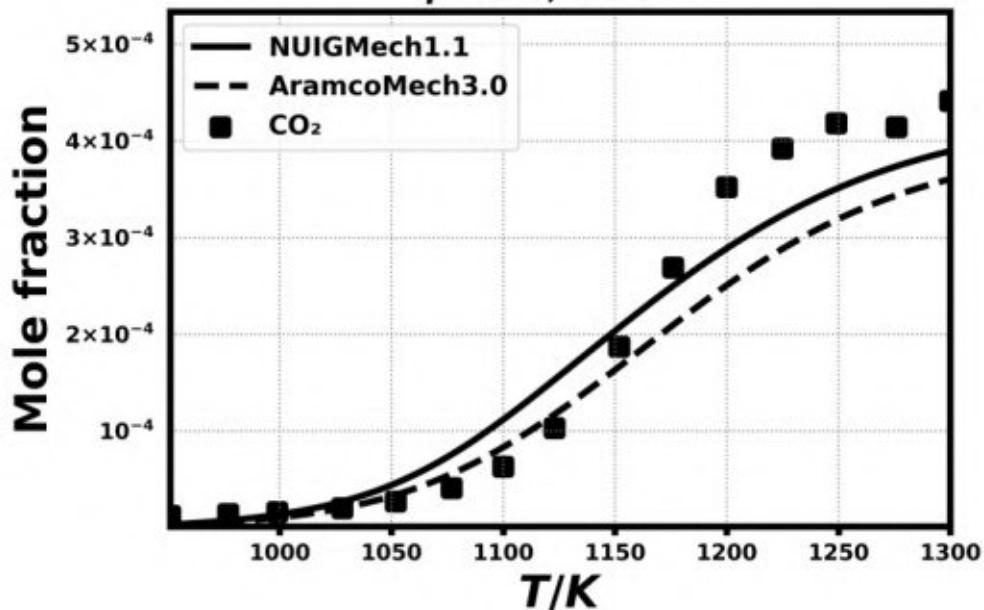
$0.17\% \text{ C}_2\text{H}_4$
 $0.225\% \text{ O}_2, 99.575\% \text{ N}_2$
 $\phi = 2.0, 1.0 \text{ atm}$



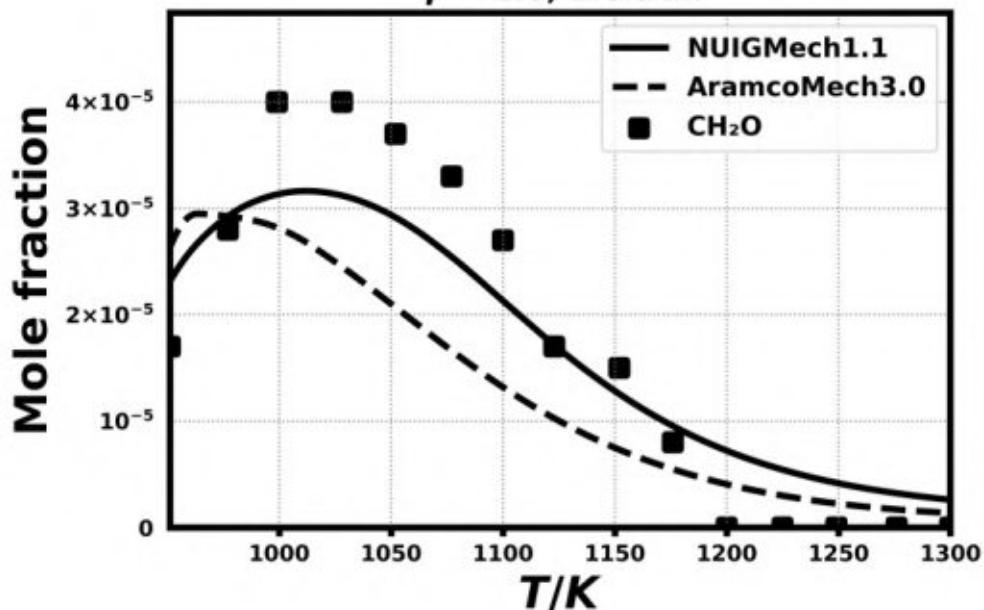
$0.17\% \text{ C}_2\text{H}_4$
 $0.225\% \text{ O}_2, 99.575\% \text{ N}_2$
 $\phi = 2.0, 1.0 \text{ atm}$

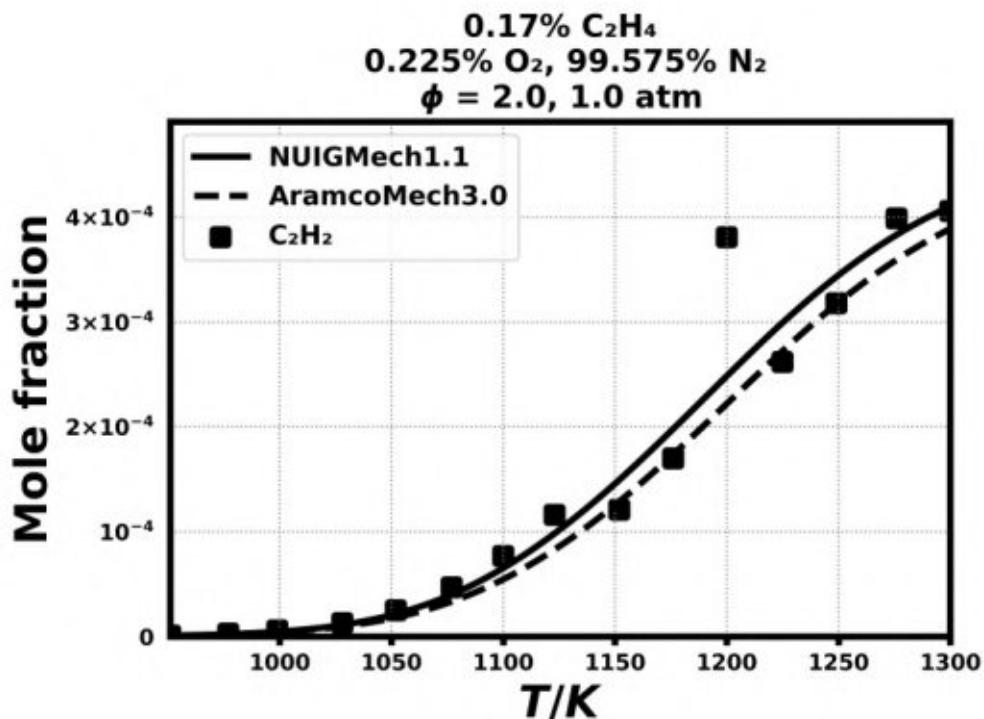
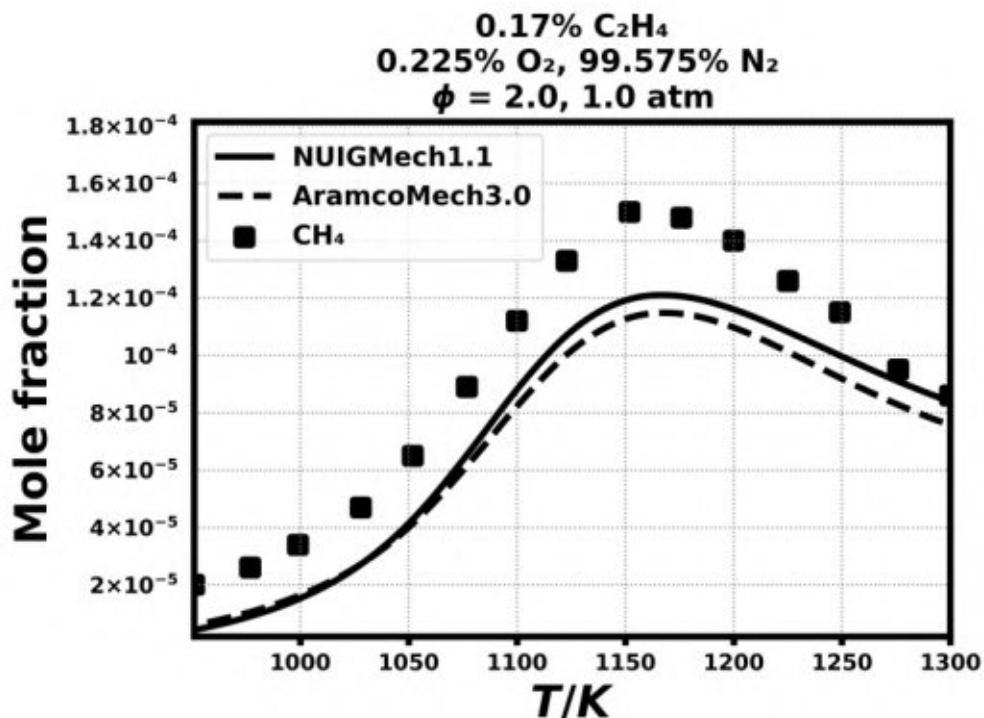


$0.17\% \text{ C}_2\text{H}_4$
 $0.225\% \text{ O}_2, 99.575\% \text{ N}_2$
 $\phi = 2.0, 1.0 \text{ atm}$



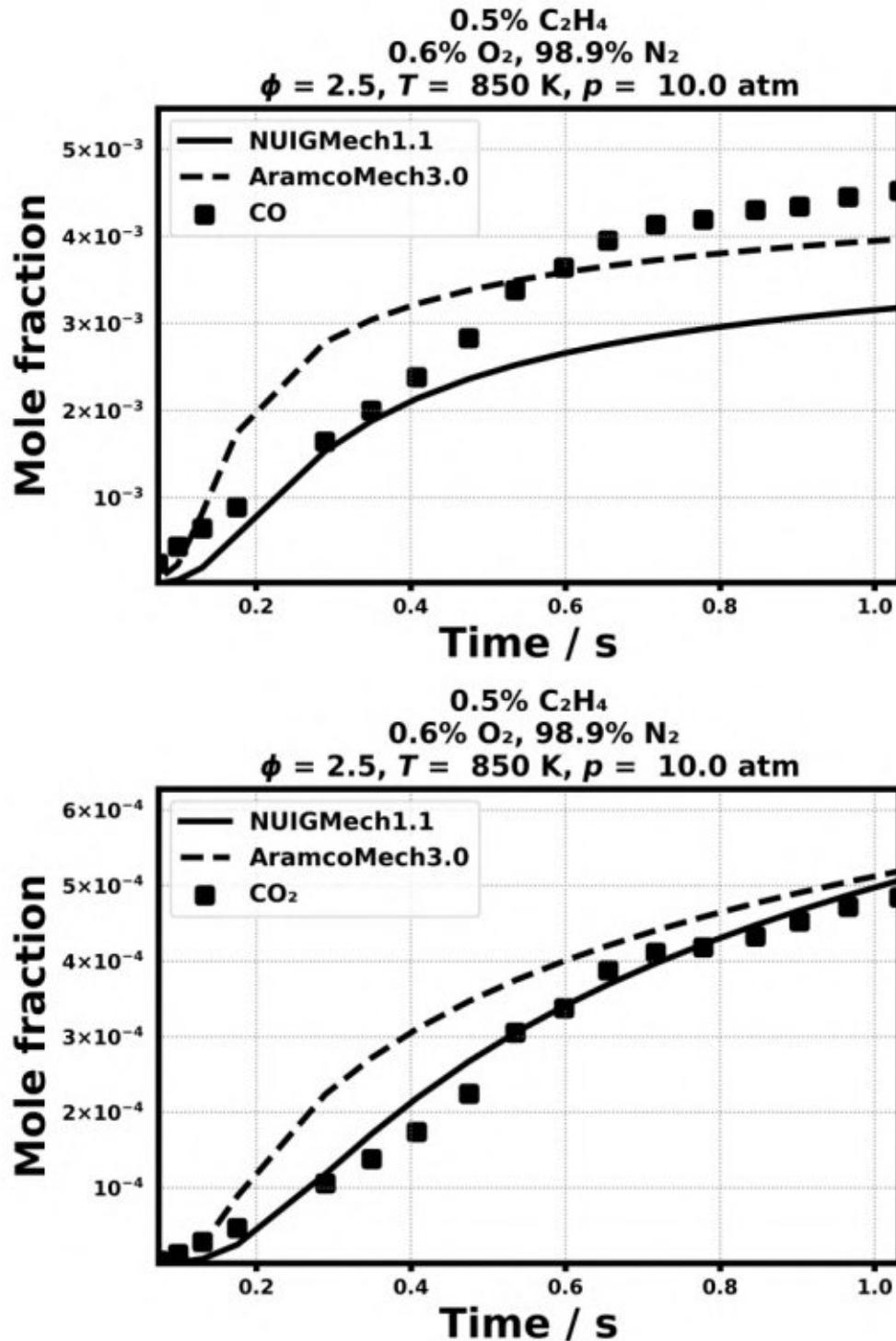
$0.17\% \text{ C}_2\text{H}_4$
 $0.225\% \text{ O}_2, 99.575\% \text{ N}_2$
 $\phi = 2.0, 1.0 \text{ atm}$



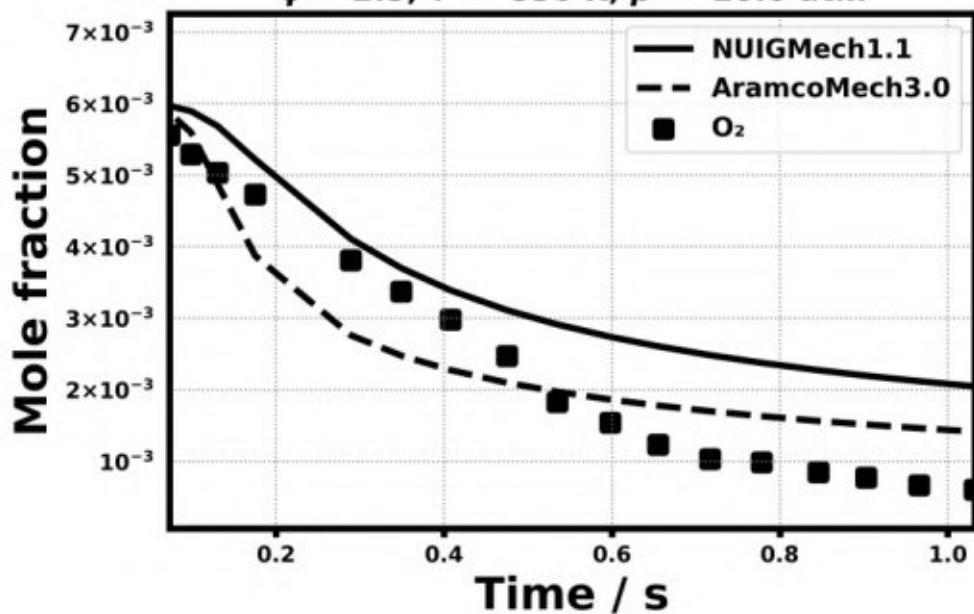


Speciation in Flow reactor

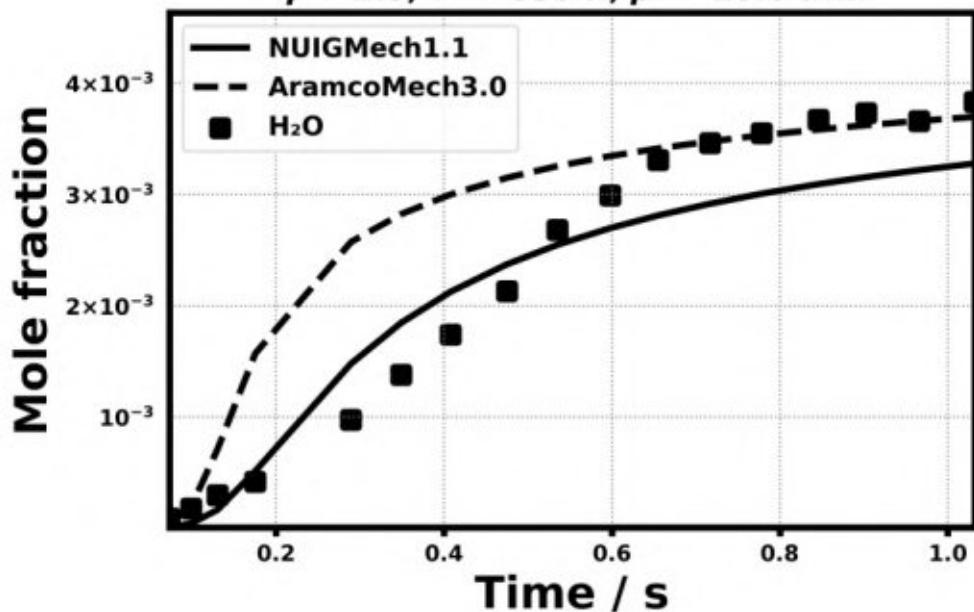
6.14) Carriere, T., Westmoreland, P. R., Kazakov, A., Stein, Y. S., & Dryer, F. L., Proceedings of the Combustion Institute, 29(1) (2002) 1257-1266.

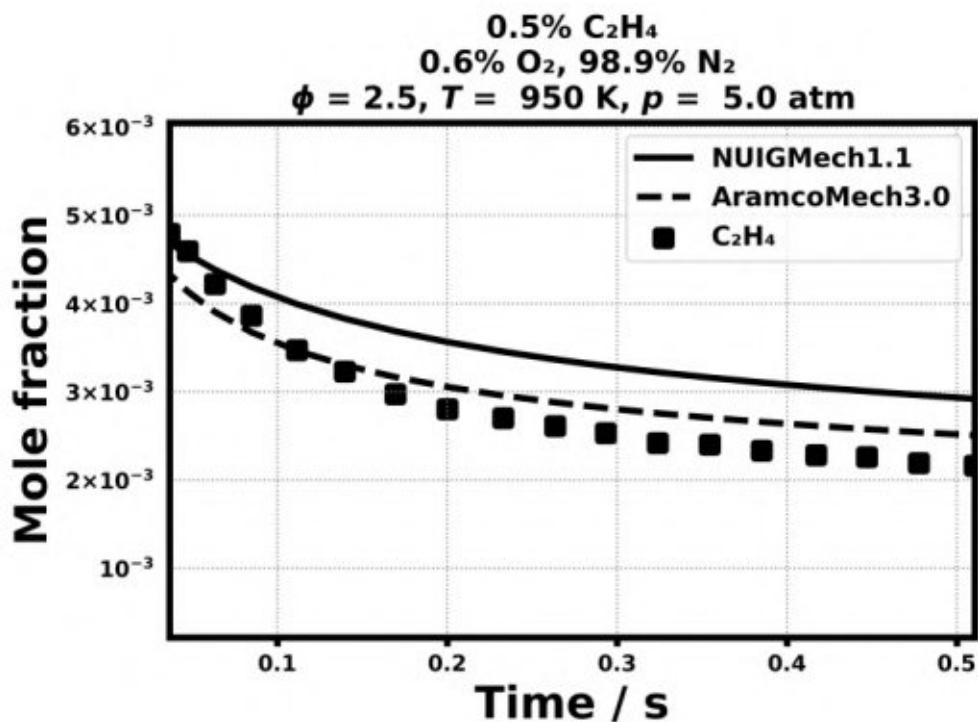
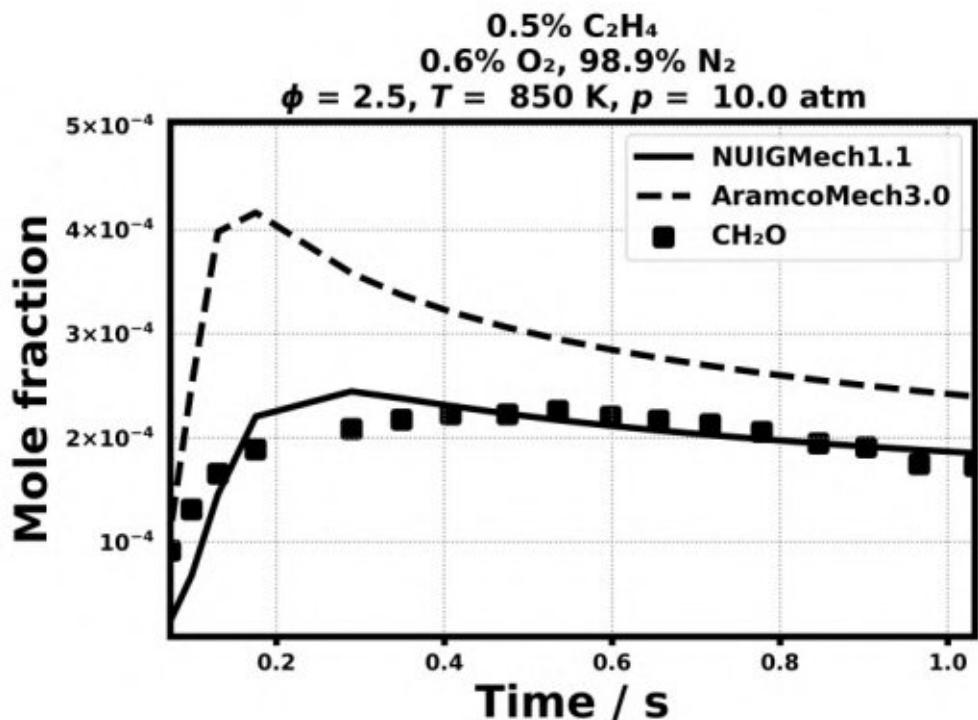


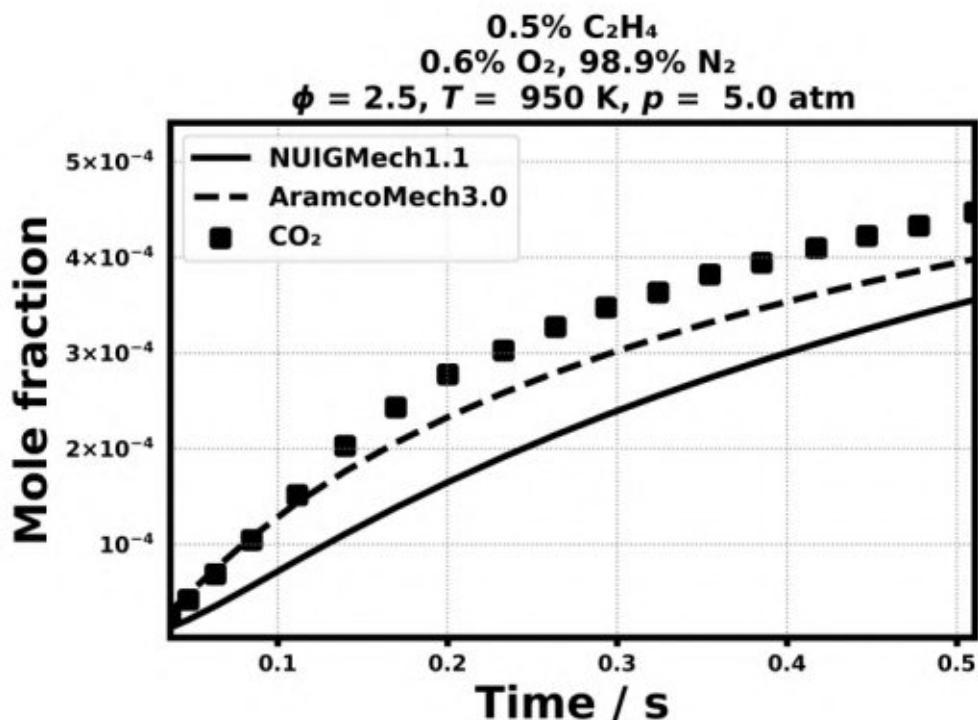
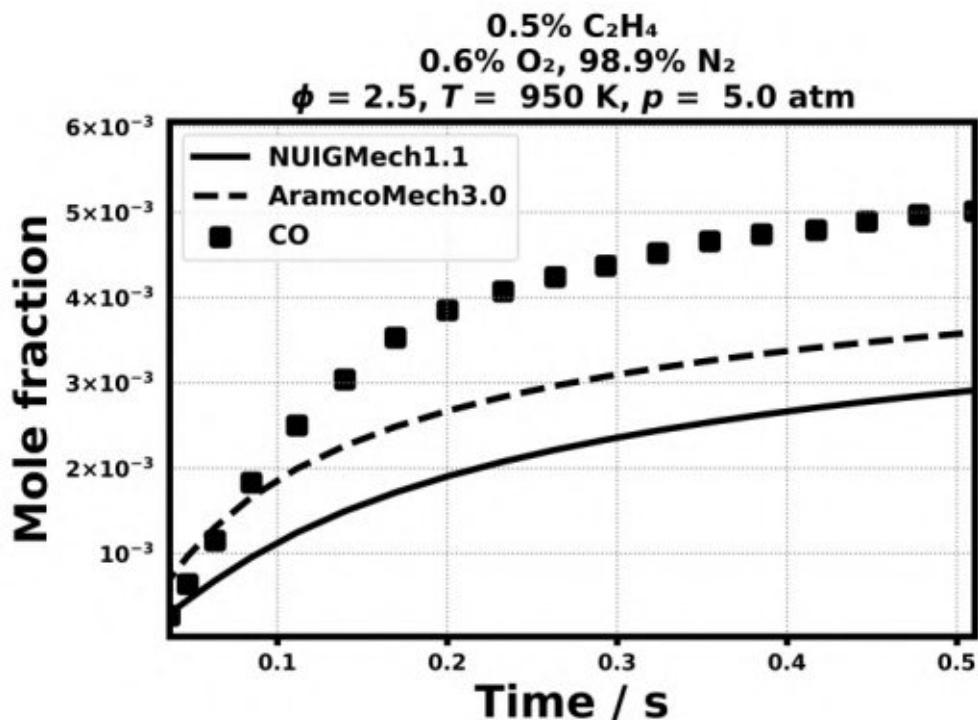
$0.5\% \text{C}_2\text{H}_4$
 $0.6\% \text{O}_2, 98.9\% \text{N}_2$
 $\phi = 2.5, T = 850 \text{ K}, p = 10.0 \text{ atm}$



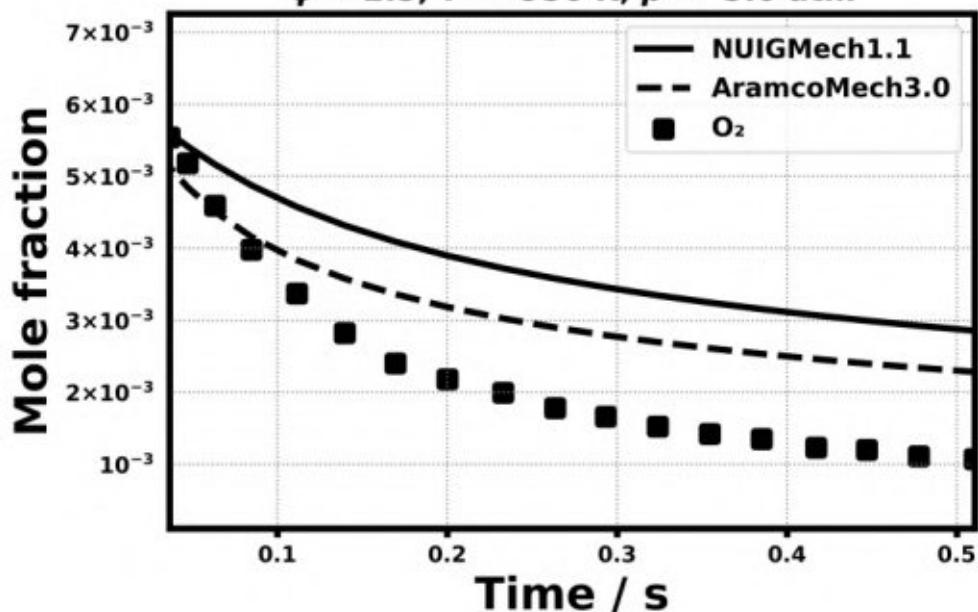
$0.5\% \text{C}_2\text{H}_4$
 $0.6\% \text{O}_2, 98.9\% \text{N}_2$
 $\phi = 2.5, T = 850 \text{ K}, p = 10.0 \text{ atm}$



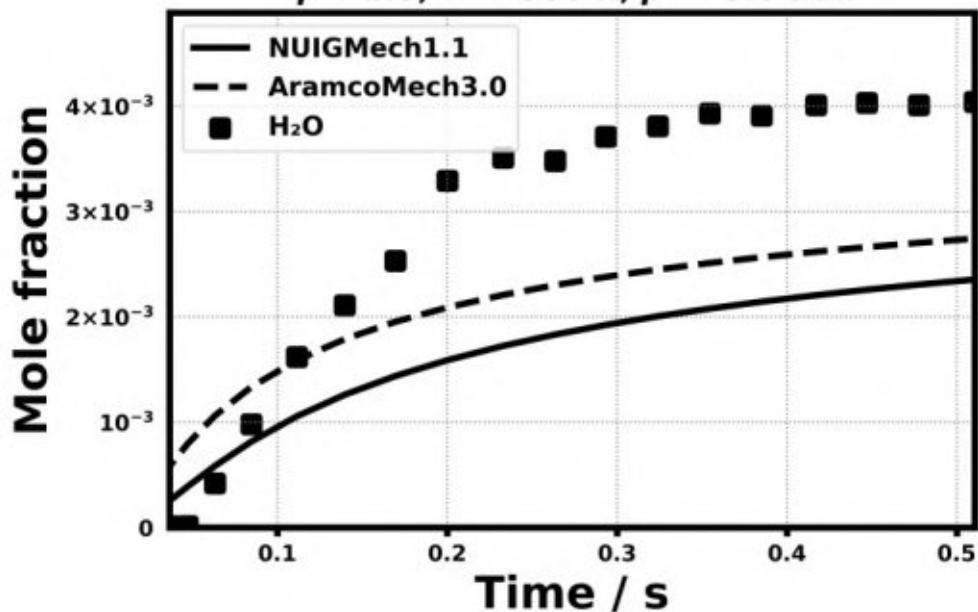




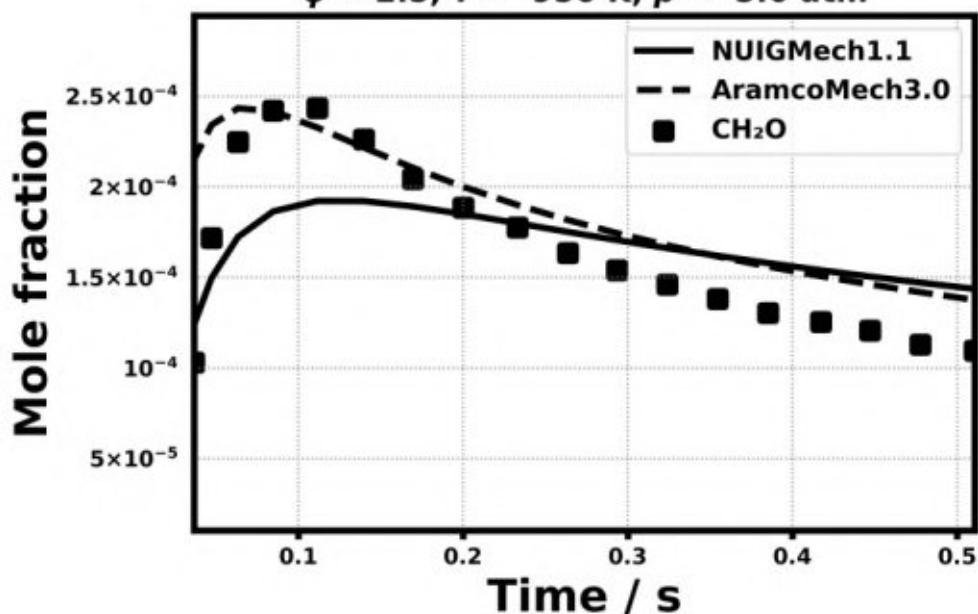
$0.5\% \text{C}_2\text{H}_4$
 $0.6\% \text{O}_2, 98.9\% \text{N}_2$
 $\phi = 2.5, T = 950 \text{ K}, p = 5.0 \text{ atm}$



$0.5\% \text{C}_2\text{H}_4$
 $0.6\% \text{O}_2, 98.9\% \text{N}_2$
 $\phi = 2.5, T = 950 \text{ K}, p = 5.0 \text{ atm}$

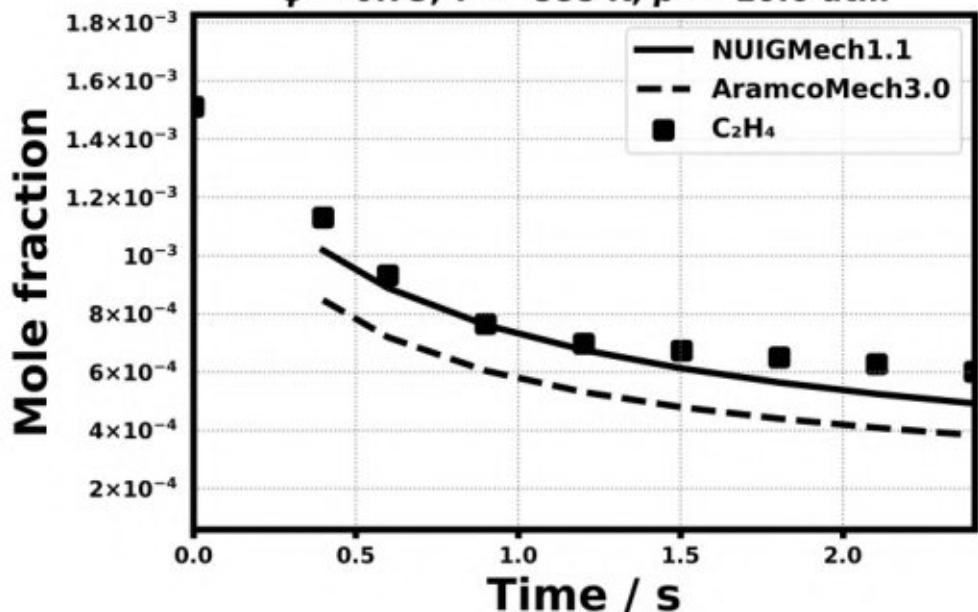


$0.5\% \text{C}_2\text{H}_4$
 $0.6\% \text{O}_2, 98.9\% \text{N}_2$
 $\phi = 2.5, T = 950 \text{ K}, p = 5.0 \text{ atm}$

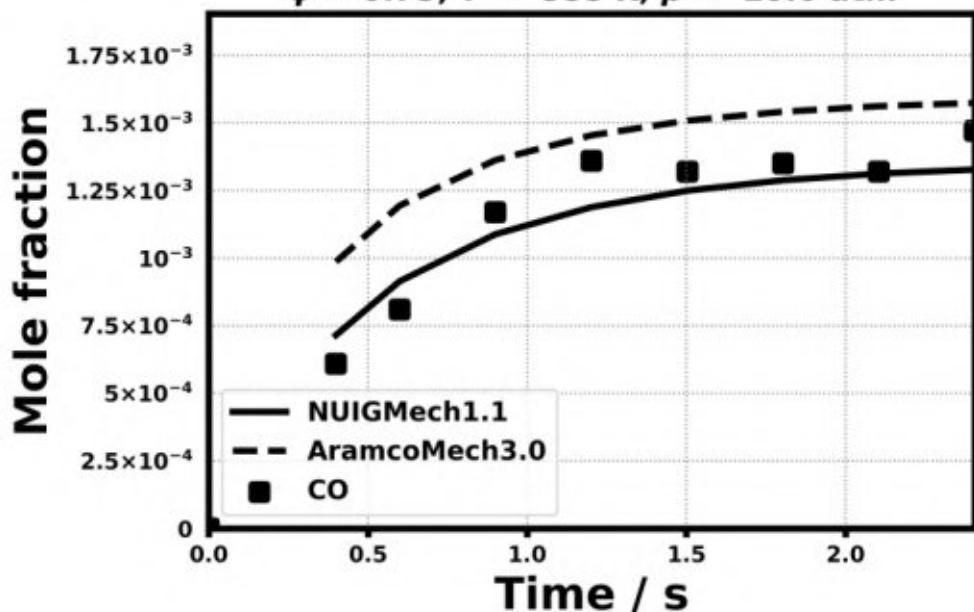


6.15) Dagaut, P., Boettner, J. C., & Cathonnet, M. (1991). Combustion science and technology, 77(1-3), 127-148.

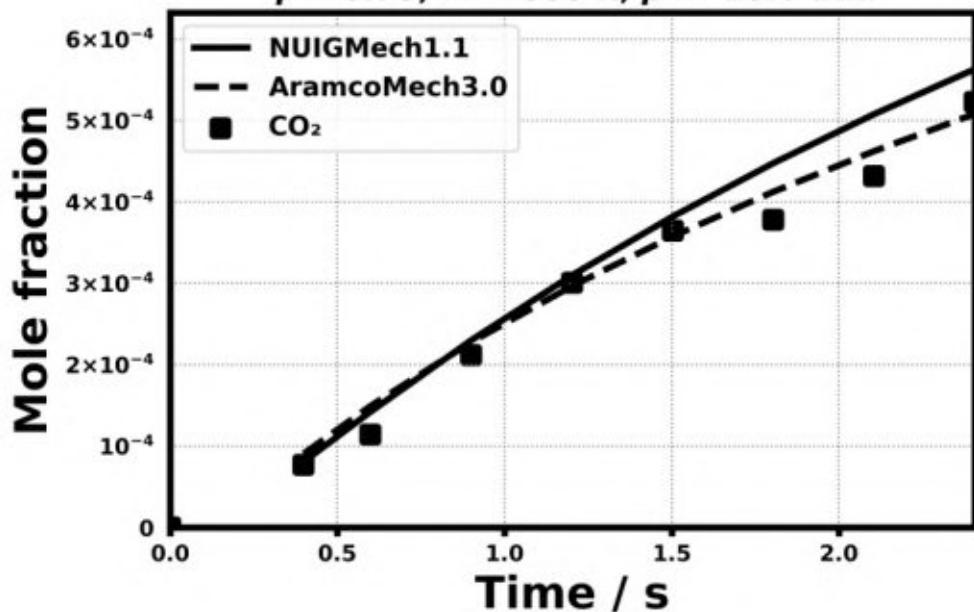
$0.15\% \text{C}_2\text{H}_4$
 $0.6\% \text{O}_2, 99.25\% \text{N}_2$
 $\phi = 0.75, T = 888 \text{ K}, p = 10.0 \text{ atm}$



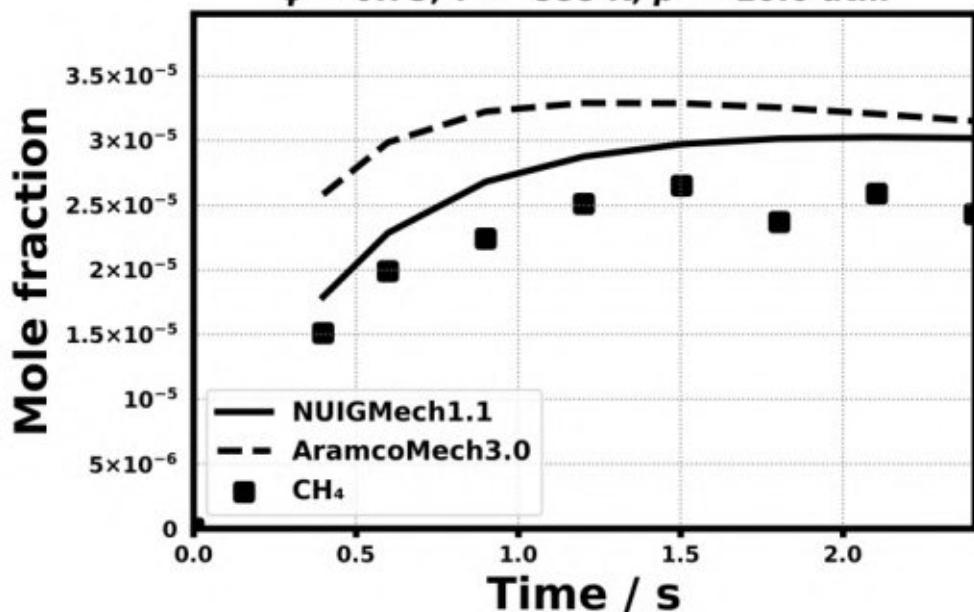
$0.15\% \text{ C}_2\text{H}_4$
 $0.6\% \text{ O}_2, 99.25\% \text{ N}_2$
 $\phi = 0.75, T = 888 \text{ K}, p = 10.0 \text{ atm}$



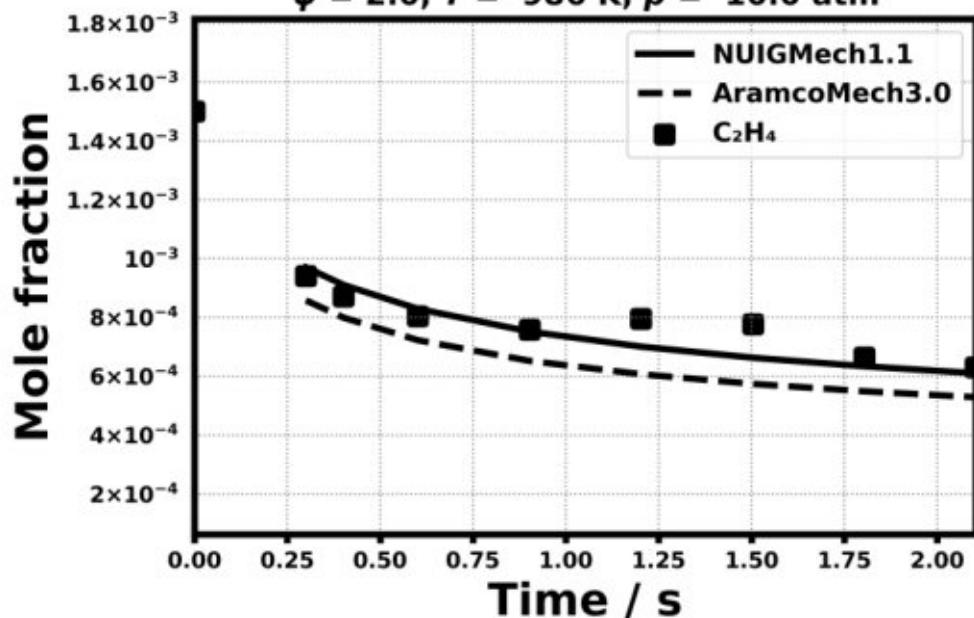
$0.15\% \text{ C}_2\text{H}_4$
 $0.6\% \text{ O}_2, 99.25\% \text{ N}_2$
 $\phi = 0.75, T = 888 \text{ K}, p = 10.0 \text{ atm}$



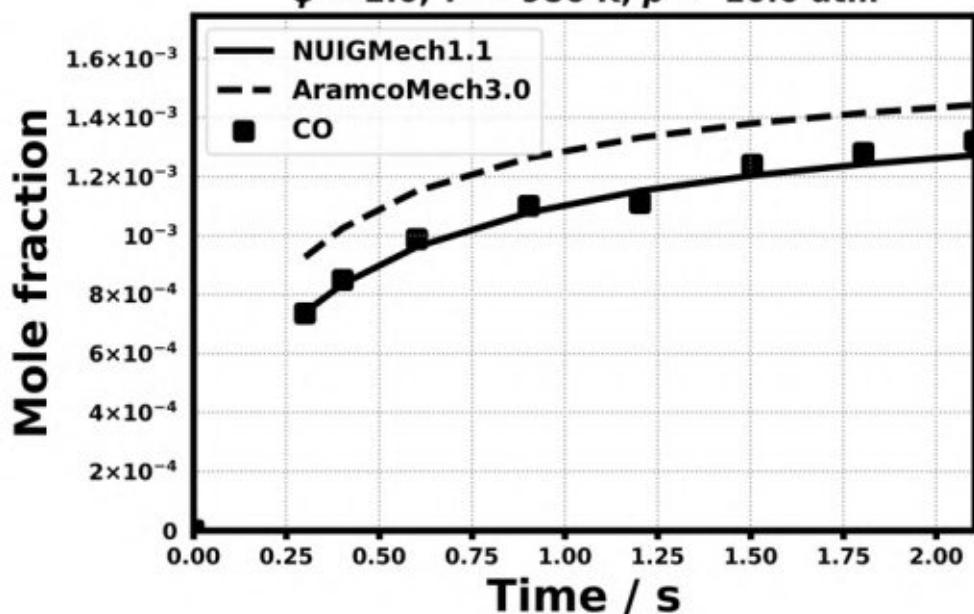
$0.15\% \text{ C}_2\text{H}_4$
 $0.6\% \text{ O}_2, 99.25\% \text{ N}_2$
 $\phi = 0.75, T = 888 \text{ K}, p = 10.0 \text{ atm}$



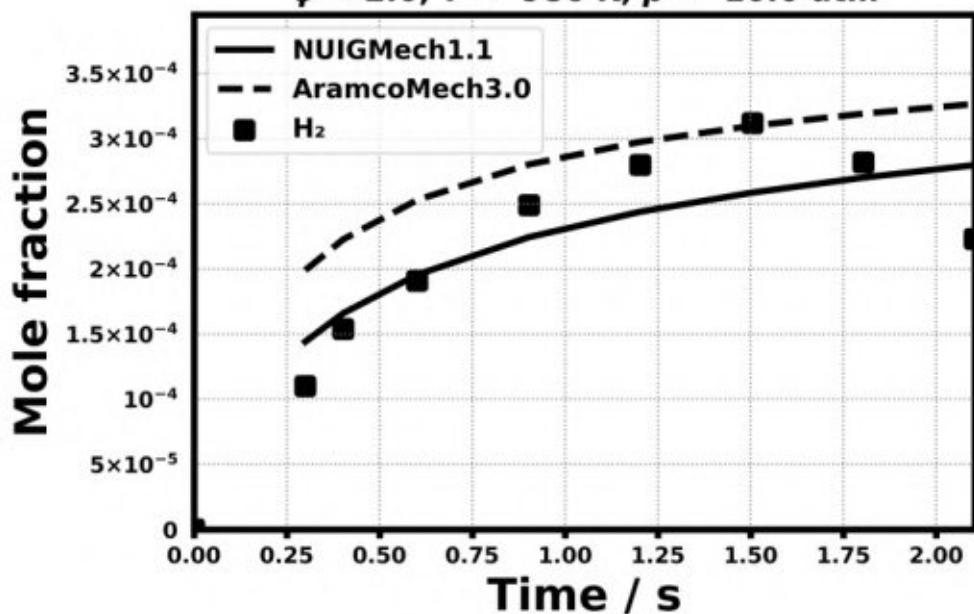
$0.15\% \text{ C}_2\text{H}_4$
 $0.225\% \text{ O}_2, 99.625\% \text{ N}_2$
 $\phi = 2.0, T = 986 \text{ K}, p = 10.0 \text{ atm}$



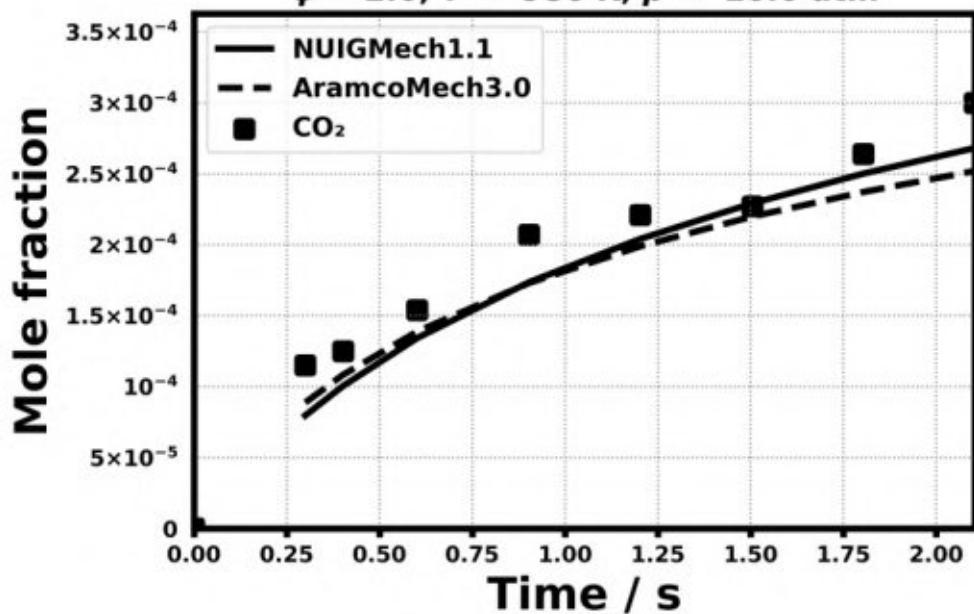
$0.15\% \text{ C}_2\text{H}_4$
 $0.225\% \text{ O}_2, 99.625\% \text{ N}_2$
 $\phi = 2.0, T = 986 \text{ K}, p = 10.0 \text{ atm}$



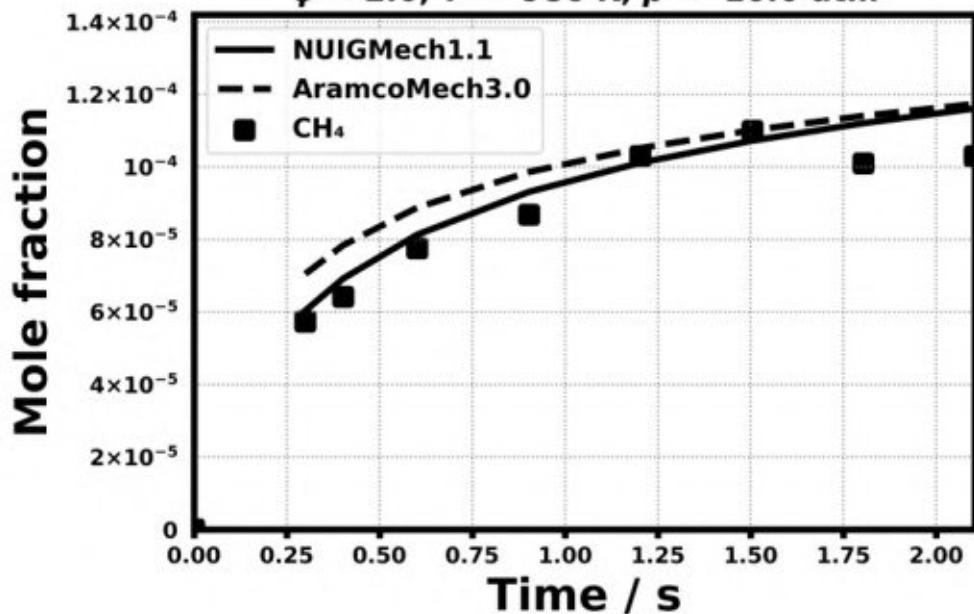
$0.15\% \text{ C}_2\text{H}_4$
 $0.225\% \text{ O}_2, 99.625\% \text{ N}_2$
 $\phi = 2.0, T = 986 \text{ K}, p = 10.0 \text{ atm}$



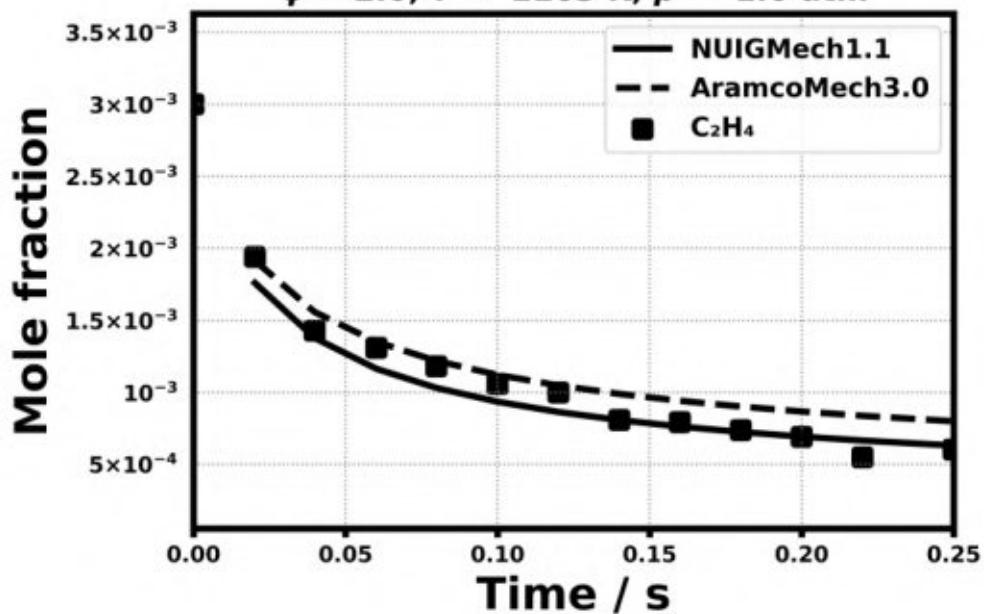
$0.15\% \text{ C}_2\text{H}_4$
 $0.225\% \text{ O}_2, 99.625\% \text{ N}_2$
 $\phi = 2.0, T = 986 \text{ K}, p = 10.0 \text{ atm}$



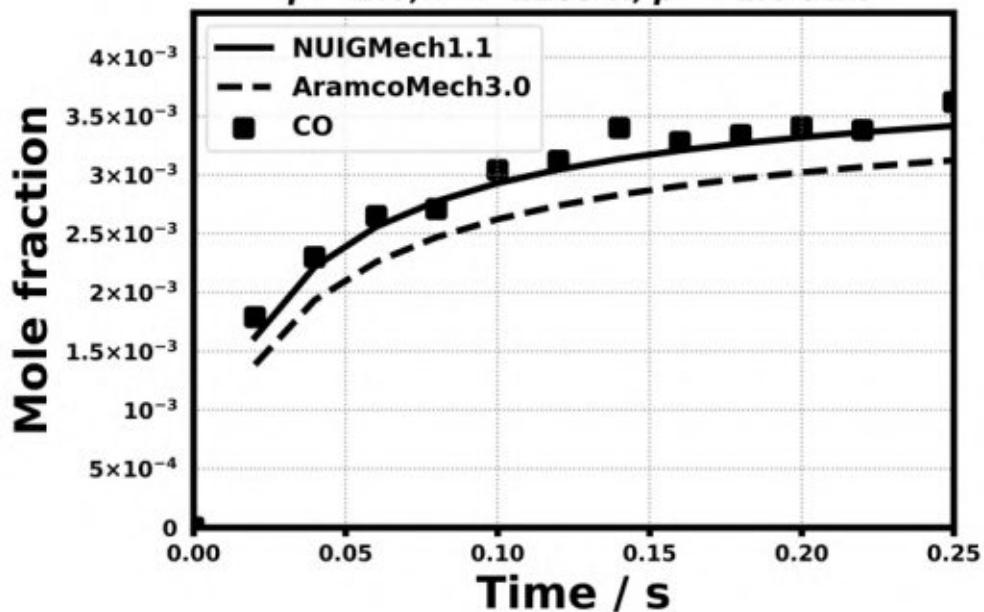
$0.15\% \text{ C}_2\text{H}_4$
 $0.225\% \text{ O}_2, 99.625\% \text{ N}_2$
 $\phi = 2.0, T = 986 \text{ K}, p = 10.0 \text{ atm}$



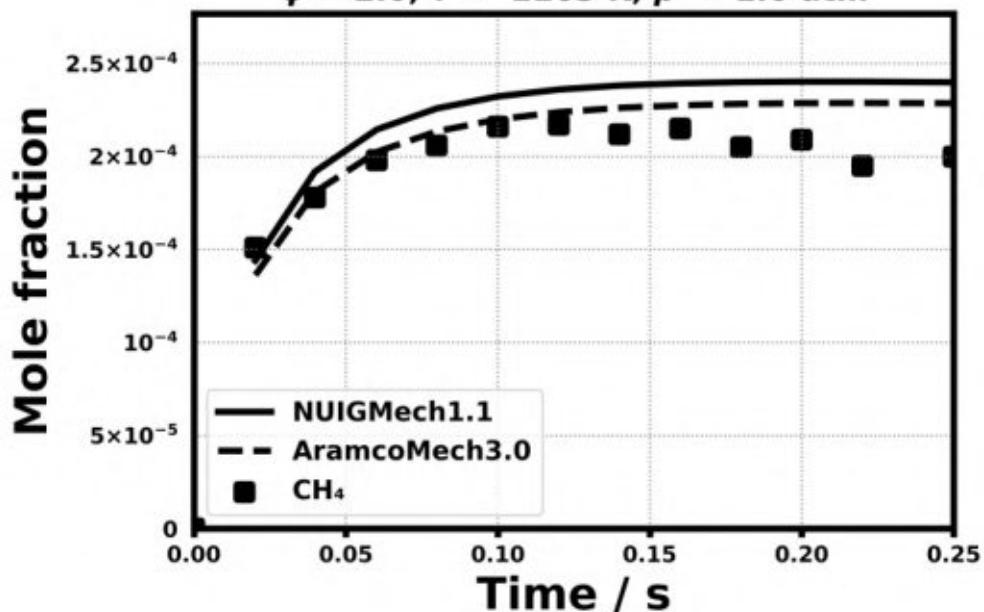
$0.3\% \text{ C}_2\text{H}_4$
 $0.45\% \text{ O}_2, 99.25\% \text{ N}_2$
 $\phi = 2.0, T = 1163 \text{ K}, p = 1.0 \text{ atm}$



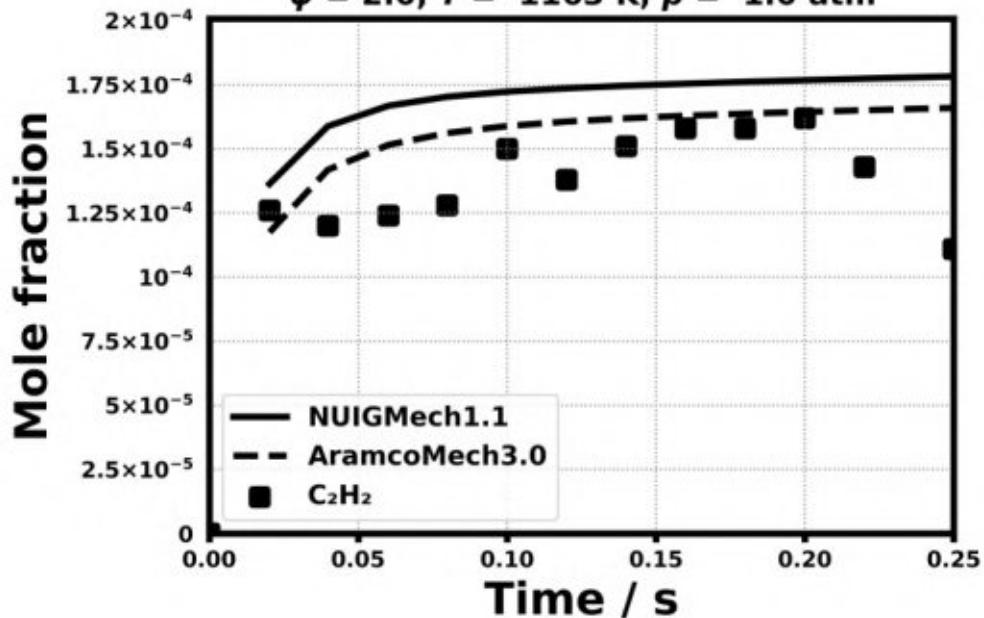
$0.3\% \text{ C}_2\text{H}_4$
 $0.45\% \text{ O}_2, 99.25\% \text{ N}_2$
 $\phi = 2.0, T = 1163 \text{ K}, p = 1.0 \text{ atm}$



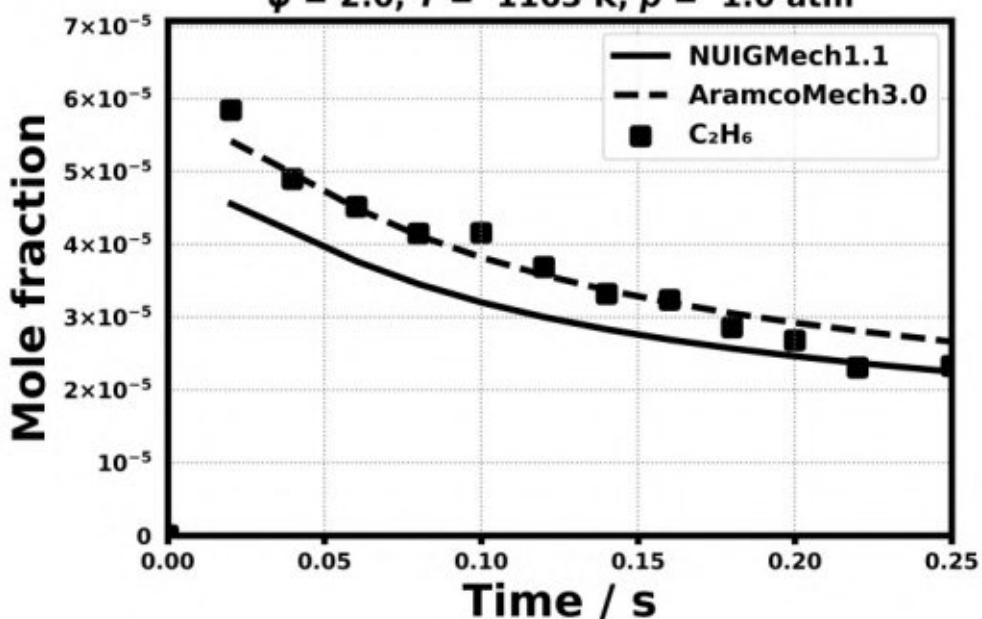
$0.3\% \text{ C}_2\text{H}_4$
 $0.45\% \text{ O}_2, 99.25\% \text{ N}_2$
 $\phi = 2.0, T = 1163 \text{ K}, p = 1.0 \text{ atm}$



$0.3\% \text{ C}_2\text{H}_4$
 $0.45\% \text{ O}_2, 99.25\% \text{ N}_2$
 $\phi = 2.0, T = 1163 \text{ K}, p = 1.0 \text{ atm}$

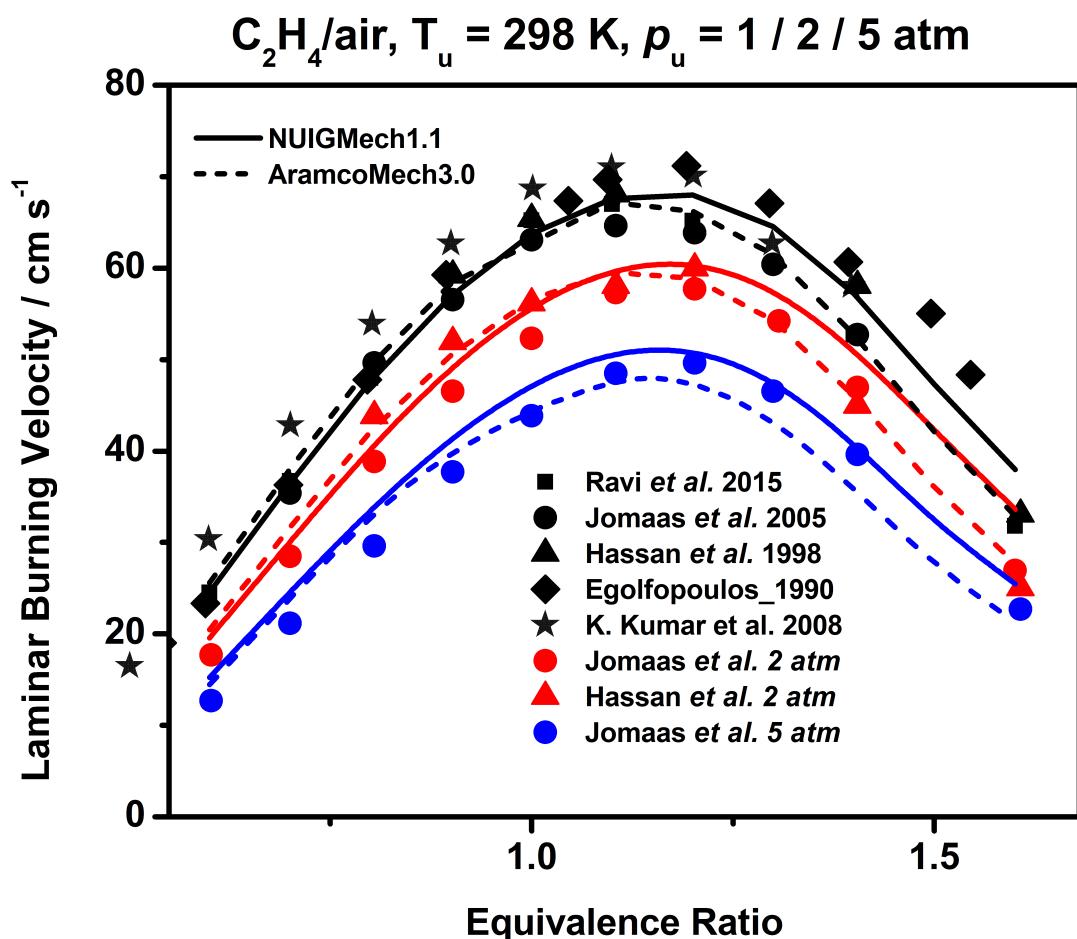


0.3% C₂H₄
0.45% O₂, 99.25% N₂
 $\phi = 2.0, T = 1163\text{ K}, p = 1.0\text{ atm}$



Laminar flame speed

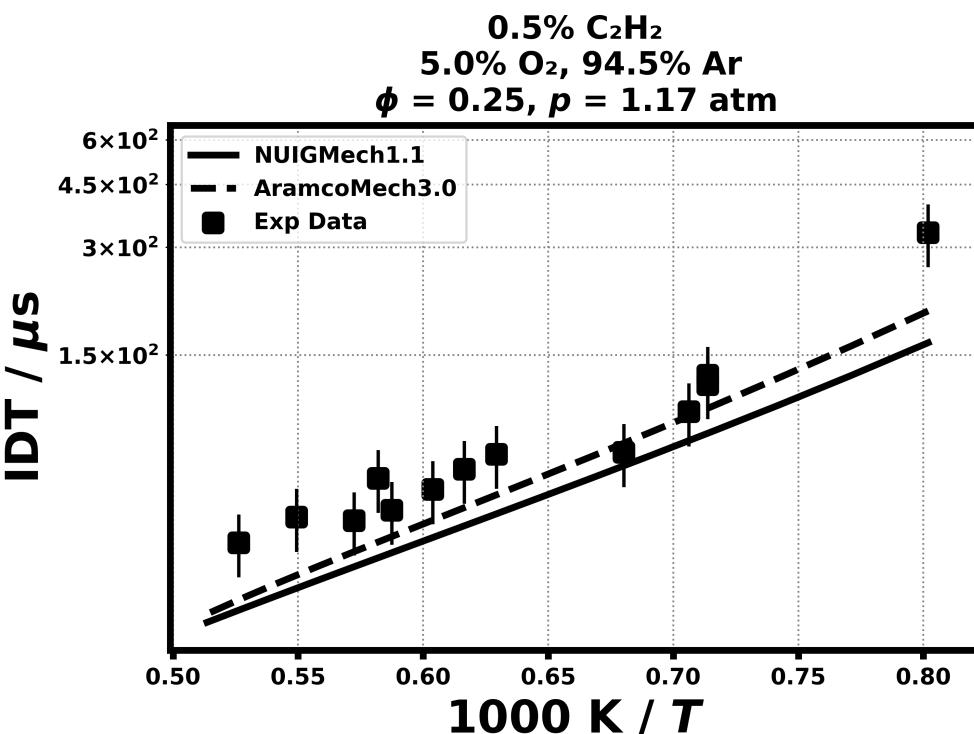
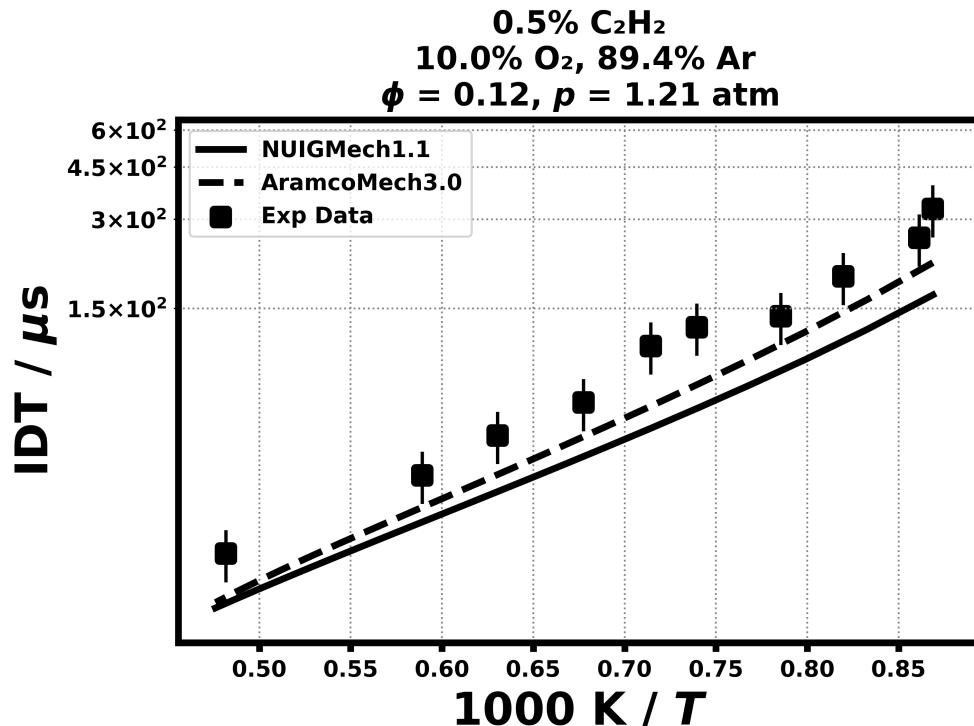
- 6.16) F. N. Egolfopoulos, D. L. Zhu, C. K. Law, Proceedings of the Combustion Institute 23 (1990) 471-478.
6.17) G. Jomaas, X. L. Zheng, D. L. Zhu, C. K. Law, Proceedings of the Combustion Institute 30 (2005) 193–200.
6.18) M. I. Hassan, K. T. Aung, O. C. Kwon, G. M. Faeth, Journal of Propulsion and Power 14 (1998) 479-488.
6.19) K. Kumar, G. Mittal, C. J. Sung, C. K. Law, Combustion and Flame 153 (2008) 343–361
6.20) Ravi, S., Sikes, T. G., Morones, A., Keesee, C. L., & Petersen, E. L., Proceedings of the Combustion Institute, 35(1) (2015) 679-686.

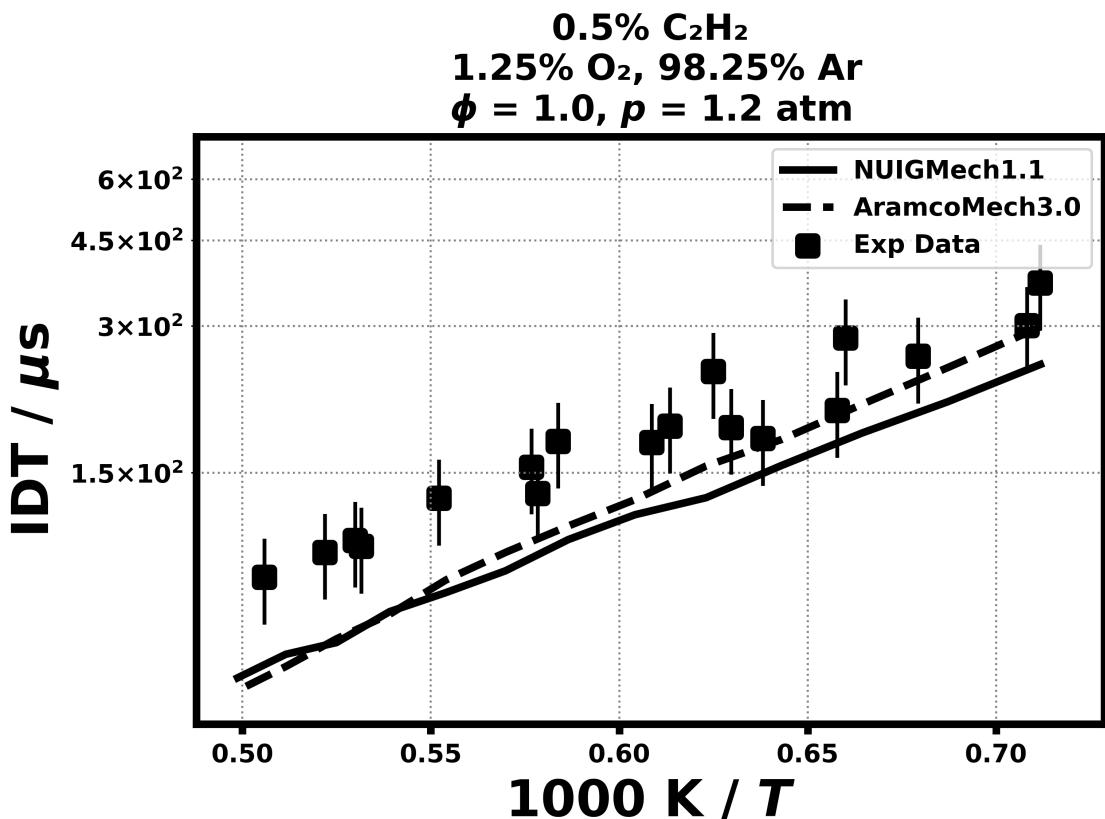
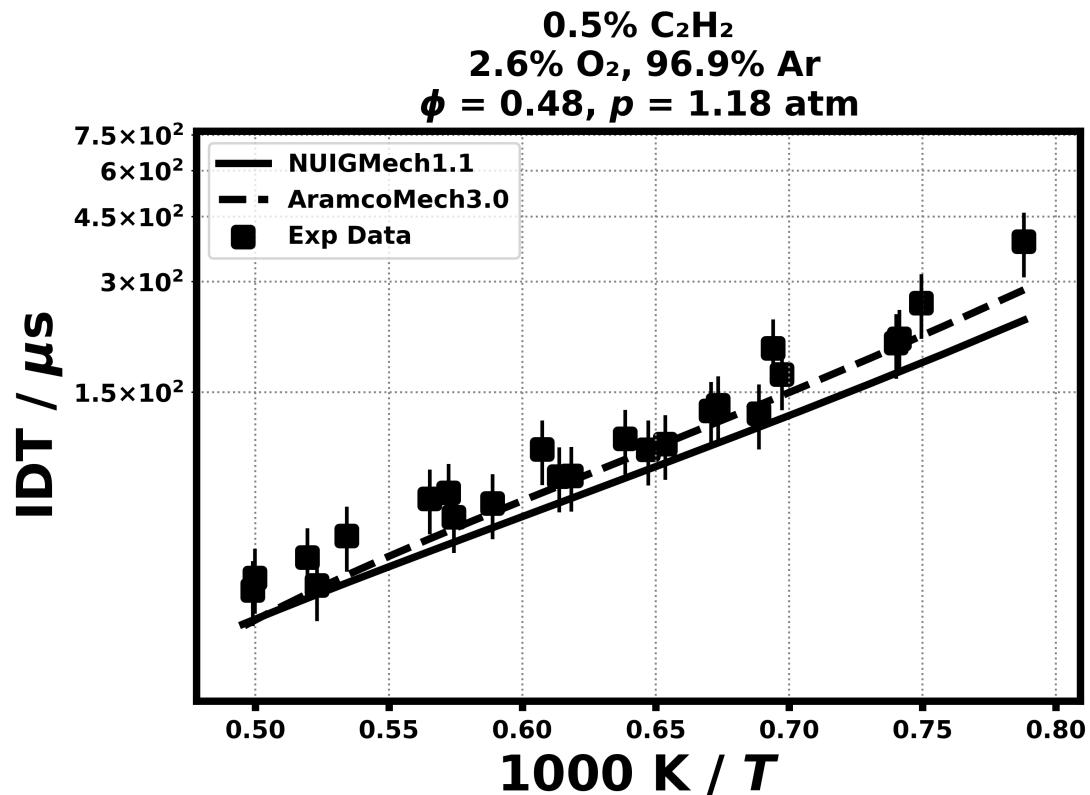


7. Validation for C₂H₂

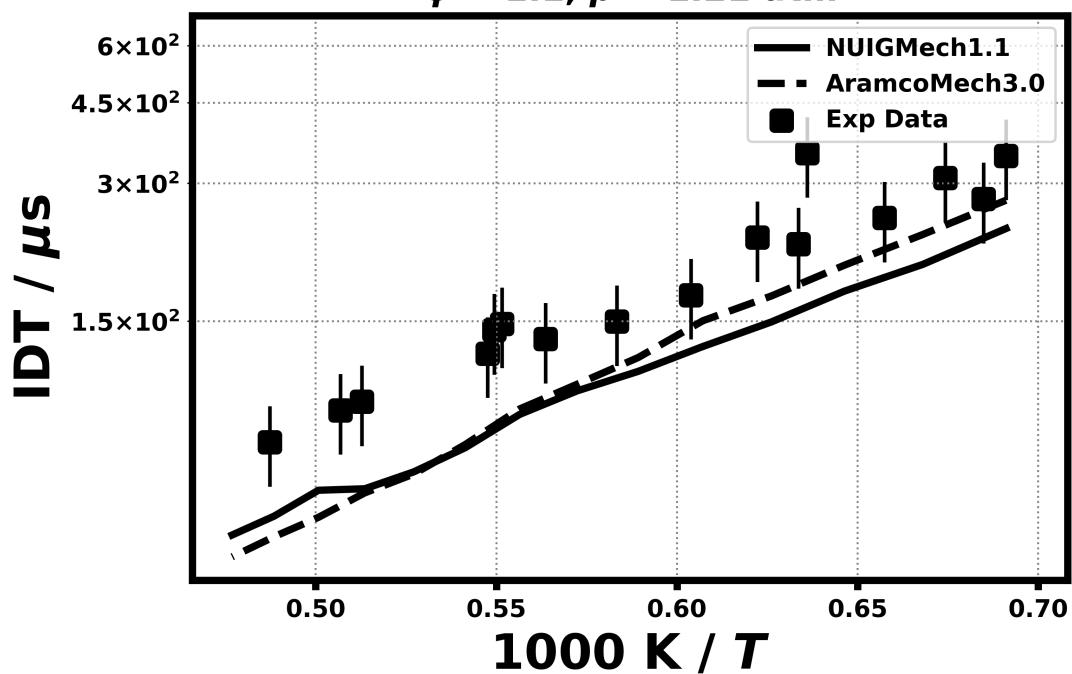
Shock tube ignition delay time

7.1) Eiteneer, B., & Frenklach, M., International Journal of Chemical Kinetics, 35(9) (2003) 391-414.

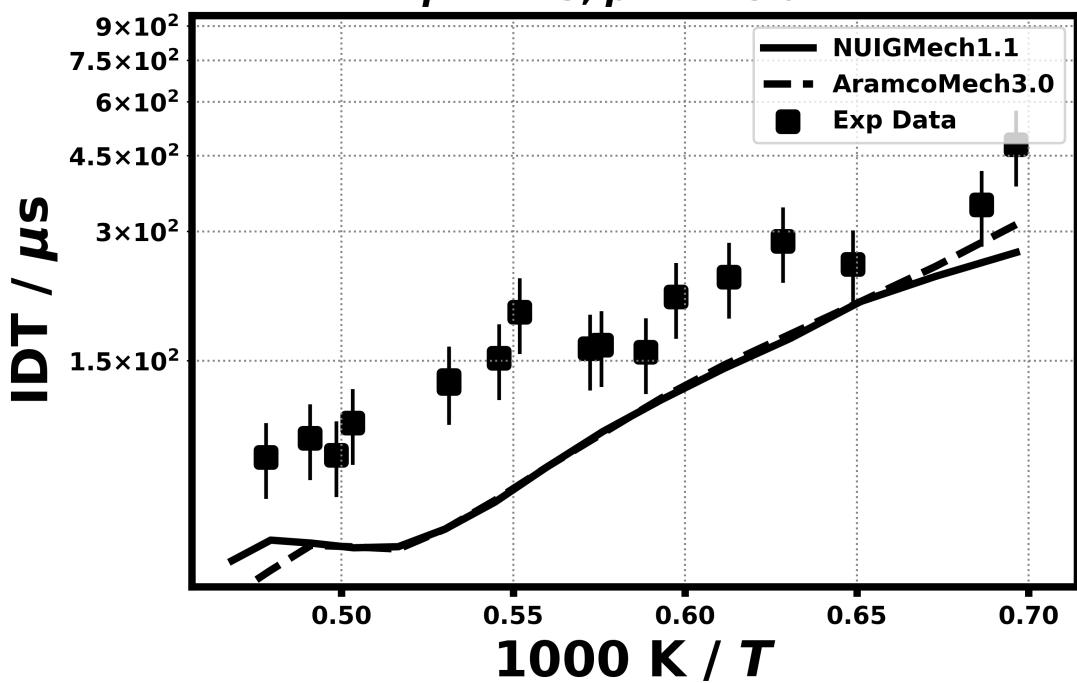




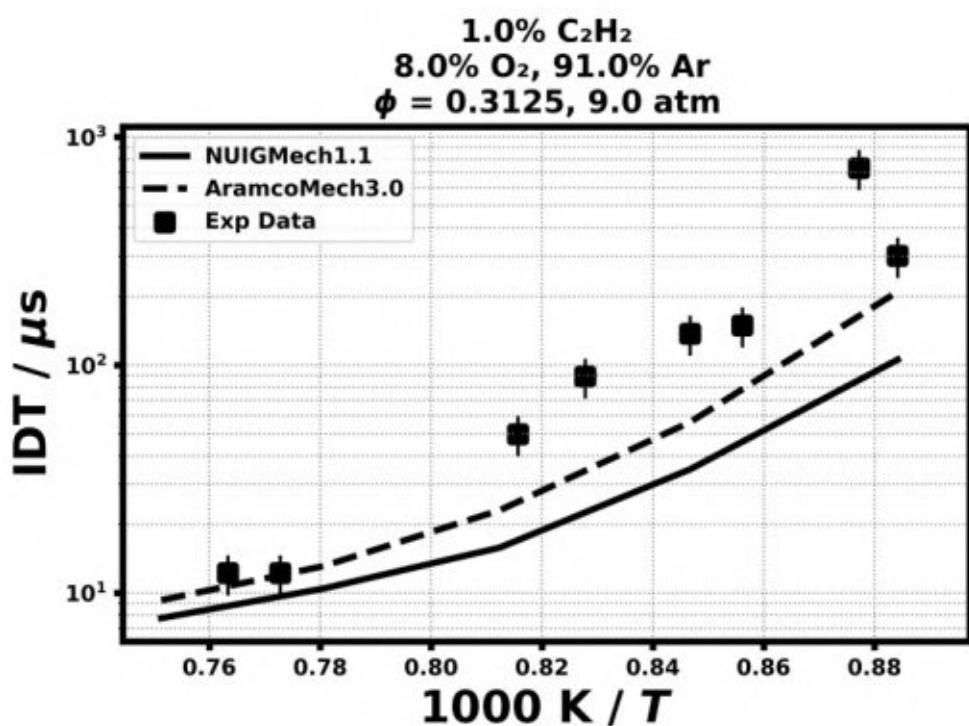
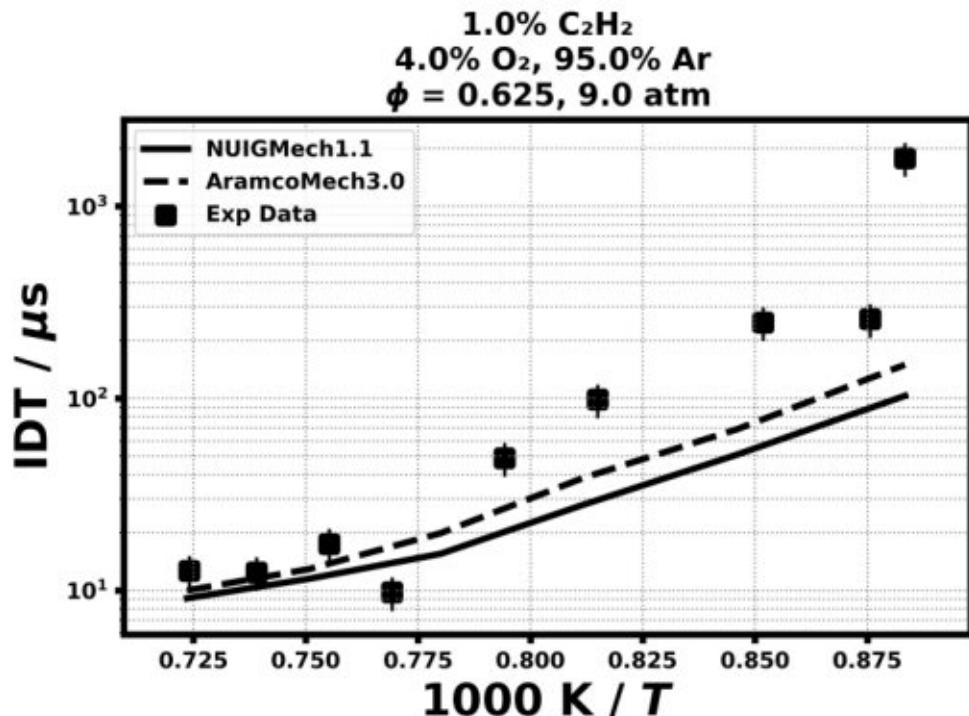
$0.5\% \text{C}_2\text{H}_2$
 $1.14\% \text{O}_2, 98.36\% \text{Ar}$
 $\phi = 1.1, p = 1.21 \text{ atm}$

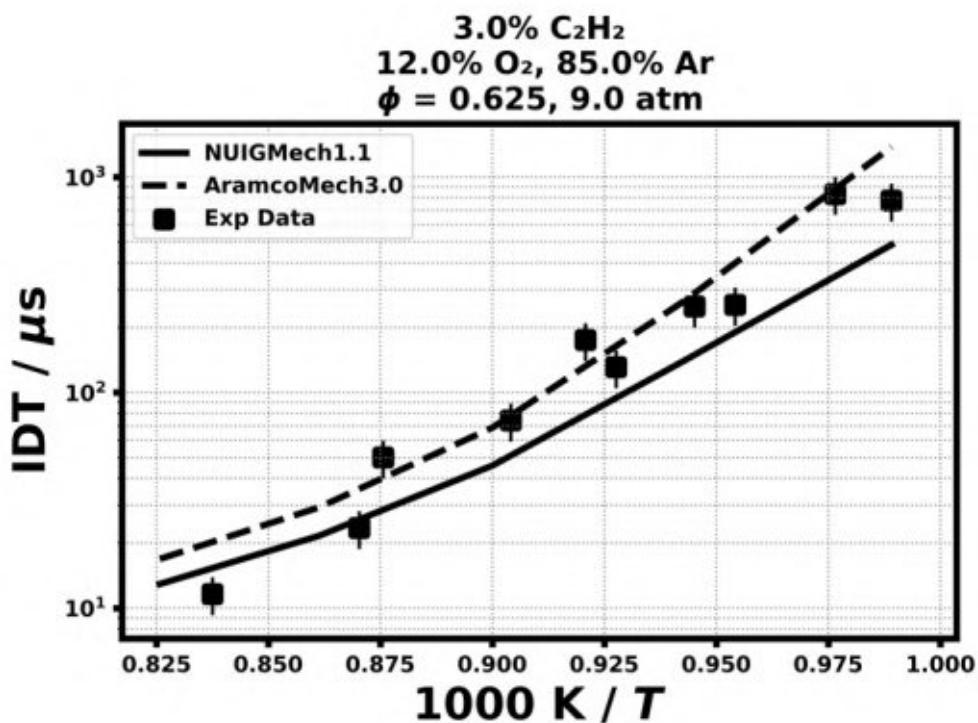


$0.5\% \text{C}_2\text{H}_2$
 $1.0\% \text{O}_2, 98.5\% \text{Ar}$
 $\phi = 1.25, p = 1.19 \text{ atm}$

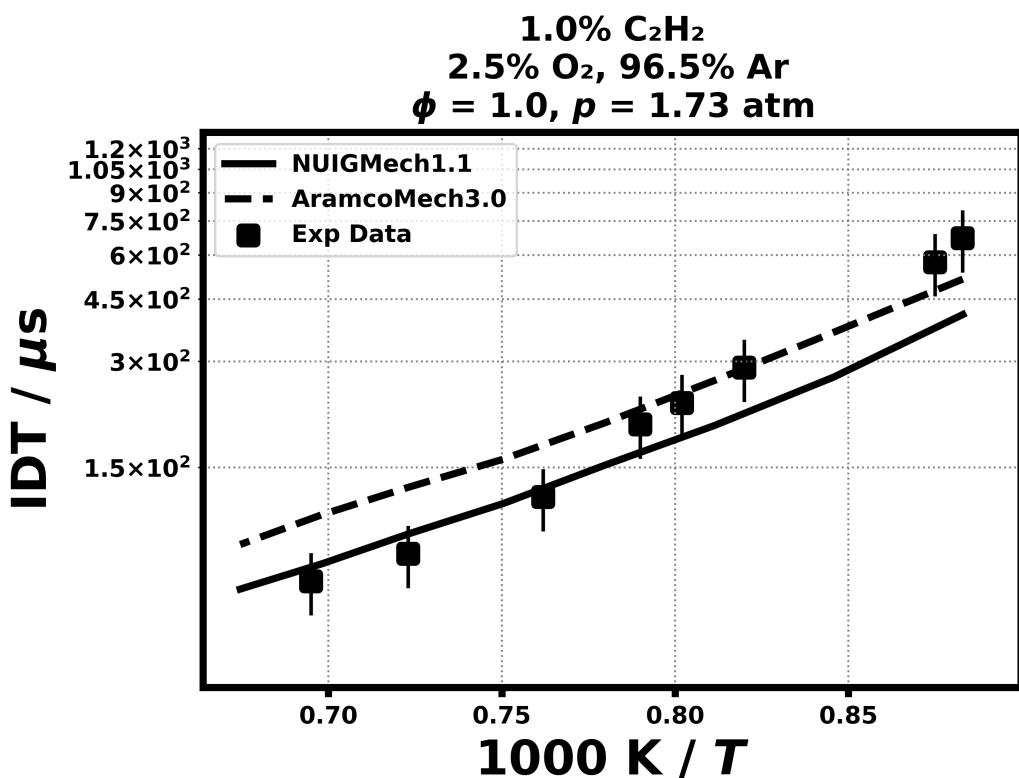


7.2) Fournet, R., Bauge, J. C., & Battin Leclerc, F. International journal of chemical kinetics, 31(5) (1999) 361-379.

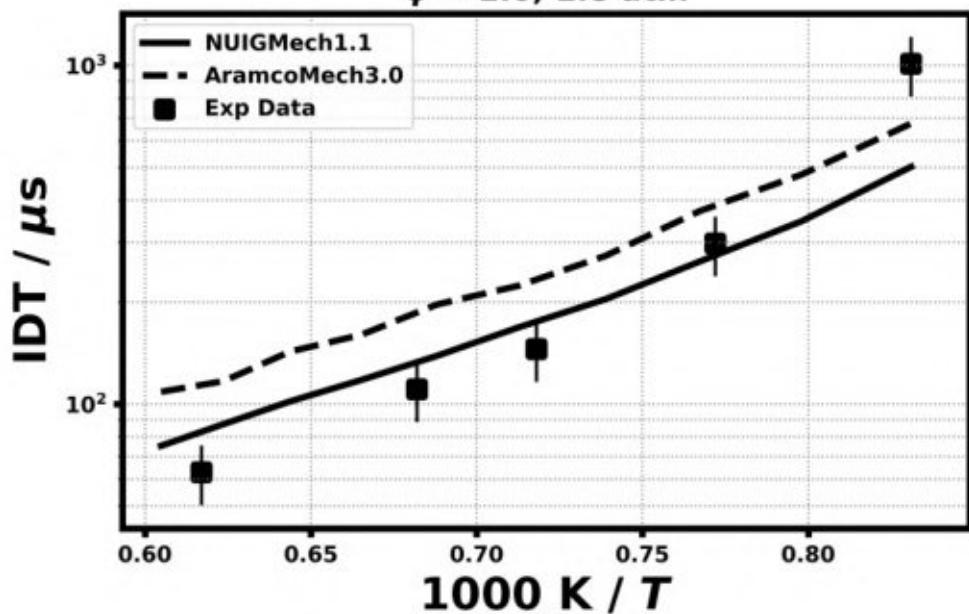




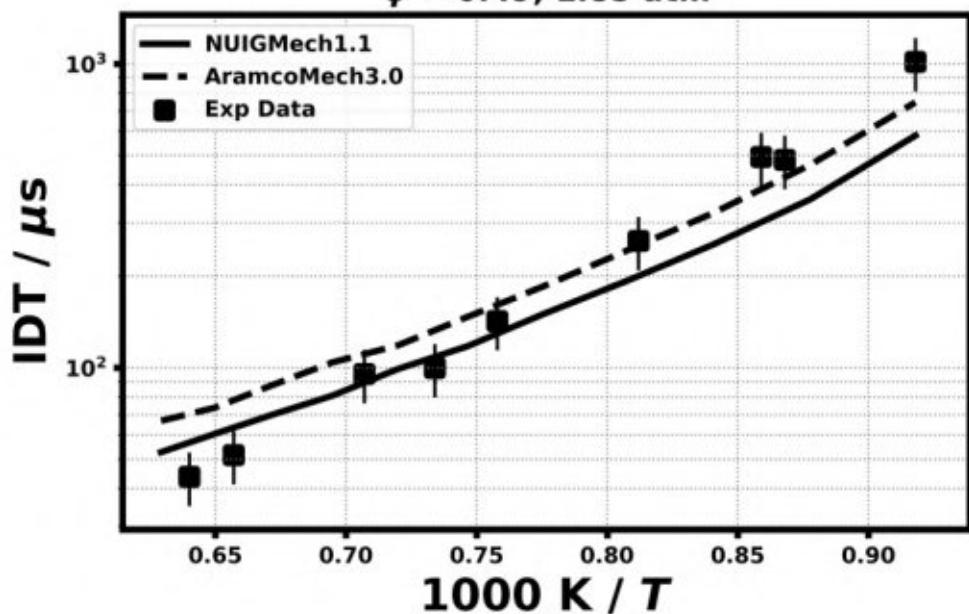
7.3) Hidaka, Y., Hattori, K., Okuno, T., Inami, K., Abe, T., & Koike, T. Combustion and Flame, 107(4) (1996) 401-417.

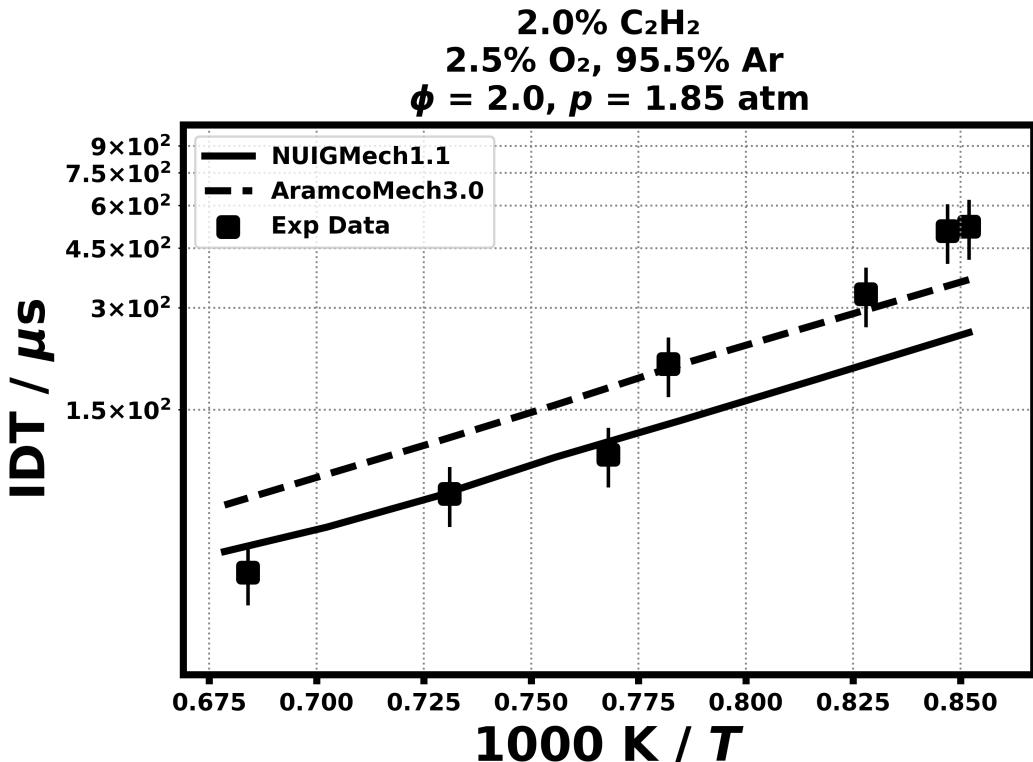


$0.5\% \text{C}_2\text{H}_2$
 $1.25\% \text{O}_2, 98.25\% \text{Ar}$
 $\phi = 1.0, 1.8 \text{ atm}$

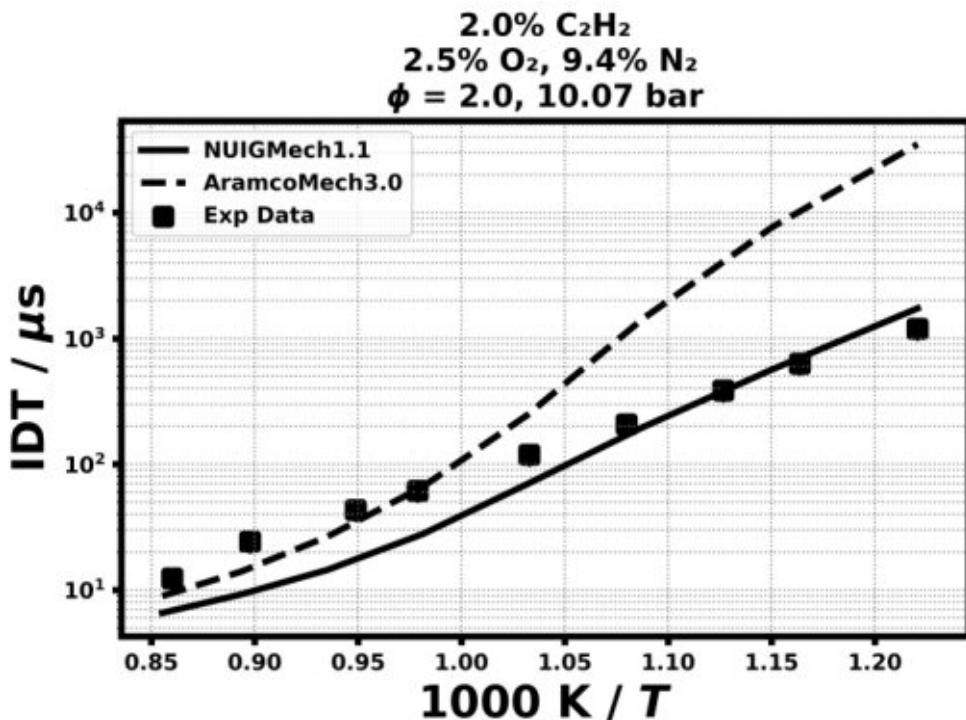


$0.5\% \text{C}_2\text{H}_2$
 $2.54\% \text{O}_2, 96.96\% \text{Ar}$
 $\phi = 0.49, 1.85 \text{ atm}$

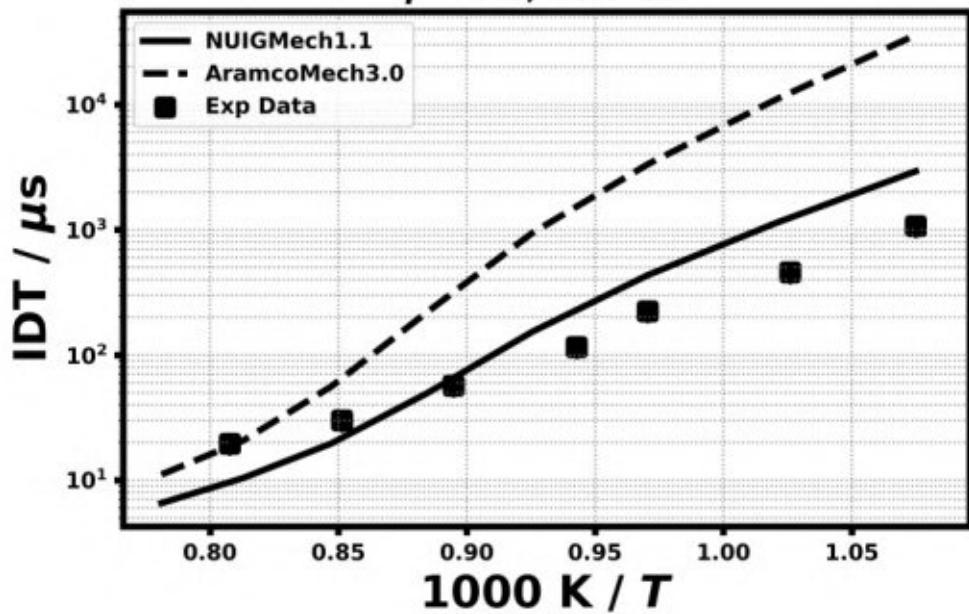




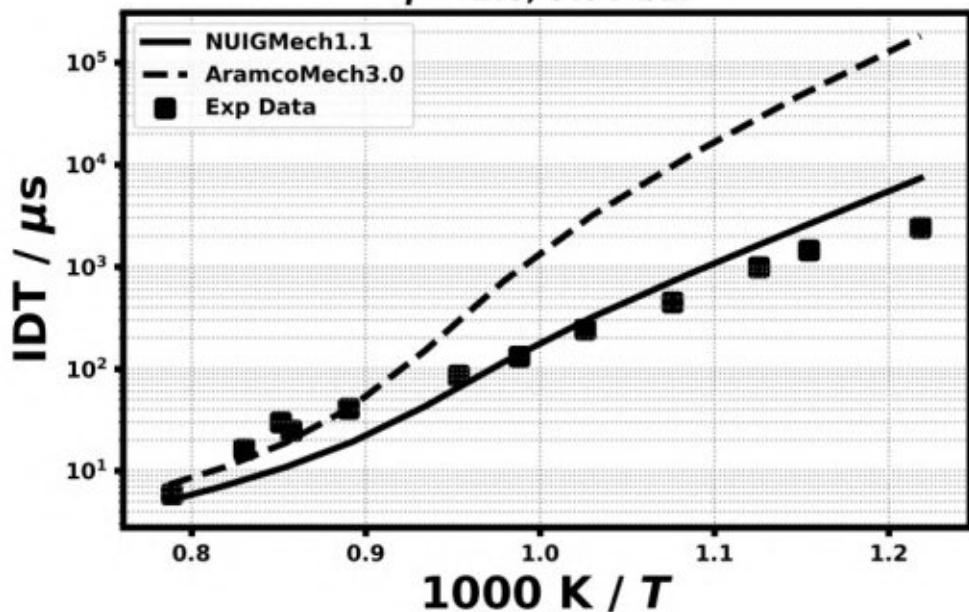
7.4) Lokachari, N., Burke, U., Ramalingam, A., Turner, M., Hesse, R., Somers, K. P., ... & Curran, H. J., Proceedings of the Combustion Institute, 37(1) (2019) 583-591.



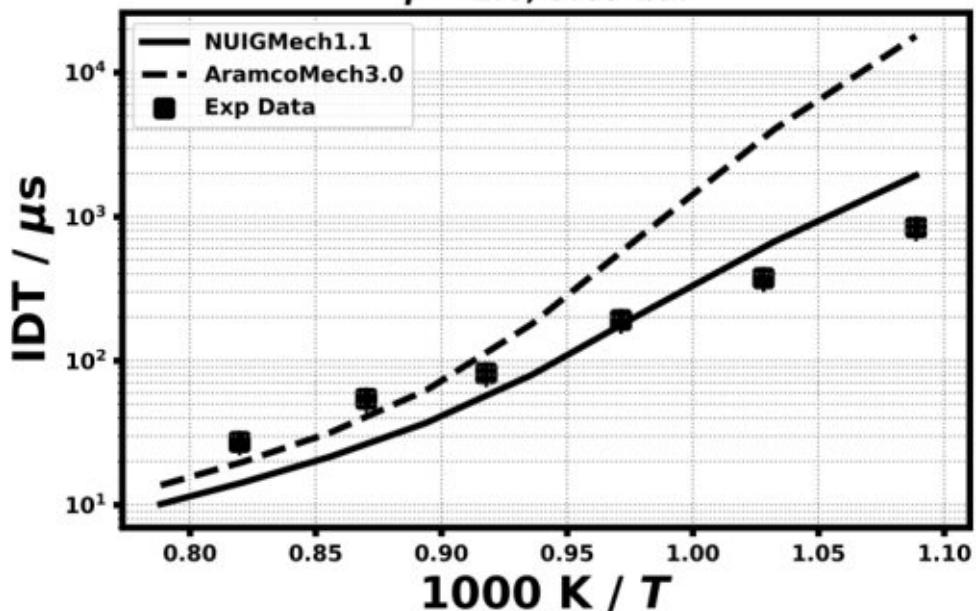
$0.5\% \text{C}_2\text{H}_2$
 $2.5\% \text{O}_2, 9.4\% \text{N}_2$
 $\phi = 0.5, 10.0 \text{ bar}$



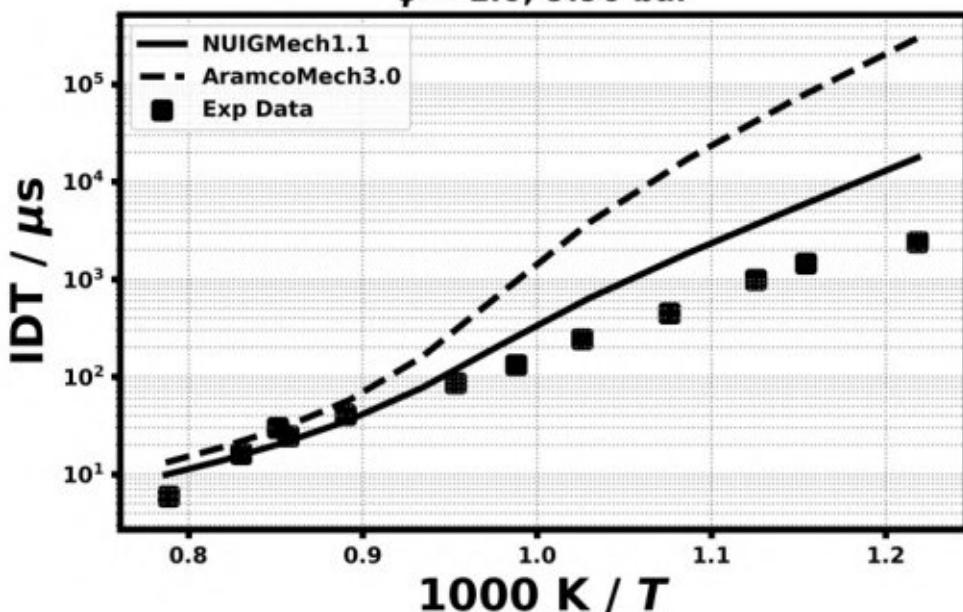
$1.0\% \text{C}_2\text{H}_2$
 $2.5\% \text{O}_2, 9.4\% \text{N}_2$
 $\phi = 1.0, 9.96 \text{ bar}$



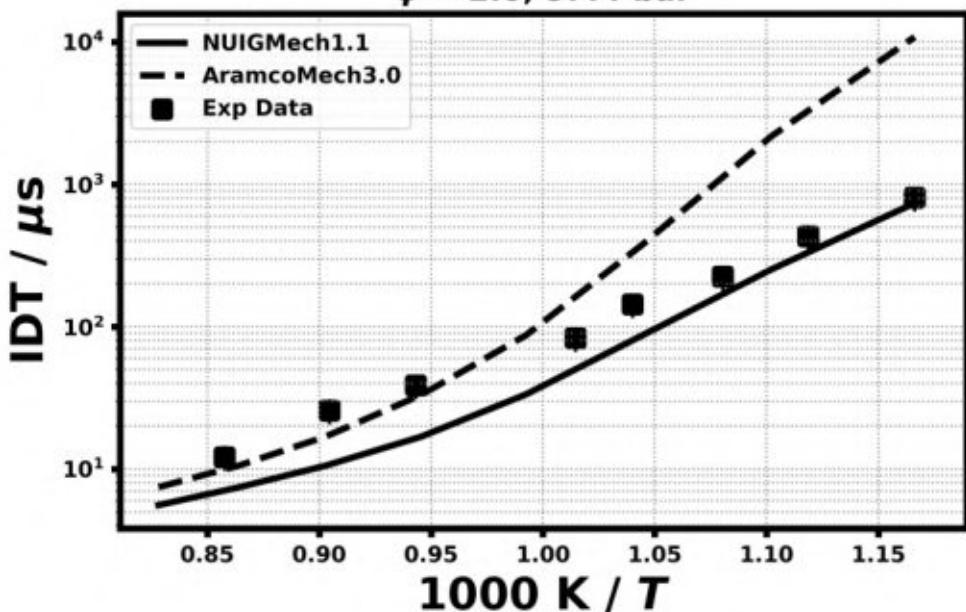
1.0% C₂H₂
2.5% O₂, 10.705% N₂, 10.705% Ar
 $\phi = 1.0, 9.69 \text{ bar}$



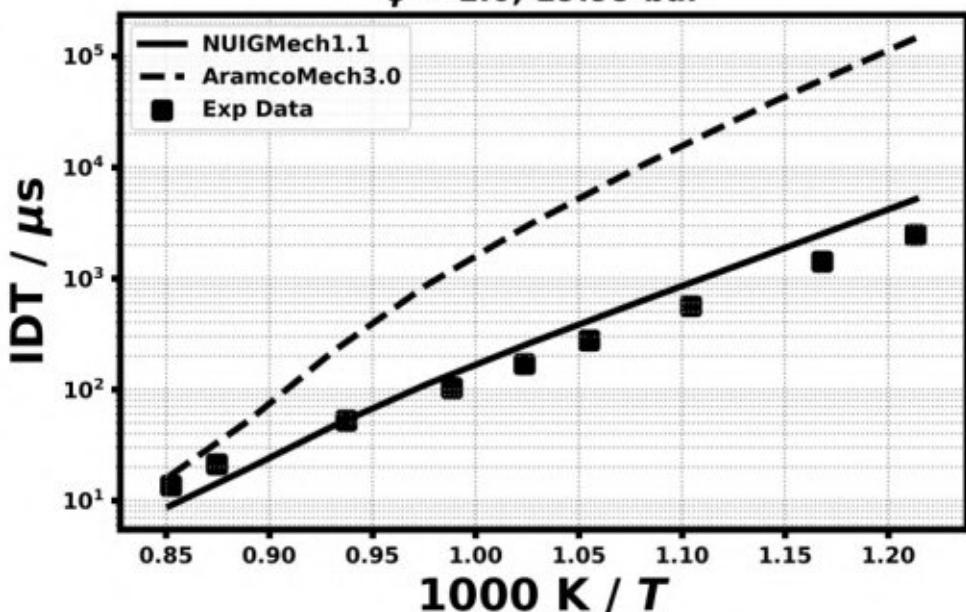
3.9998% C₂H₂
10.0% O₂, 43.0% N₂, 43.0% Ar
 $\phi = 1.0, 9.96 \text{ bar}$



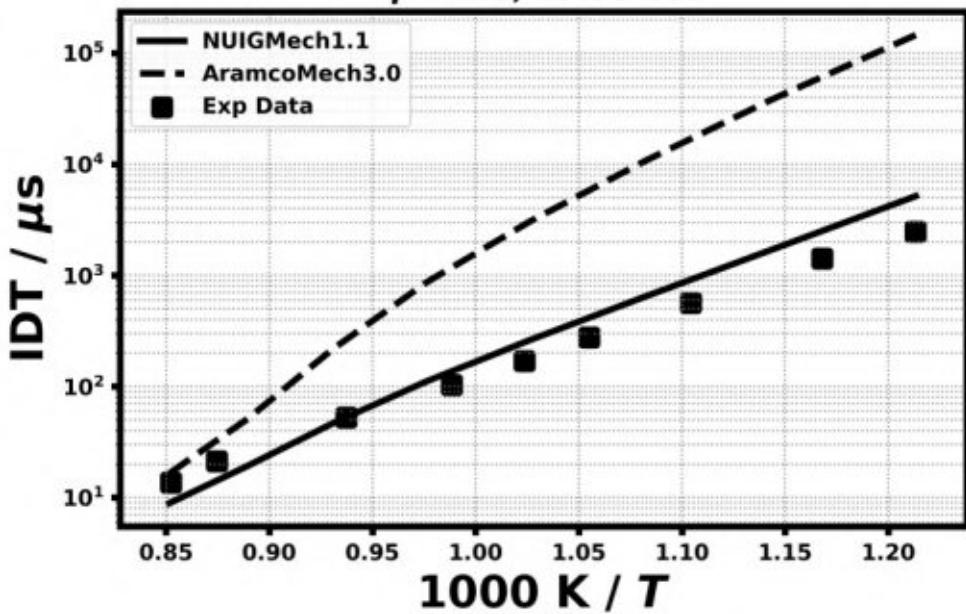
$1.0\% \text{C}_2\text{H}_2$
 $1.25\% \text{O}_2, 4.702\% \text{N}_2$
 $\phi = 2.0, 9.44 \text{ bar}$



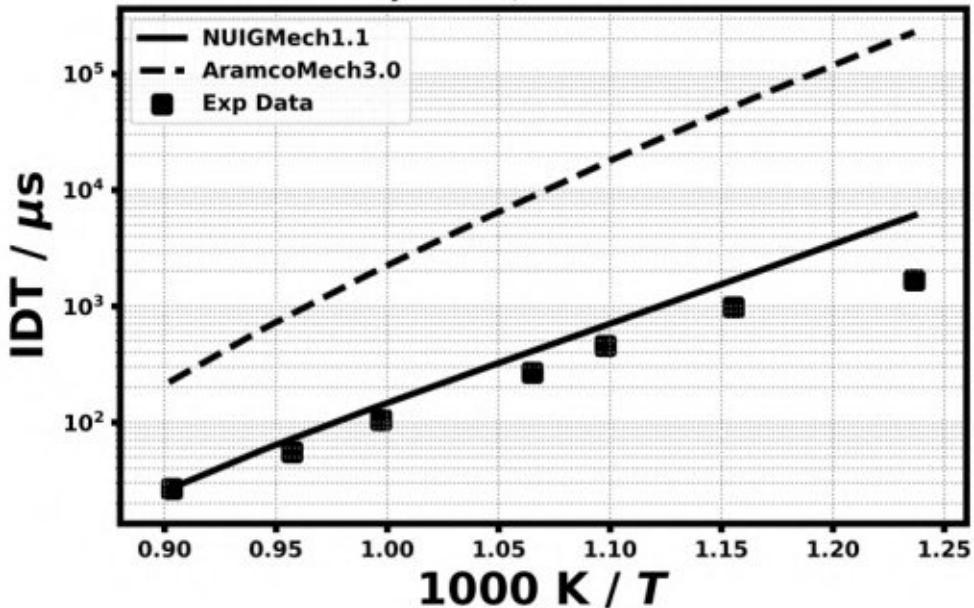
$1.0\% \text{C}_2\text{H}_2$
 $2.5\% \text{O}_2, 9.4\% \text{N}_2$
 $\phi = 1.0, 19.99 \text{ bar}$

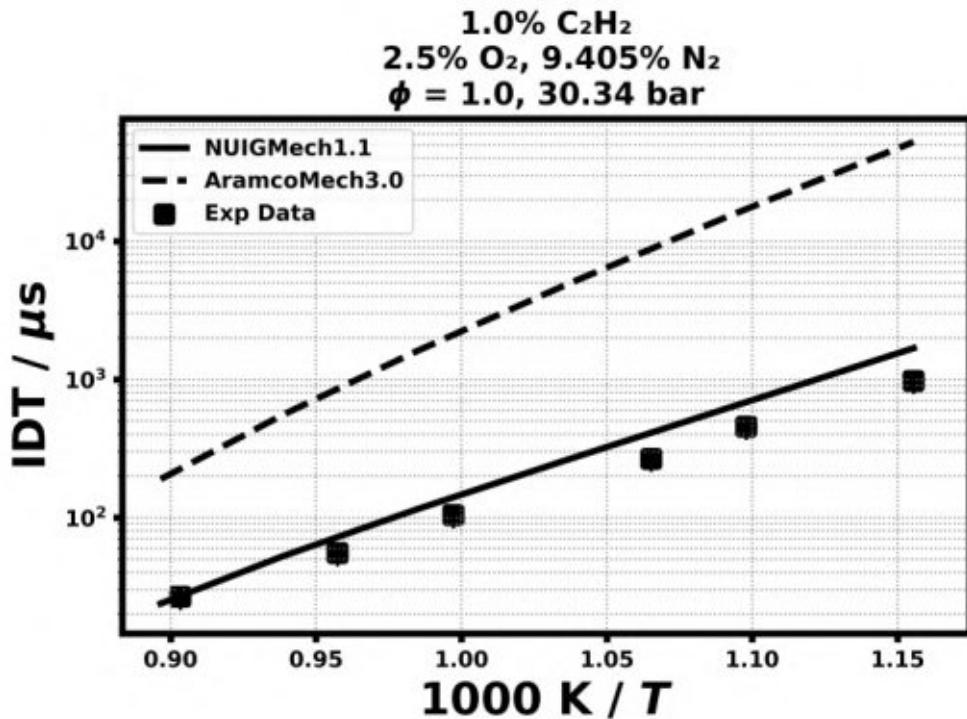


$1.0\% \text{C}_2\text{H}_2$
 $2.5\% \text{O}_2, 9.405\% \text{N}_2$
 $\phi = 1.0, 19.93 \text{ bar}$

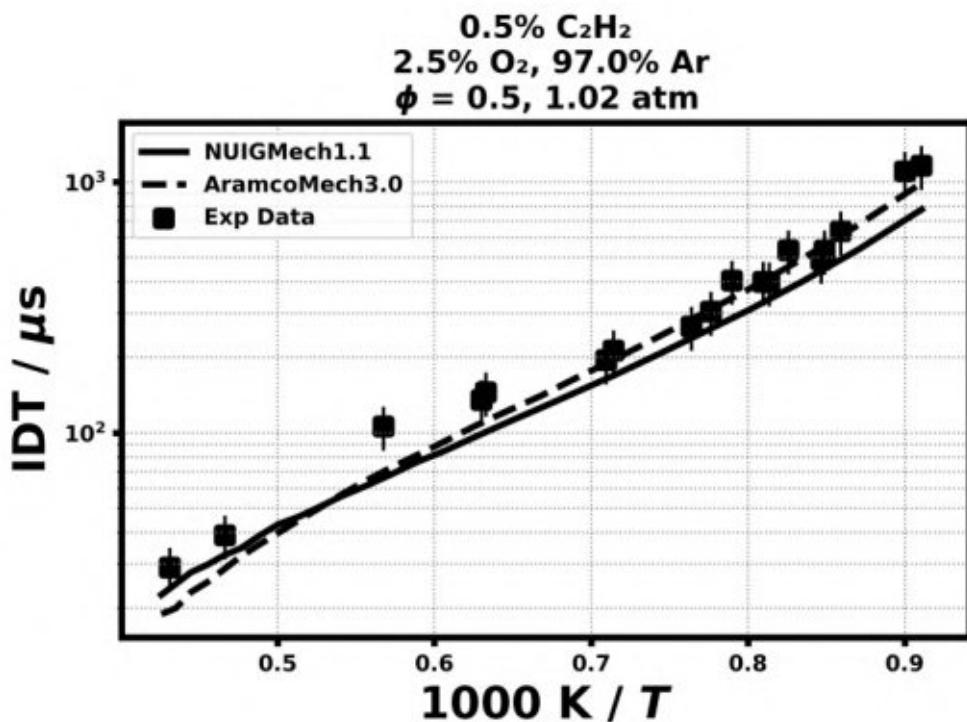


$1.0\% \text{C}_2\text{H}_2$
 $2.5\% \text{O}_2, 9.4\% \text{N}_2$
 $\phi = 1.0, 30.45 \text{ bar}$

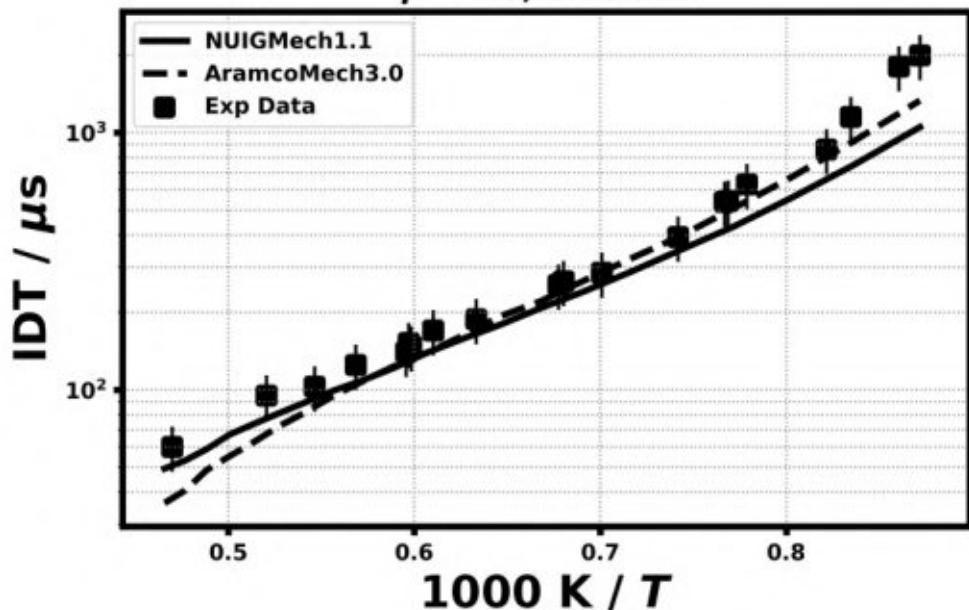




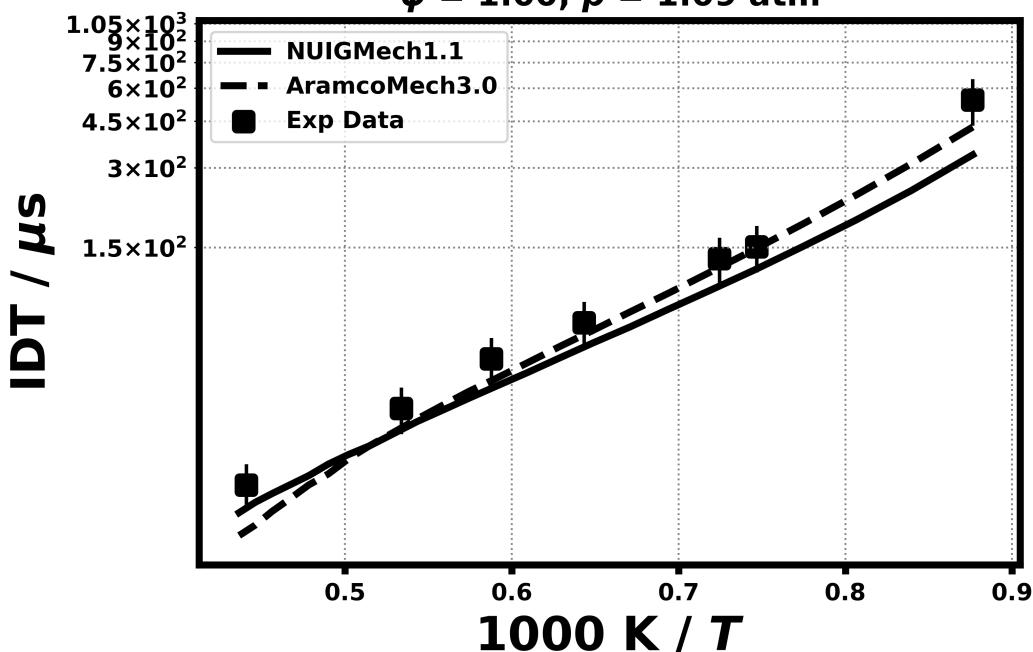
7.5) Rickard, M. J. A., Hall, J. M., & Petersen, E. L., Proceedings of the Combustion Institute, 30(2) (2005) 1915-1923.



0.5% C₂H₂
1.25% O₂, 98.25% Ar
 $\phi = 1.0, 1.16 \text{ atm}$



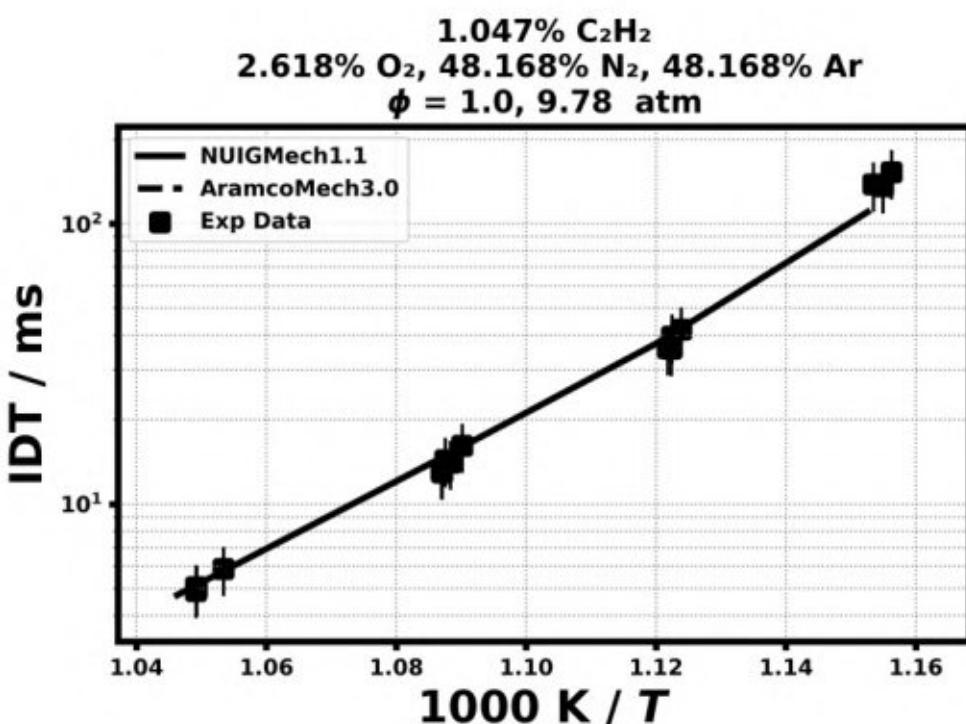
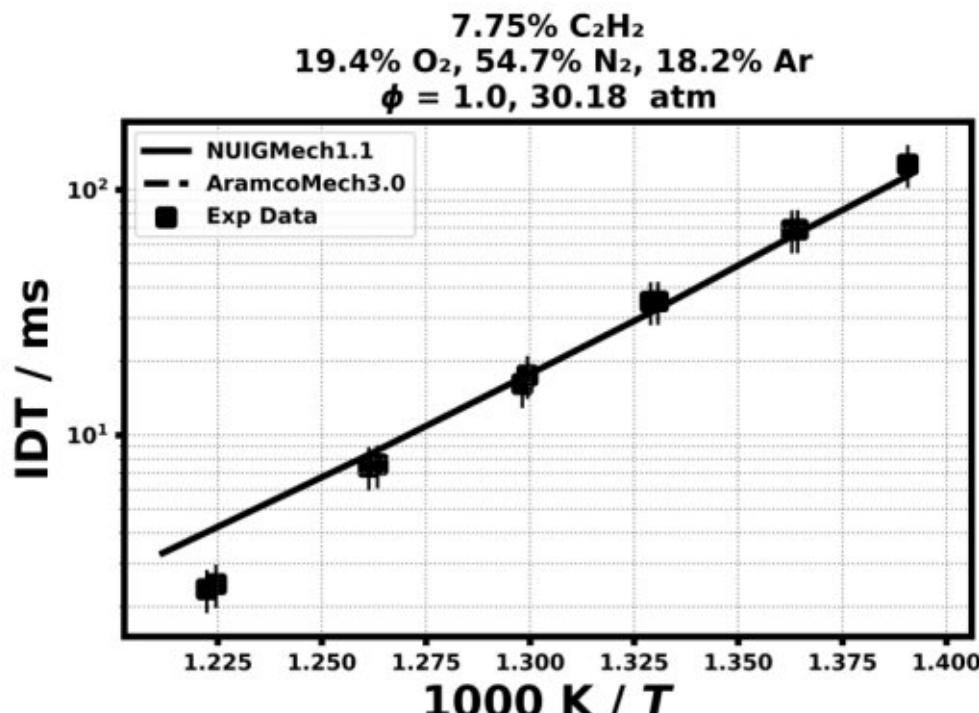
1.45% C₂H₂
3.63% O₂, 94.92% Ar
 $\phi = 1.00, p = 1.09 \text{ atm}$



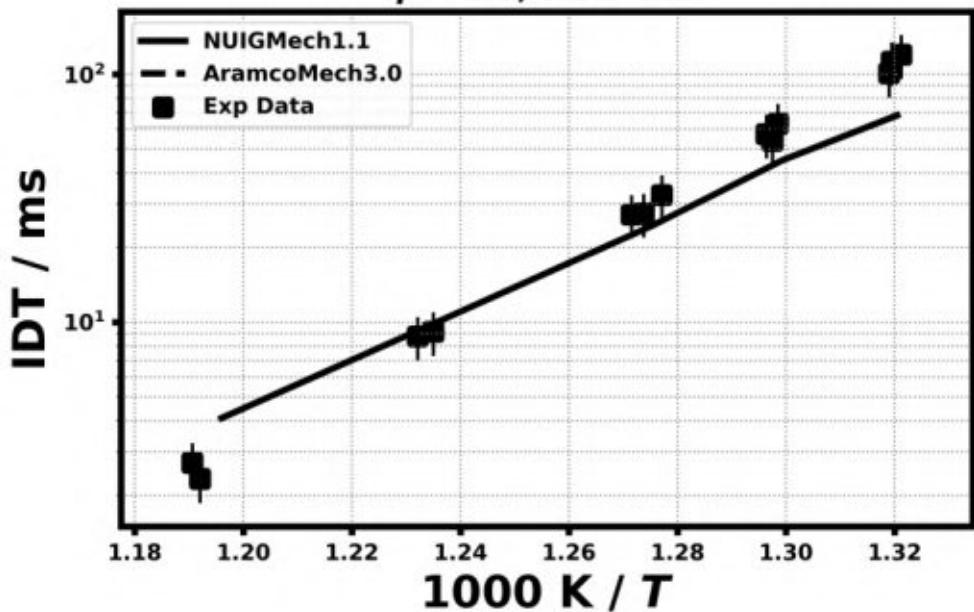
RCM Ignition delay time

7.6) Lokachari, N., Burke, U., Ramalingam, A., Turner, M., Hesse, R., Somers, K. P., ... & Curran, H. J., Proceedings of the Combustion Institute, 37(1) (2019) 583-591.

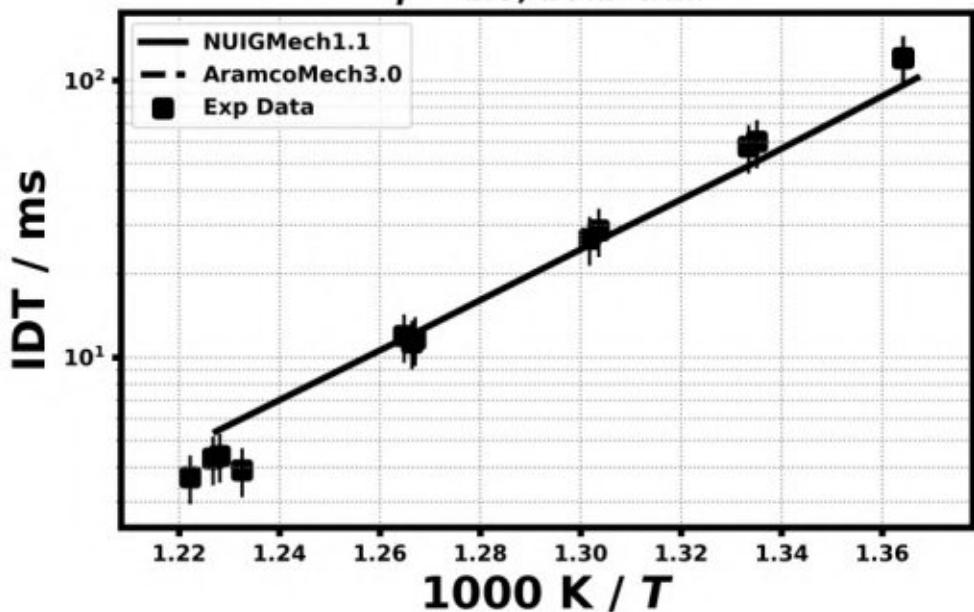
*No ignition with AramcoMech3.0



7.752% C₂H₂
19.38% O₂, 54.7% N₂, 18.2% Ar
 $\phi = 1.0, 9.92 \text{ atm}$

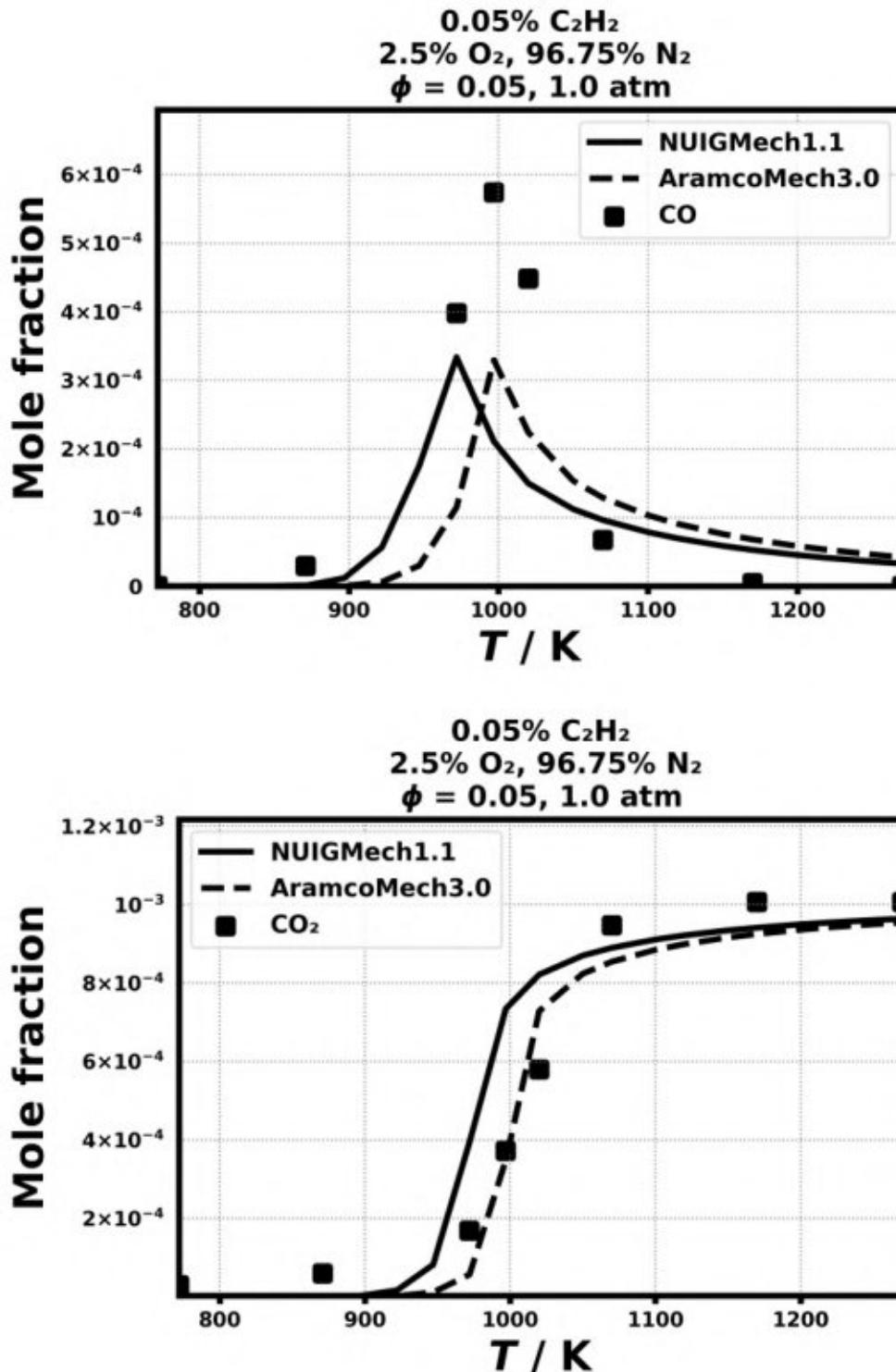


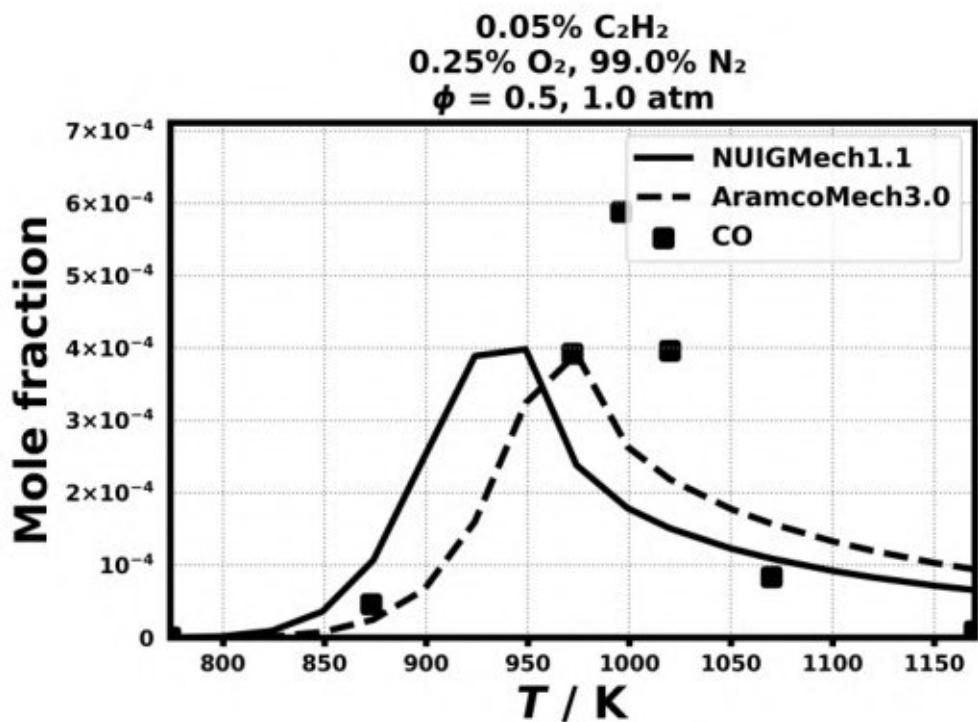
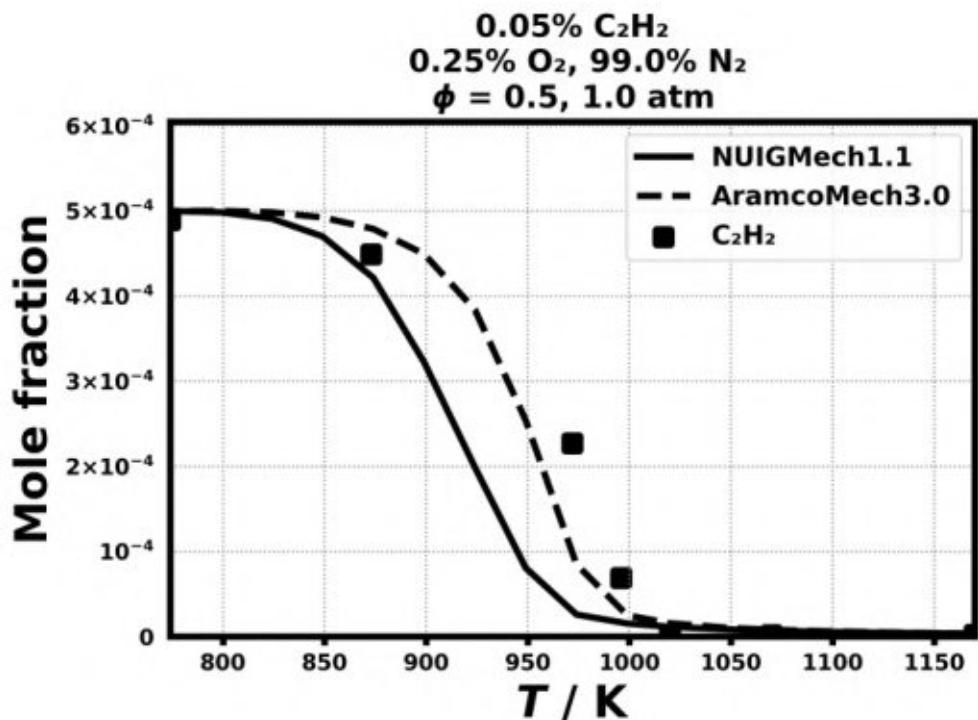
7.75% C₂H₂
19.4% O₂, 54.7% N₂, 18.2% Ar
 $\phi = 1.0, 20.1 \text{ atm}$

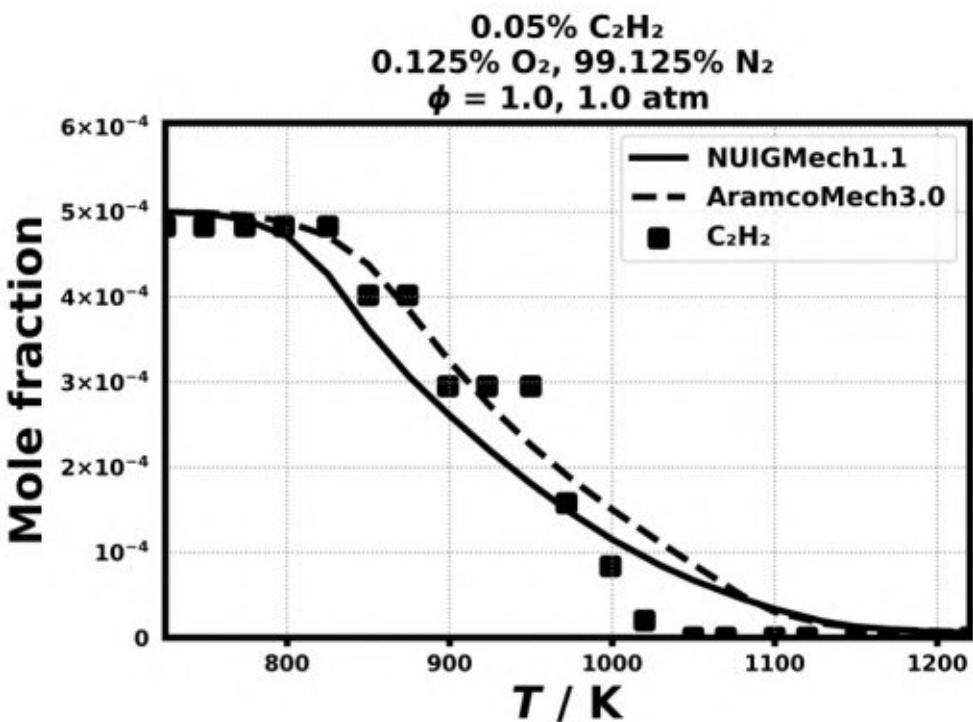
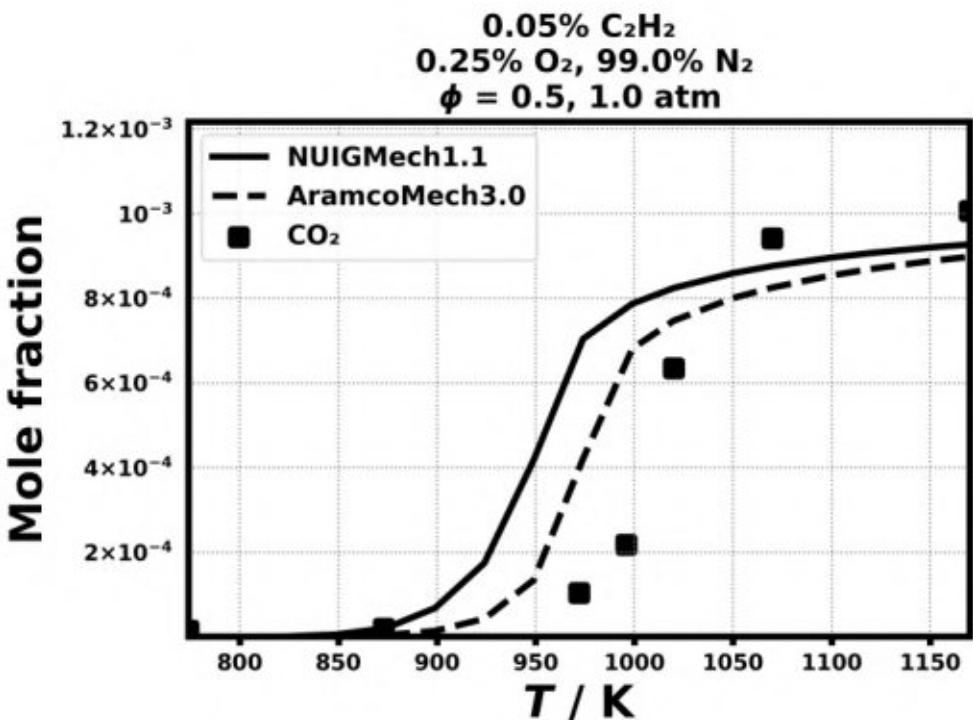


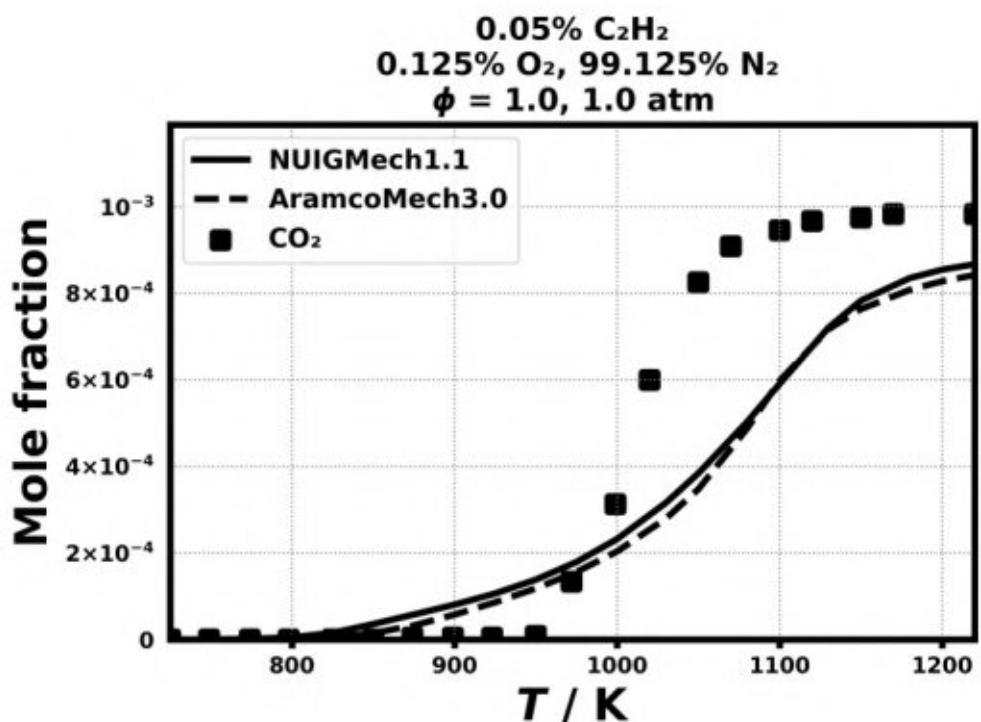
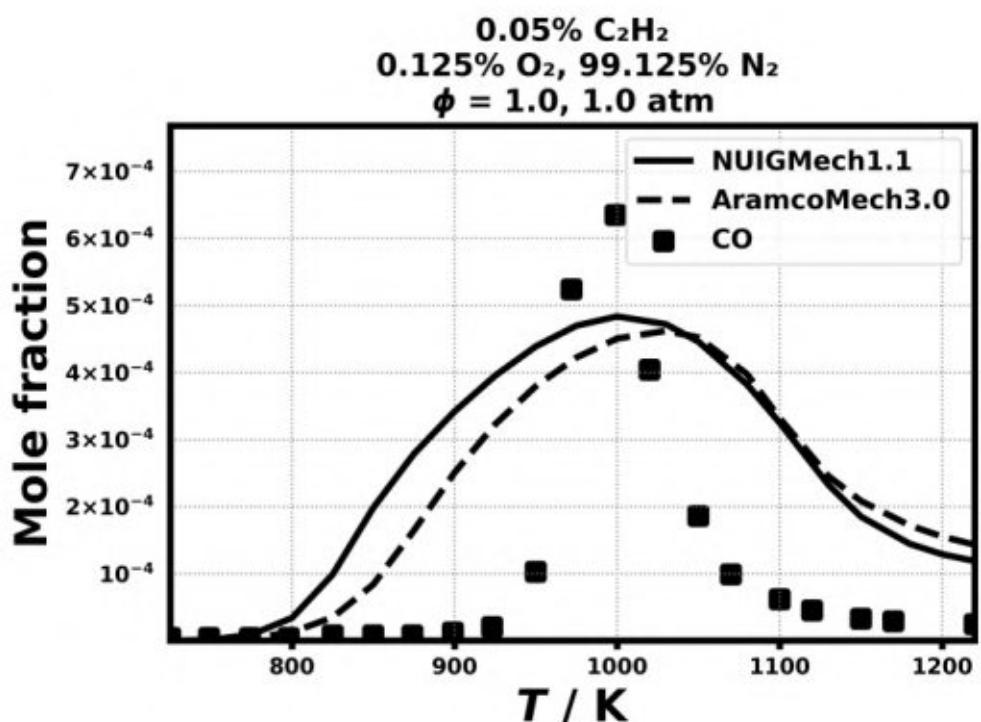
Speciation in Flow reactor

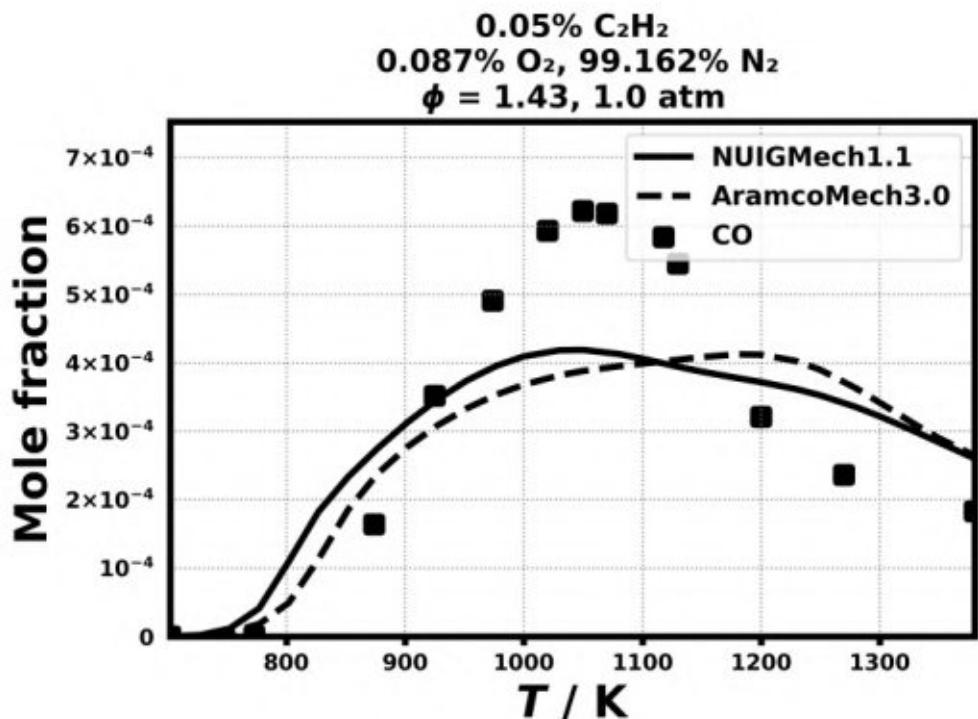
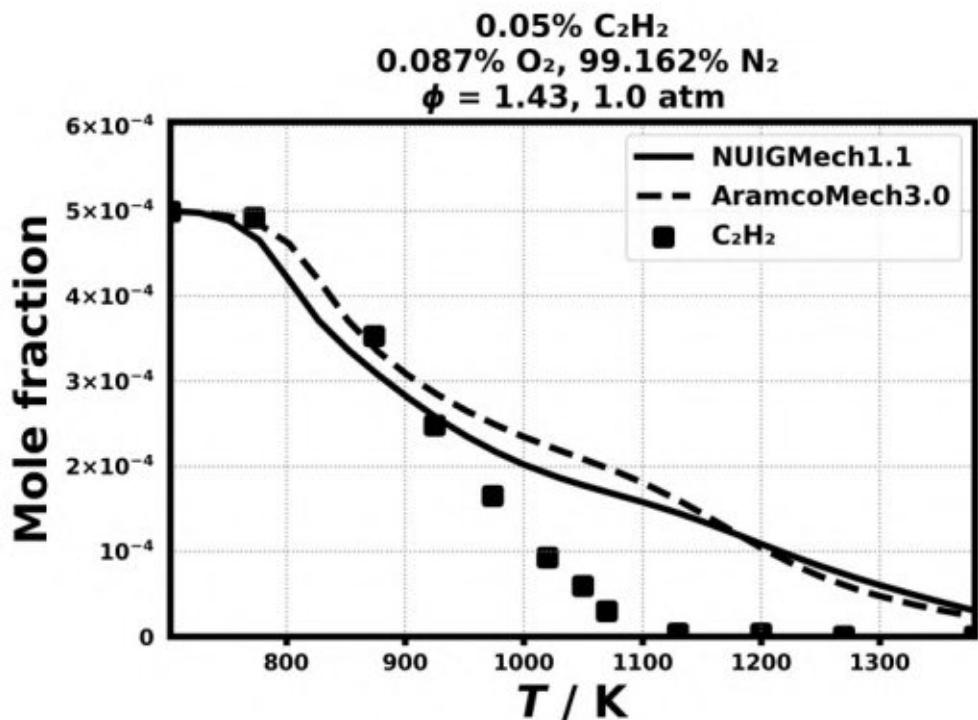
7.7) Alzueta, M. U., Borruel, M., Callejas, A., Millera, A., & Bilbao, R. Combustion and flame, 152(3) (2008) 377-386.

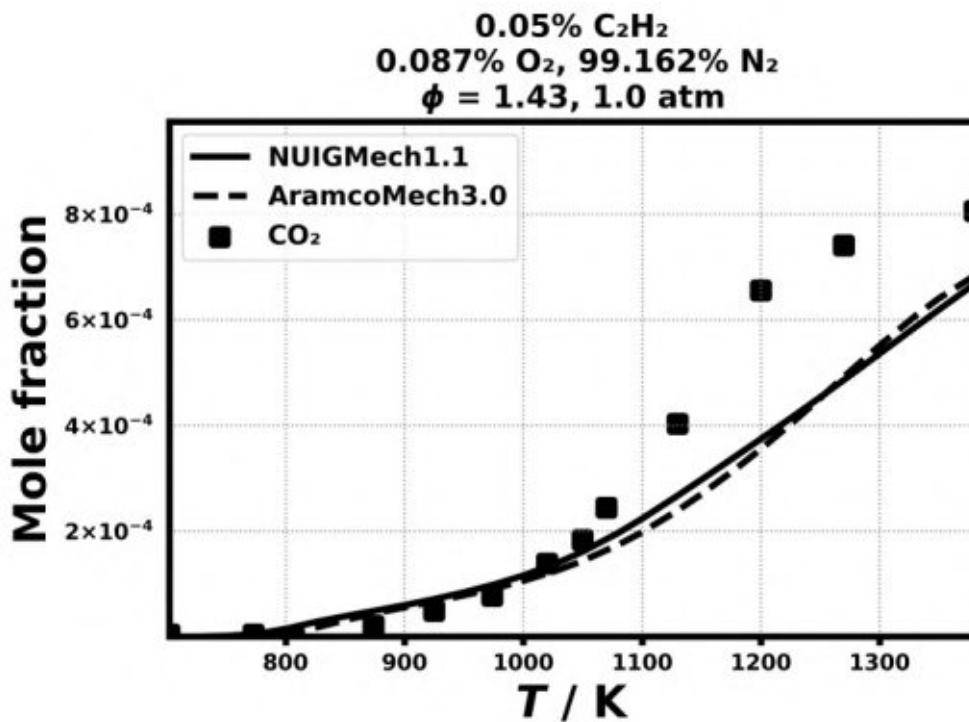




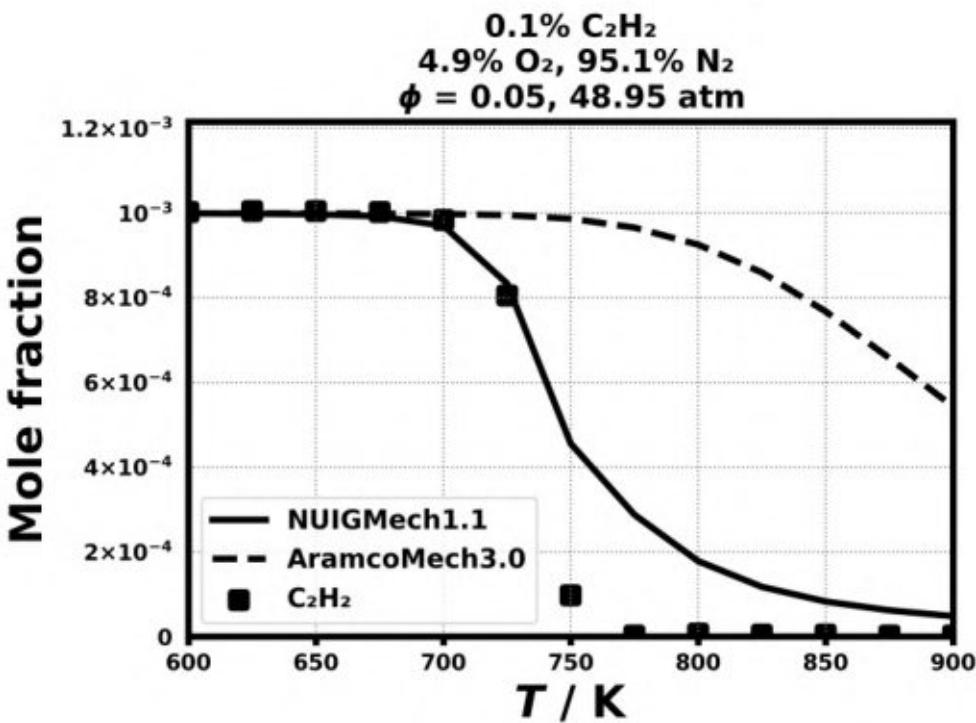




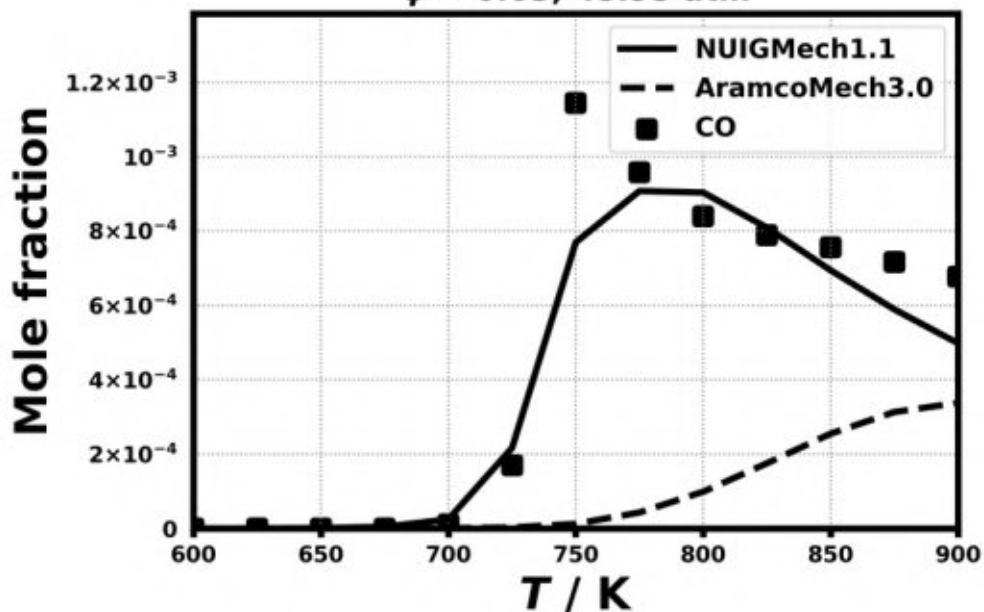




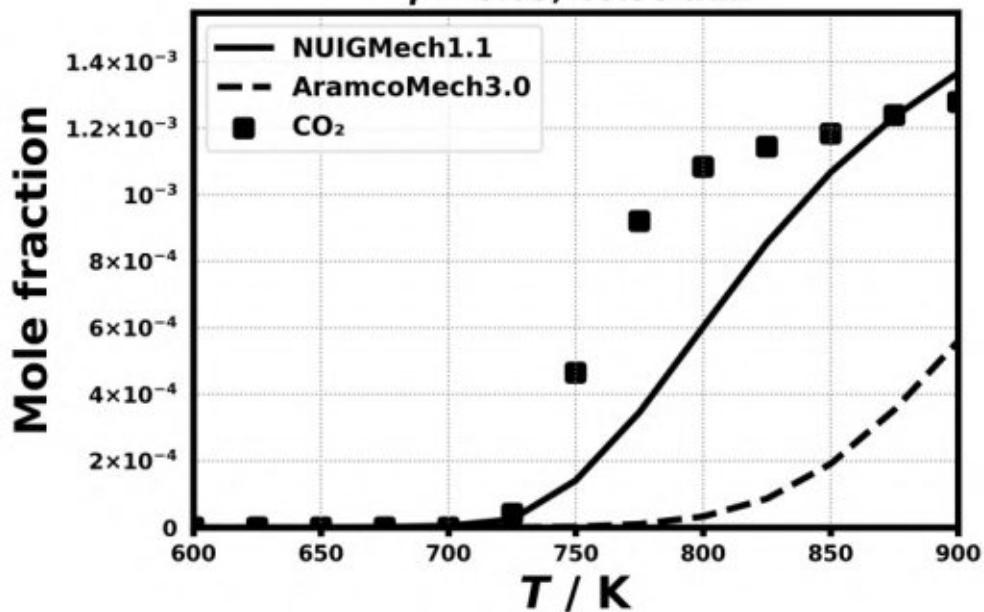
7.8) Lopez, J. G., Rasmussen, C. L., Alzueta, M. U., Gao, Y., Marshall, P., & Glarborg, P. Proceedings of the Combustion Institute, 32(1) (2009) 367-375.

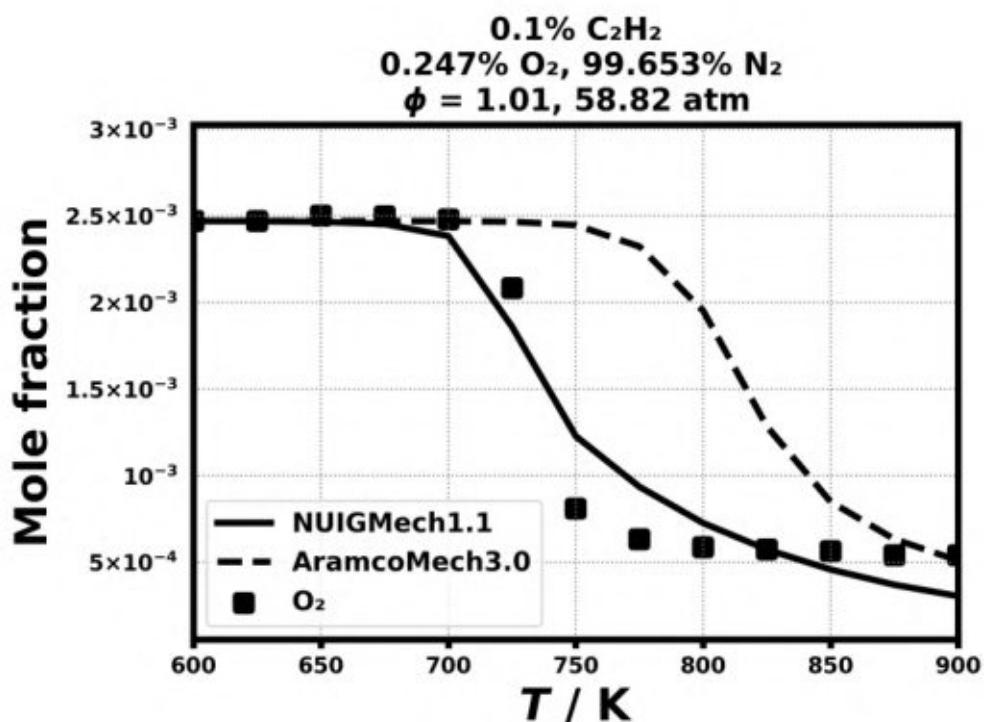
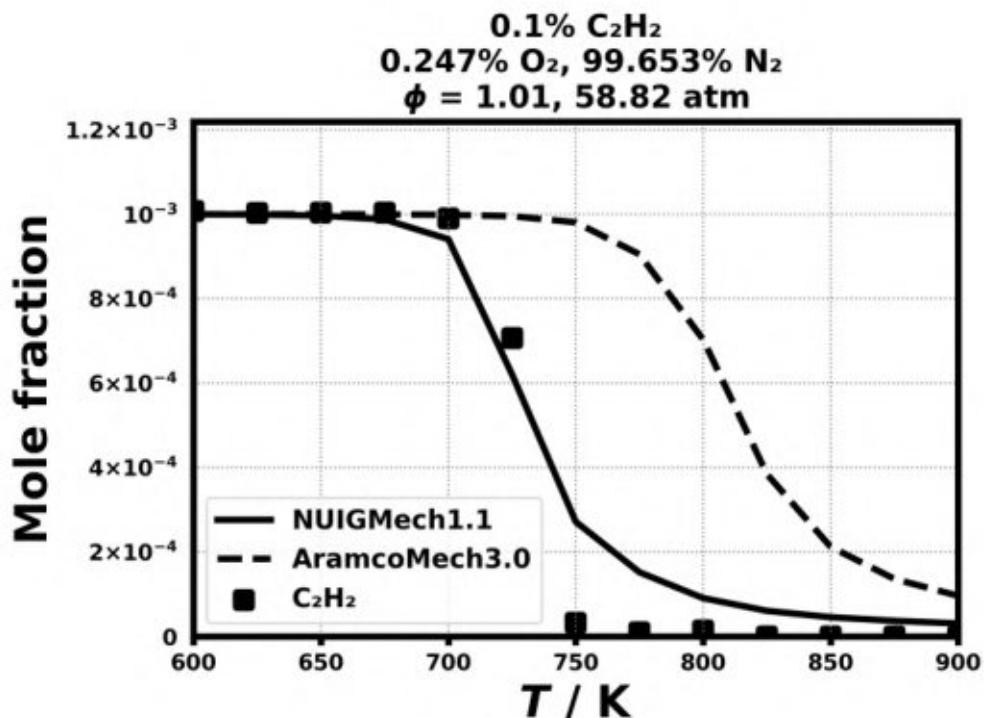


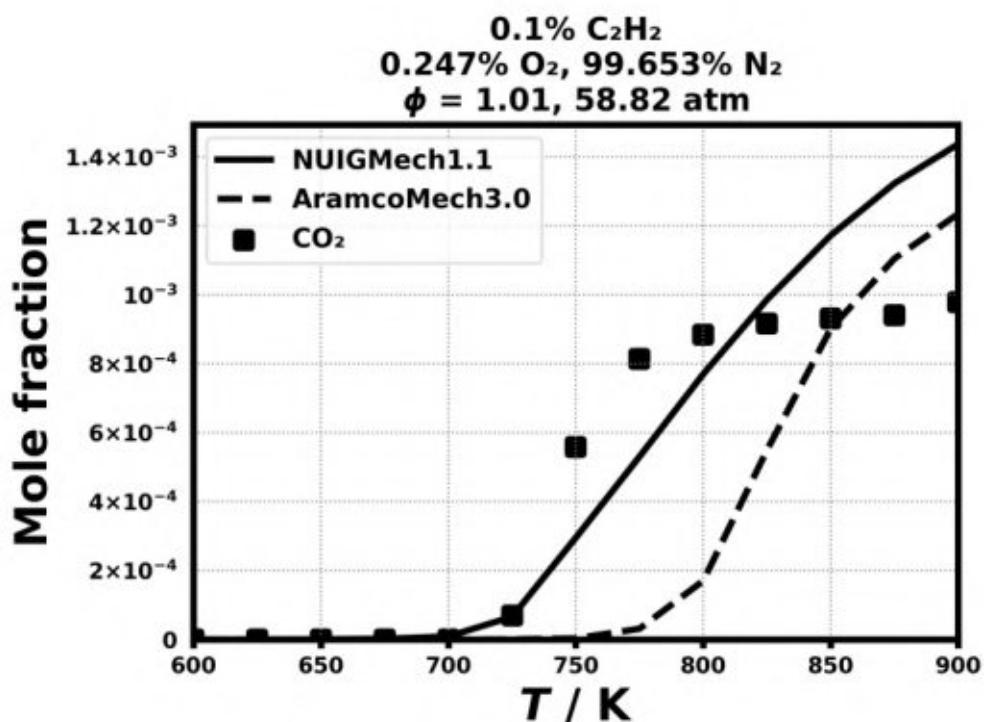
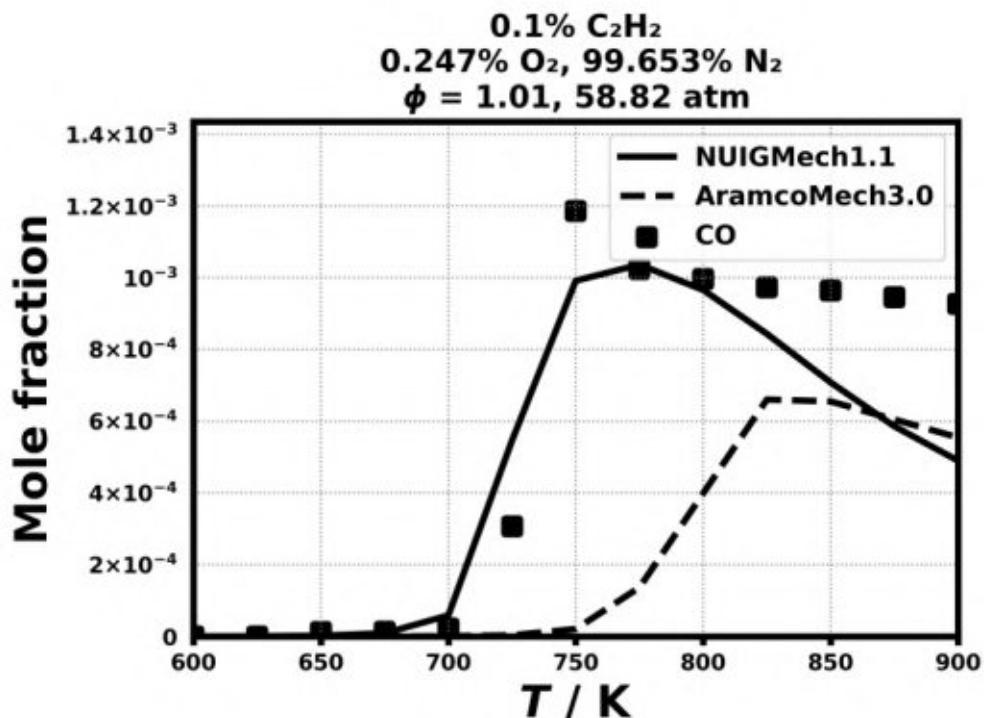
$0.1\% \text{C}_2\text{H}_2$
 $4.9\% \text{O}_2, 95.1\% \text{N}_2$
 $\phi = 0.05, 48.95 \text{ atm}$

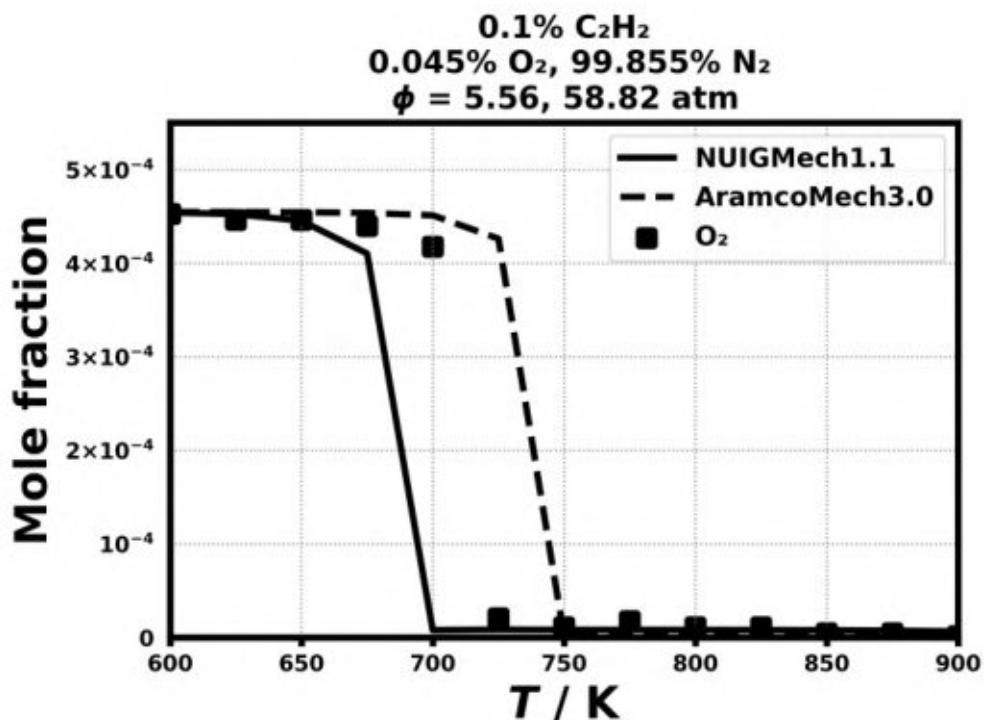
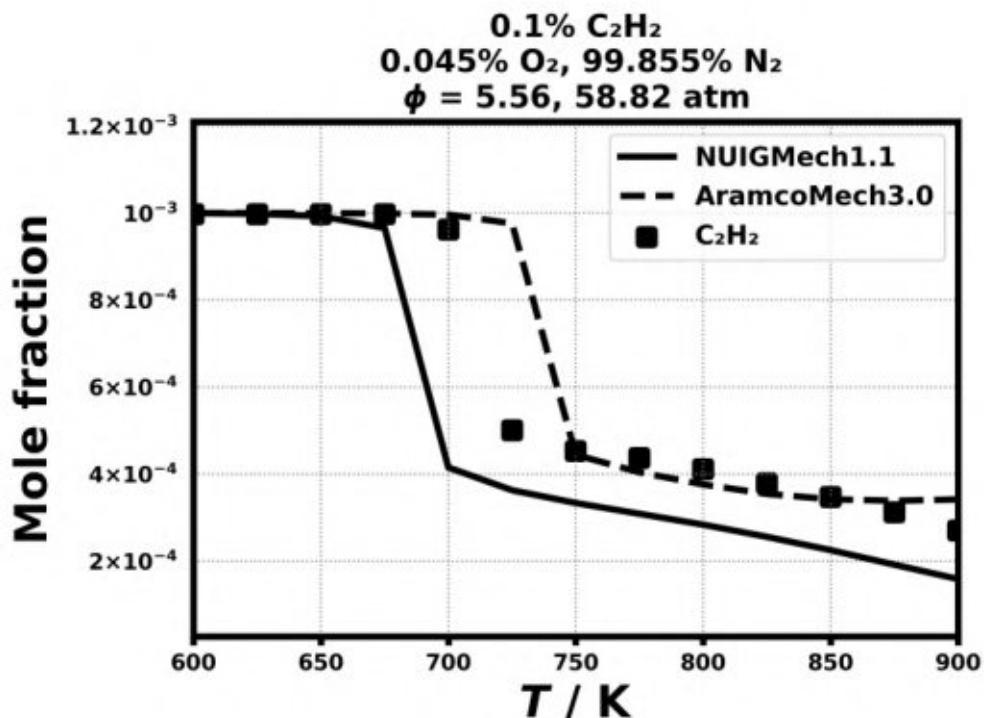


$0.1\% \text{C}_2\text{H}_2$
 $4.9\% \text{O}_2, 95.1\% \text{N}_2$
 $\phi = 0.05, 48.95 \text{ atm}$

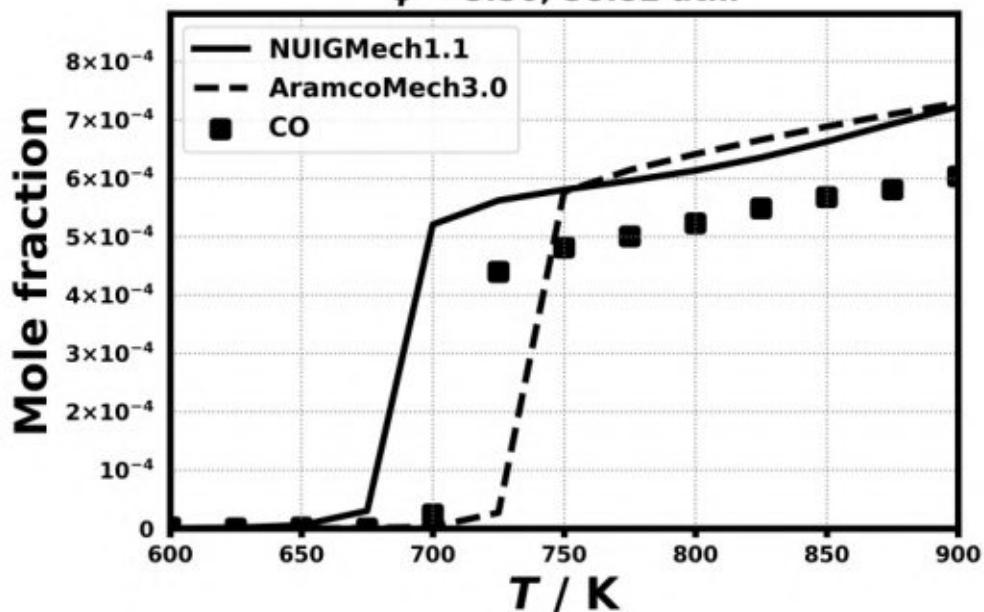




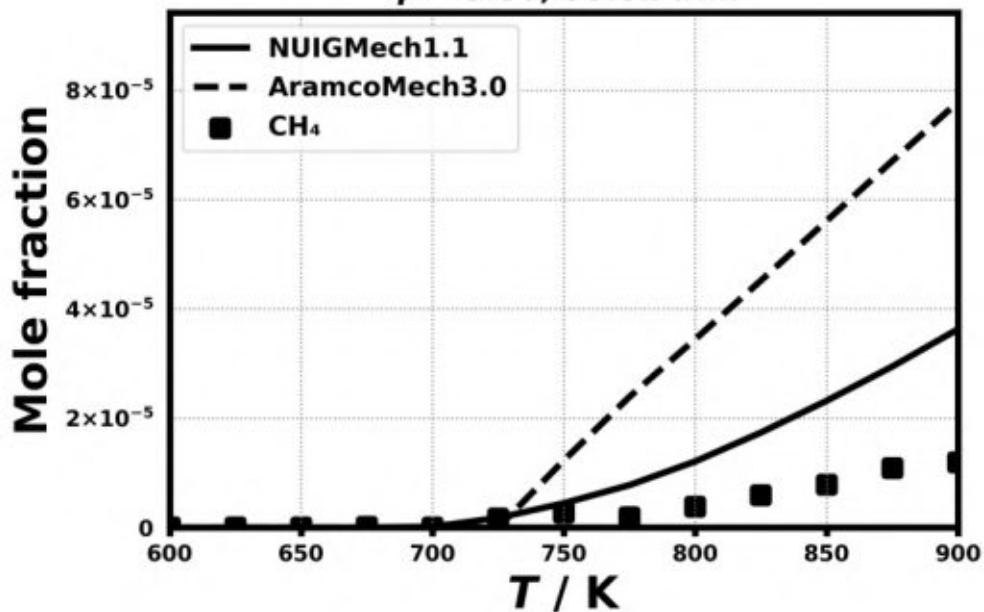




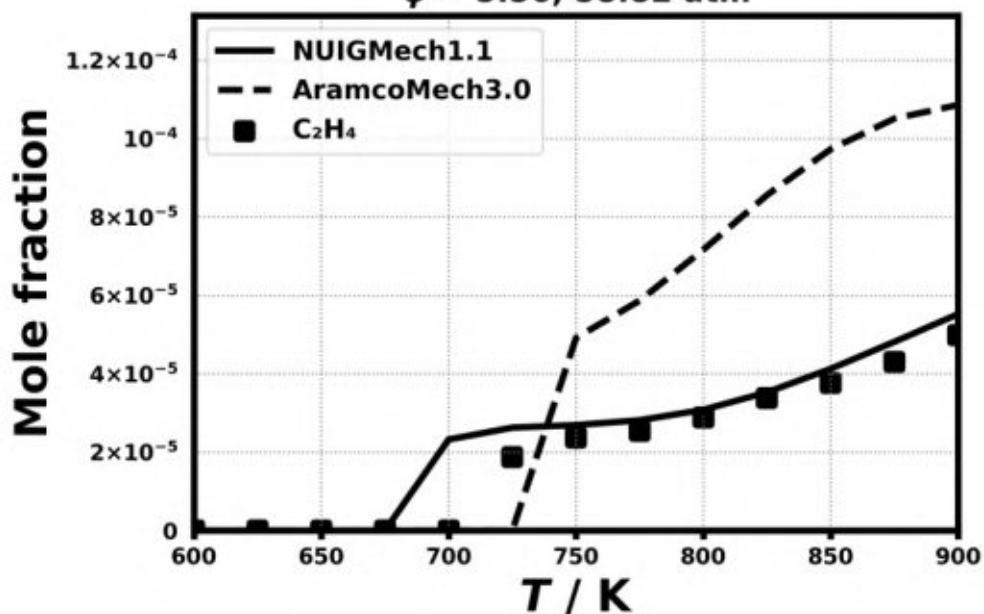
$0.1\% \text{C}_2\text{H}_2$
 $0.045\% \text{O}_2, 99.855\% \text{N}_2$
 $\phi = 5.56, 58.82 \text{ atm}$



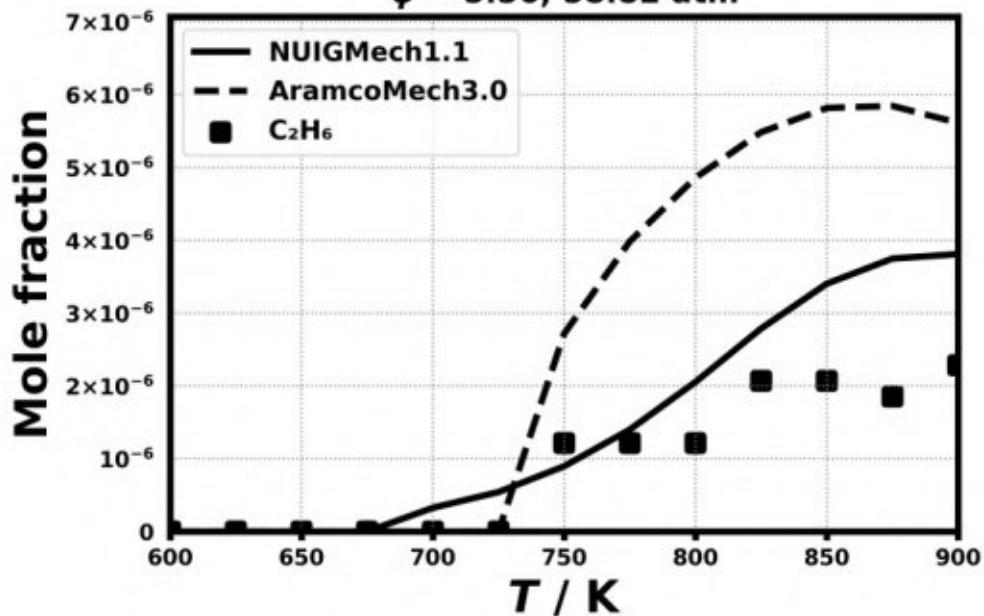
$0.1\% \text{C}_2\text{H}_2$
 $0.045\% \text{O}_2, 99.855\% \text{N}_2$
 $\phi = 5.56, 58.82 \text{ atm}$



$0.1\% \text{ C}_2\text{H}_2$
 $0.045\% \text{ O}_2, 99.855\% \text{ N}_2$
 $\phi = 5.56, 58.82 \text{ atm}$

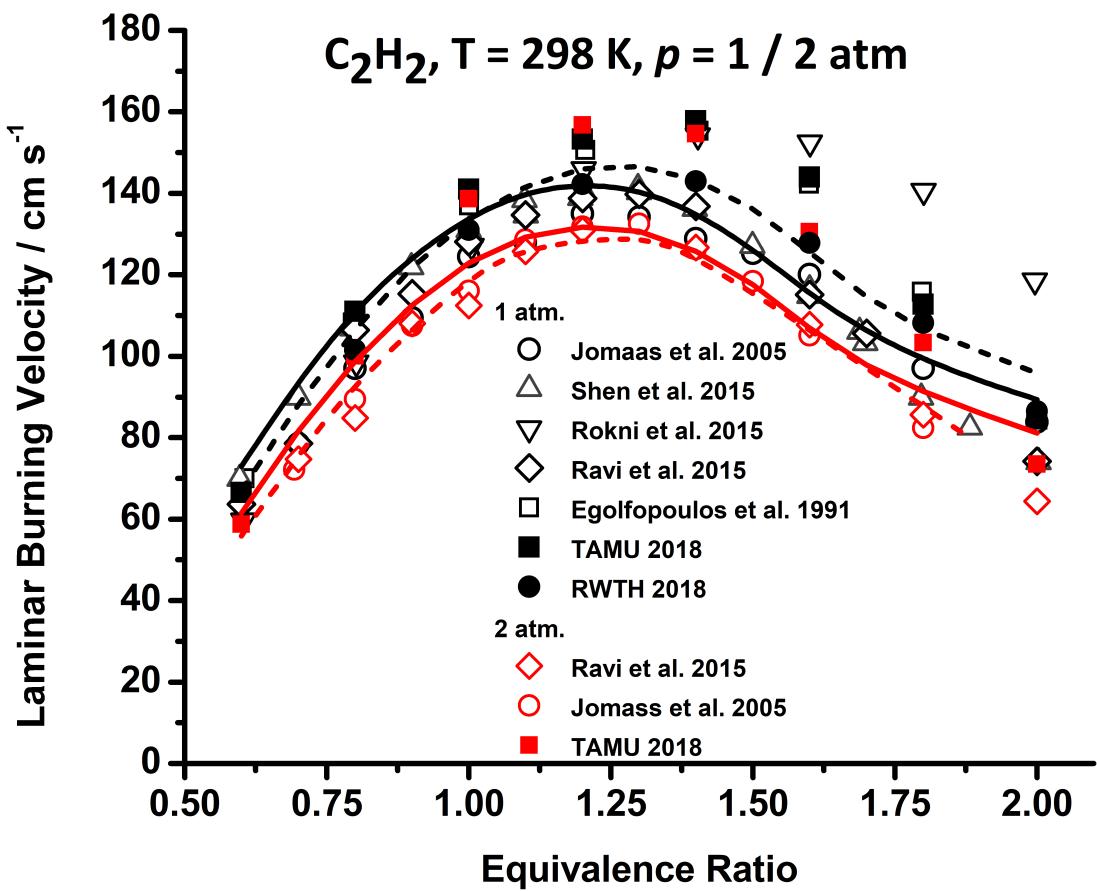


$0.1\% \text{ C}_2\text{H}_2$
 $0.045\% \text{ O}_2, 99.855\% \text{ N}_2$
 $\phi = 5.56, 58.82 \text{ atm}$



Laminar flame speed

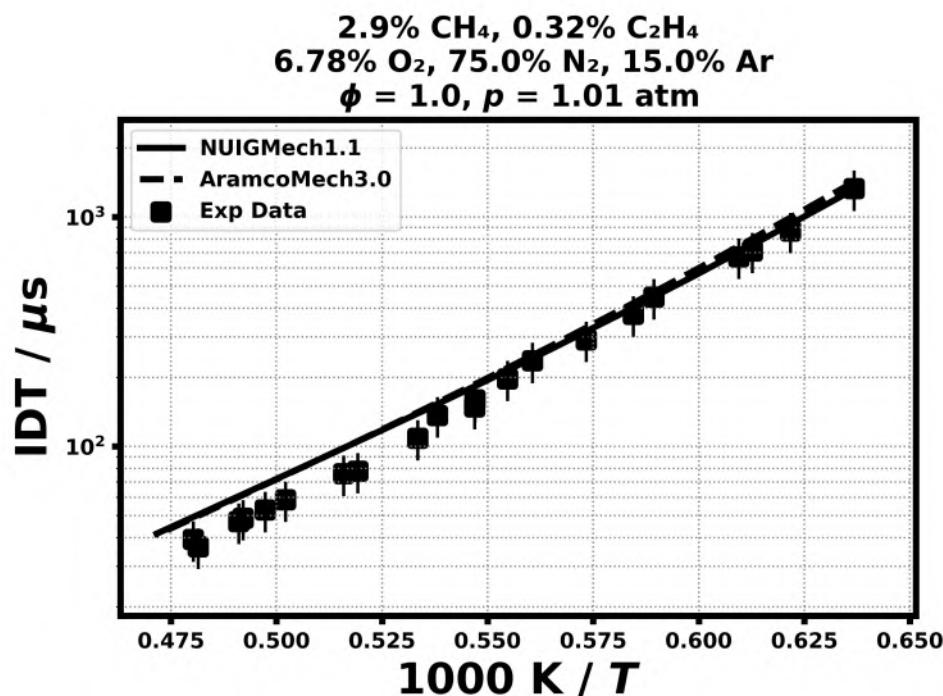
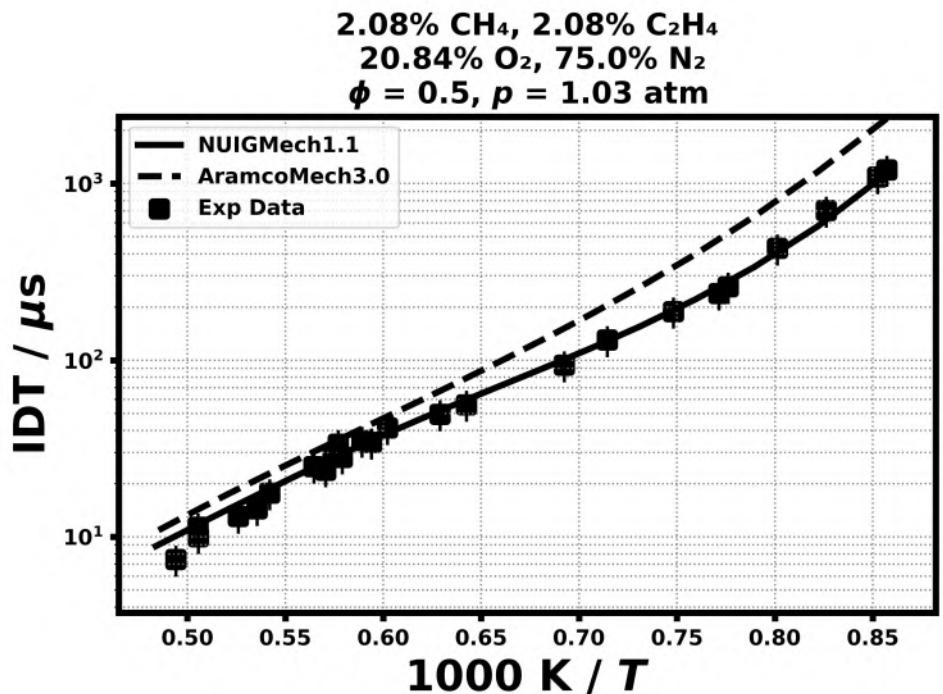
- 7.9) F. N. Egolfopoulos, D. L. Zhu, C. K. Law, Proceedings of the Combustion Institute 23 (1990) 471-478.
 7.10) G. Jomaas, X. L. Zheng, D. L. Zhu, C. K. Law, Proceedings of the Combustion Institute 30 (2005) 193–200.
 7.11) Lokachari, N., Burke, U., Ramalingam, A., Turner, M., Hesse, R., Somers, K. P., ... & Curran, H. J.,
 Proceedings of the Combustion Institute, 37(1) (2019) 583-591.
 7.12) Shen, X., Yang, X., Santner, J., Sun, J., & Ju, Y. Proceedings of the Combustion Institute, 35(1) (2015) 721-728.
 7.13) Rokni, E., Moghaddas, A., Askari, O., & Metghalchi, H., Journal of Energy Resources Technology, 137(1). (2015)
 7.14) Ravi, S., Sikes, T. G., Morones, A., Keesee, C. L., & Petersen, E. L., Proceedings of the Combustion
 Institute, 35(1) (2015) 679-686.

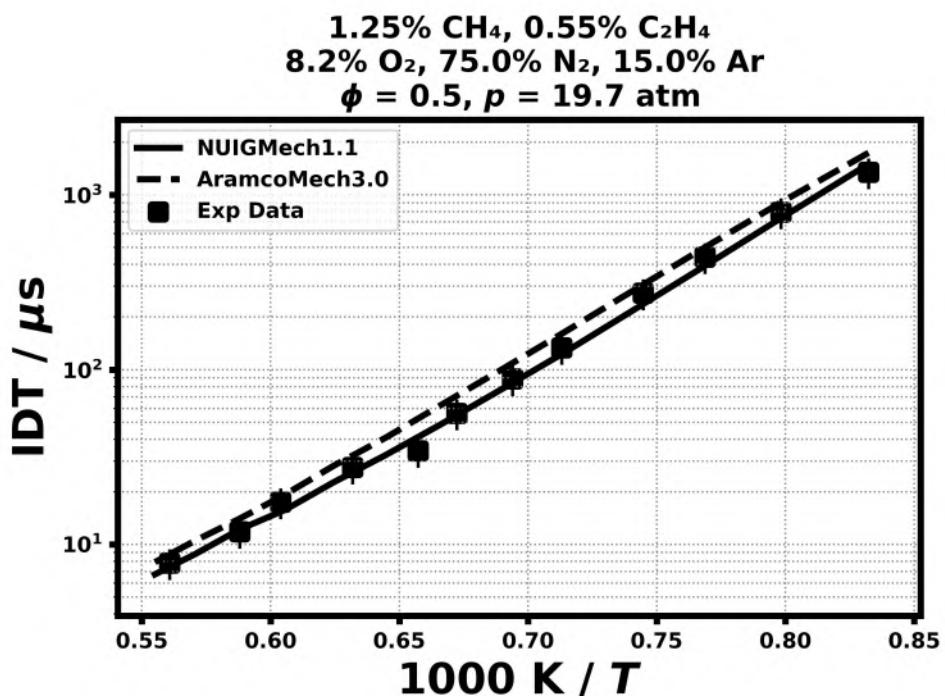
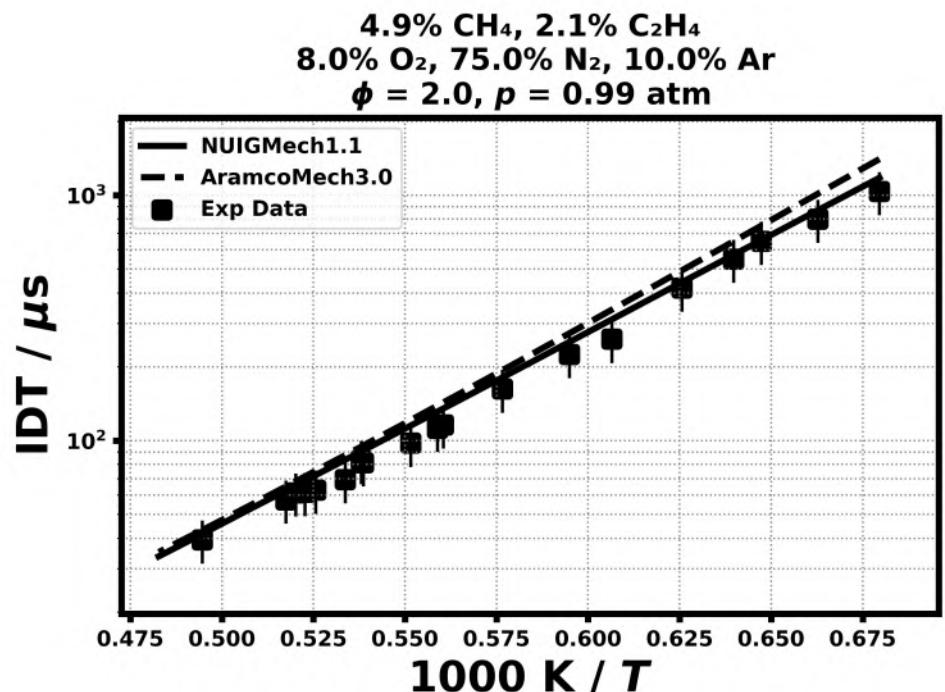


8. Validation of CH₄/C₂H₄

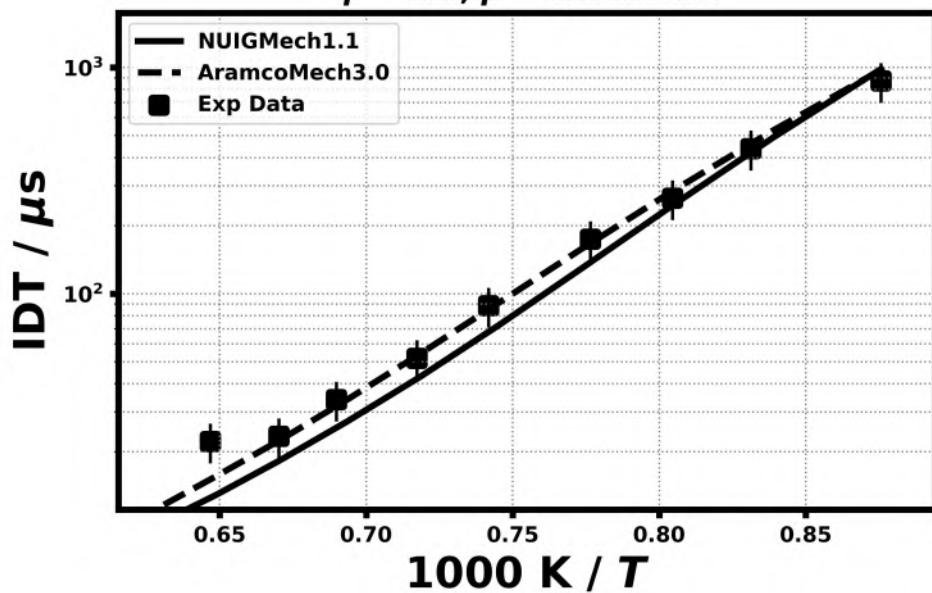
Shock tube ignition delay time

8.1) M. Baigmohammadi et. al., Energy and Fuels 34 (7) (2020) 8808-8823.

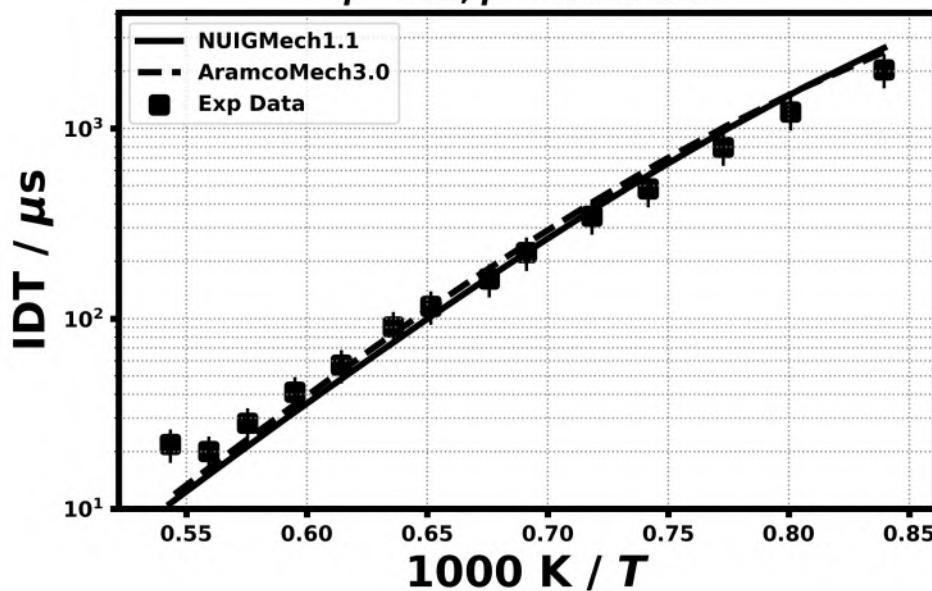


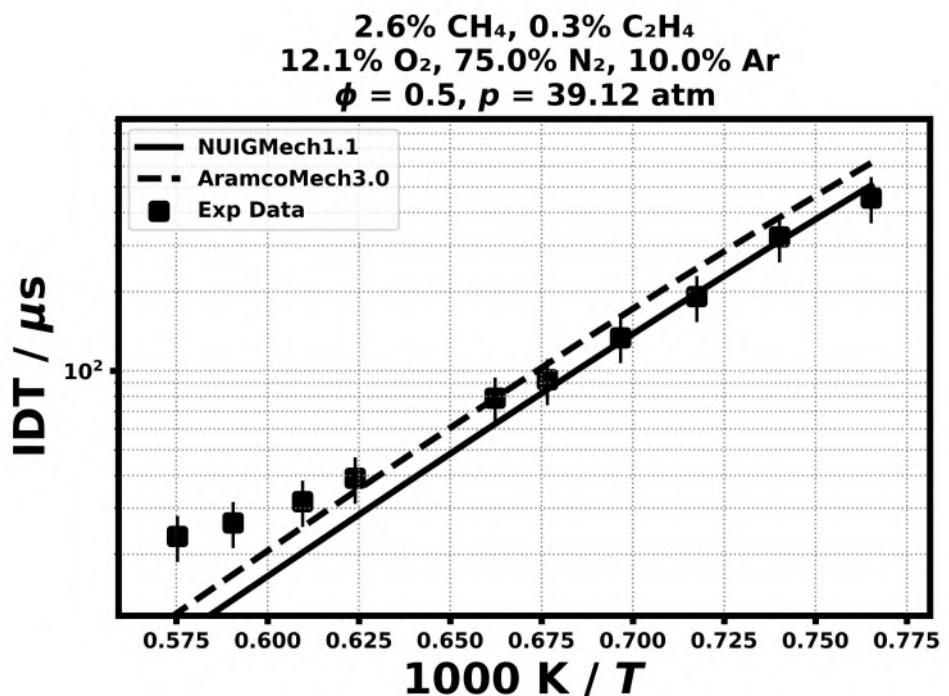
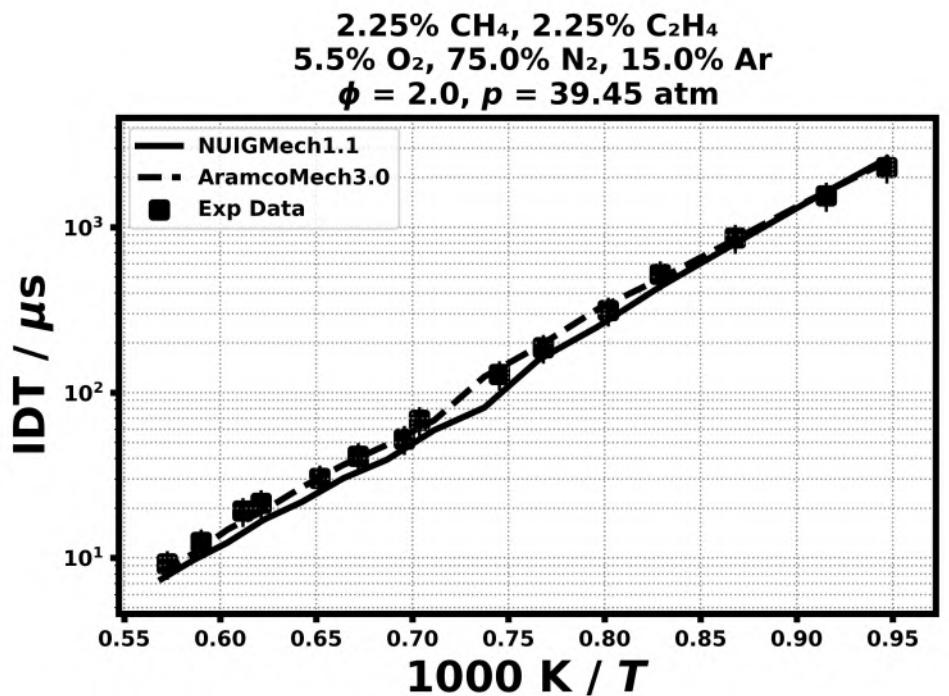


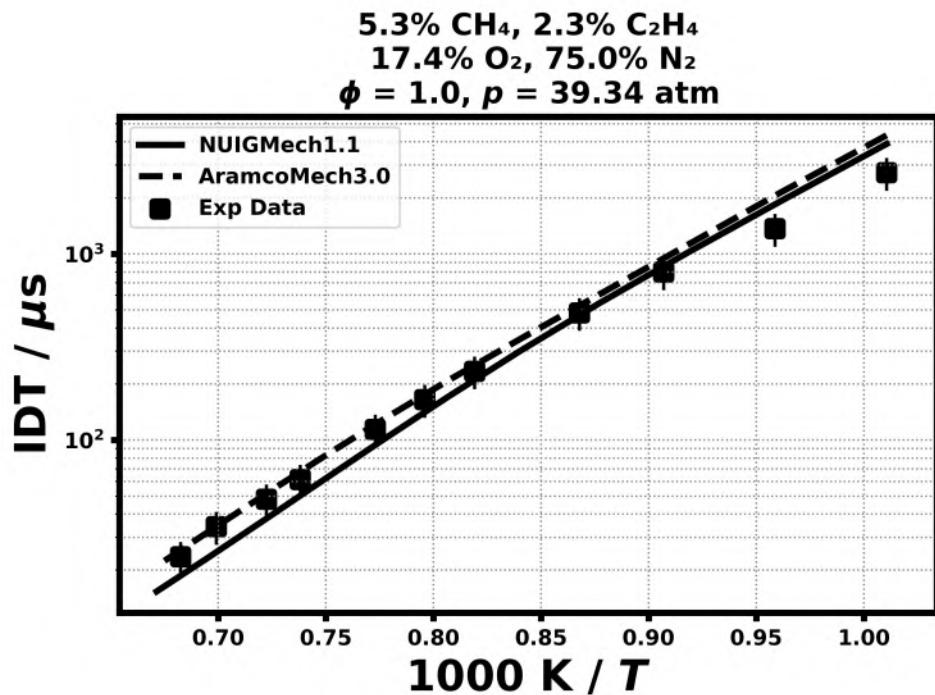
2.15% CH₄, 2.15% C₂H₄
10.7% O₂, 75.0% N₂, 10.0% Ar
 $\phi = 1.0, p = 19.63 \text{ atm}$



11.0% CH₄, 1.2% C₂H₄
12.8% O₂, 75.0% N₂
 $\phi = 2.0, p = 19.63 \text{ atm}$

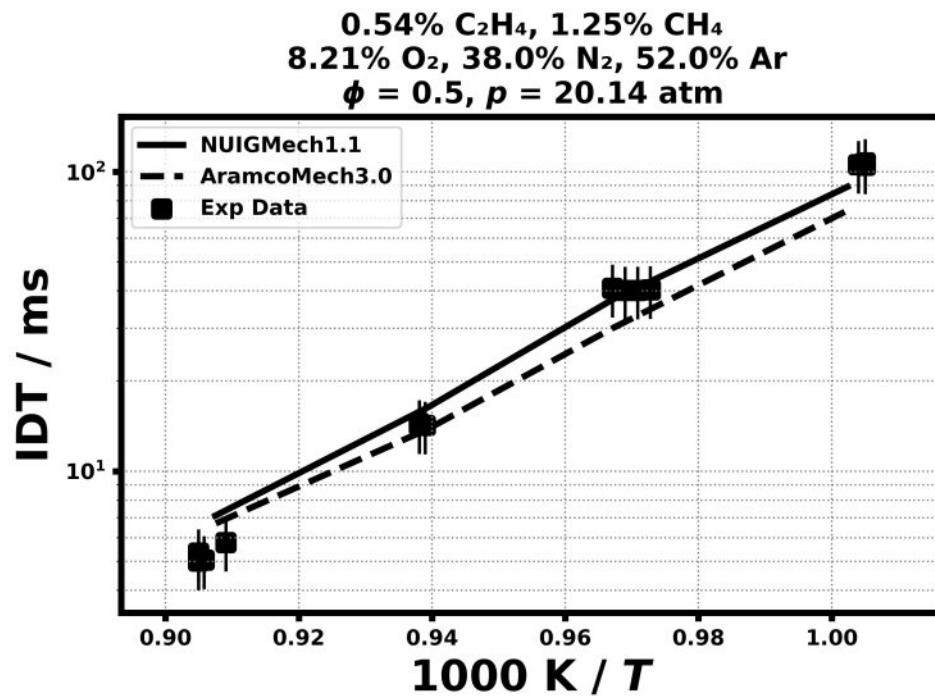




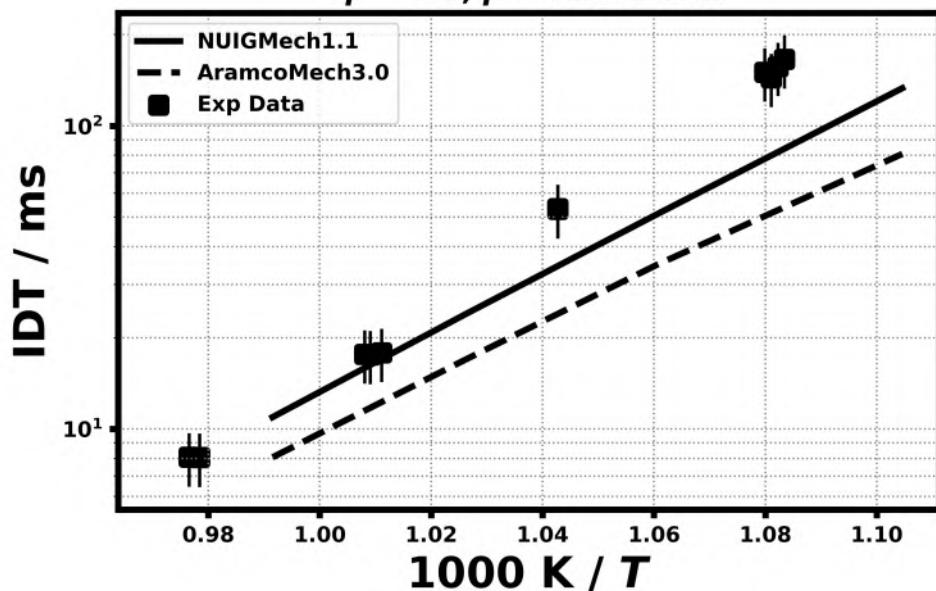


RCM Ignition delay time

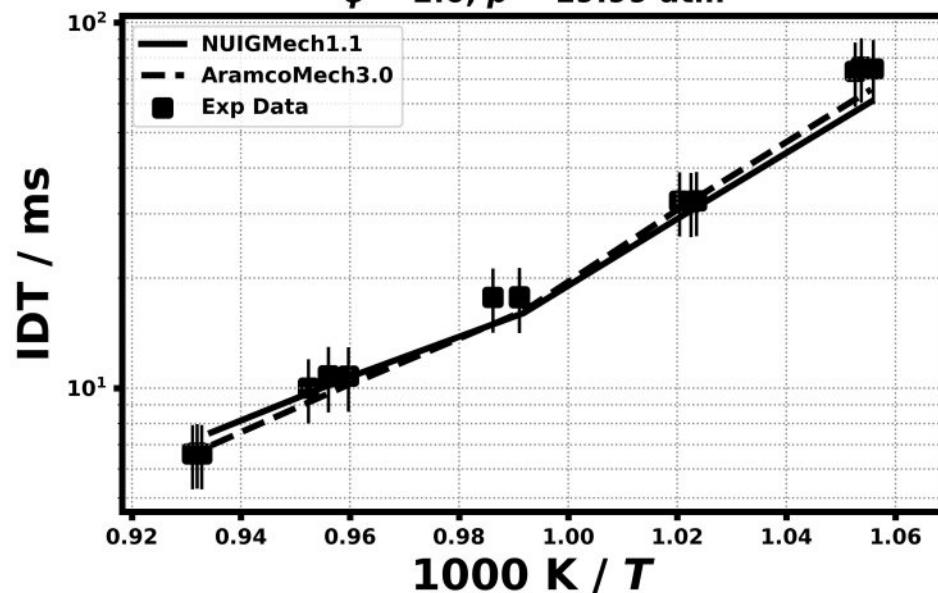
8.2) M. Baigmohammadi et. al., Energy and Fuels 34 (7) (2020) 8808-8823.



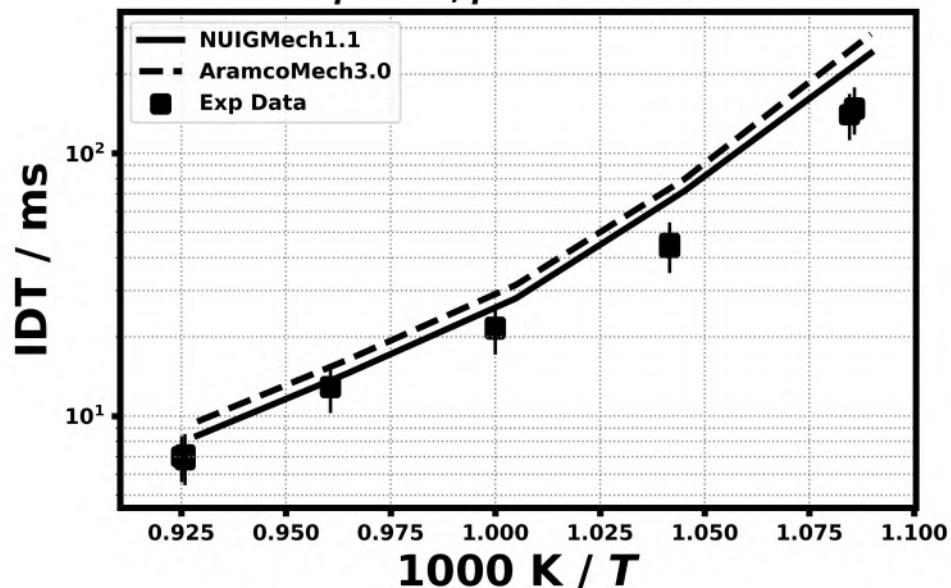
$2.143\% \text{ C}_2\text{H}_4, 2.143\% \text{ CH}_4$
 $10.714\% \text{ O}_2, 45.0\% \text{ N}_2, 40.0\% \text{ Ar}$
 $\phi = 1.0, p = 20.24 \text{ atm}$



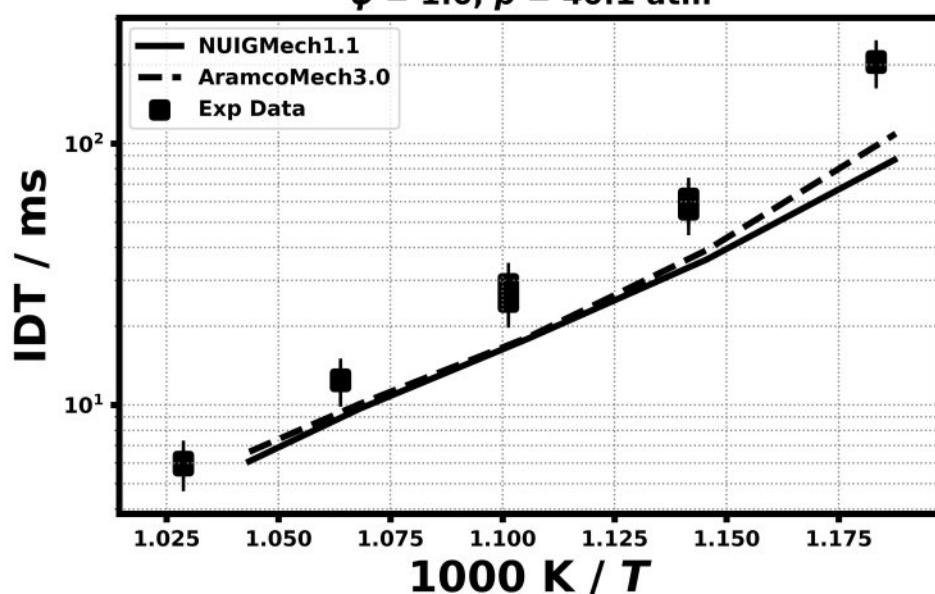
$1.22\% \text{ C}_2\text{H}_4, 10.976\% \text{ CH}_4$
 $12.805\% \text{ O}_2, 75.0\% \text{ Ar}$
 $\phi = 2.0, p = 19.99 \text{ atm}$



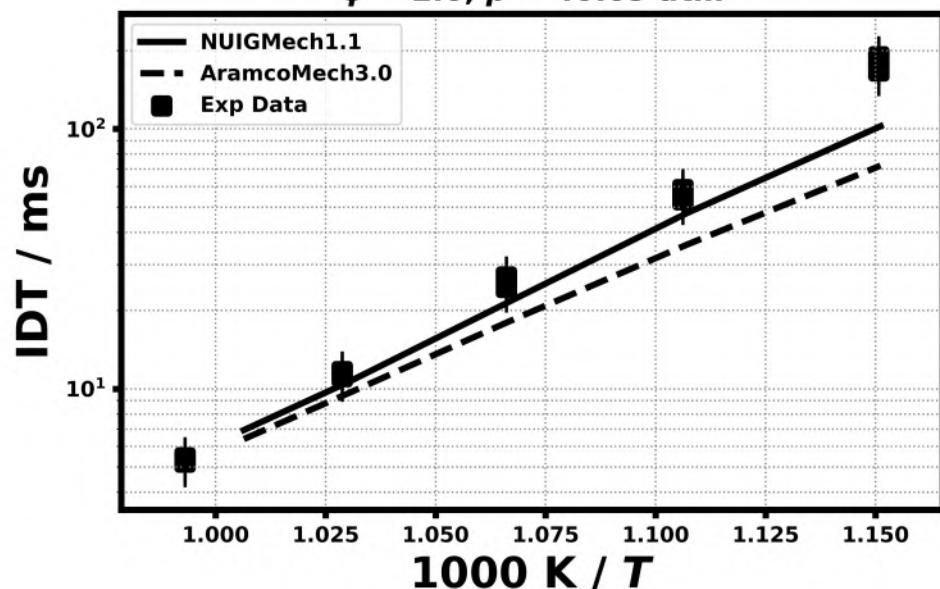
$0.288\% \text{ C}_2\text{H}_4, 2.596\% \text{ CH}_4$
 $12.115\% \text{ O}_2, 30.0\% \text{ N}_2, 55.0\% \text{ Ar}$
 $\phi = 0.5, p = 39.87 \text{ atm}$



$2.273\% \text{ C}_2\text{H}_4, 5.303\% \text{ CH}_4$
 $17.424\% \text{ O}_2, 34.0\% \text{ N}_2, 41.0\% \text{ Ar}$
 $\phi = 1.0, p = 40.1 \text{ atm}$



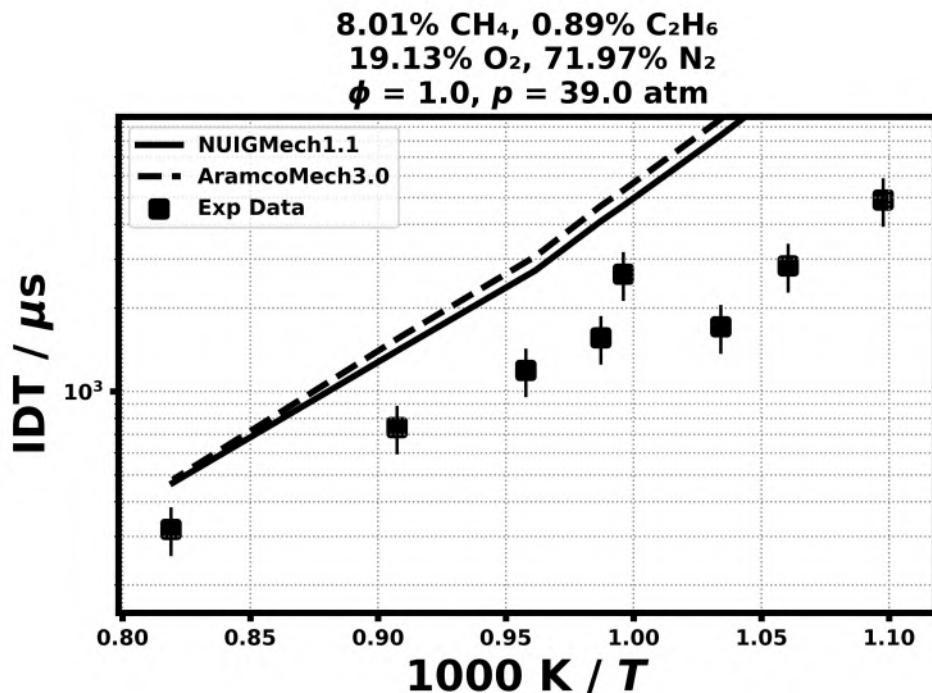
**2.223% C₂H₄, 2.223% CH₄
5.555% O₂, 50.999% N₂, 39.0% Ar
 $\phi = 2.0$, $p = 40.09$ atm**



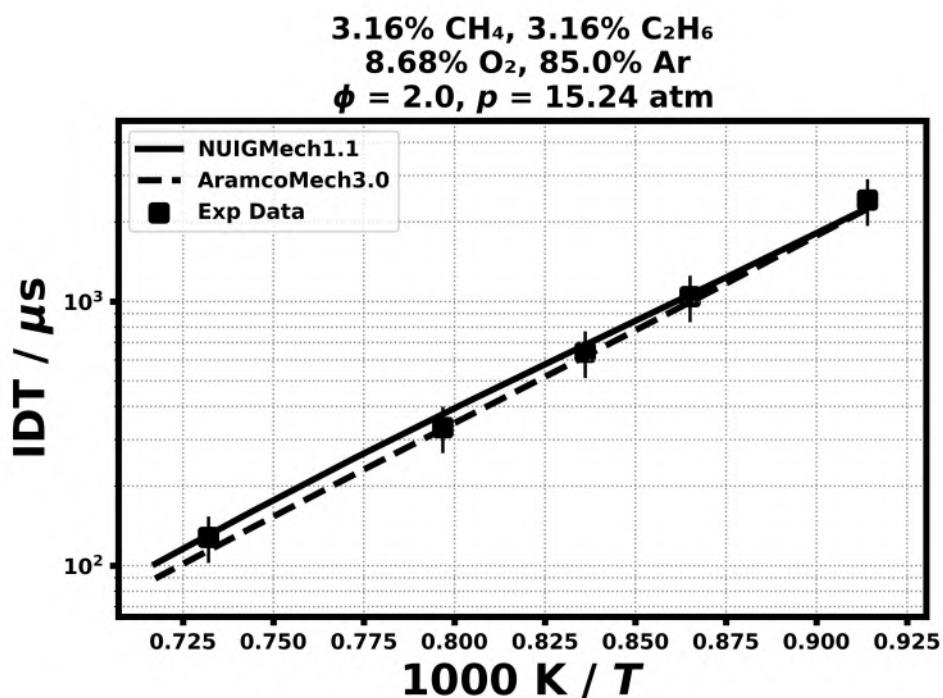
9. Validation of CH₄/C₂H₆

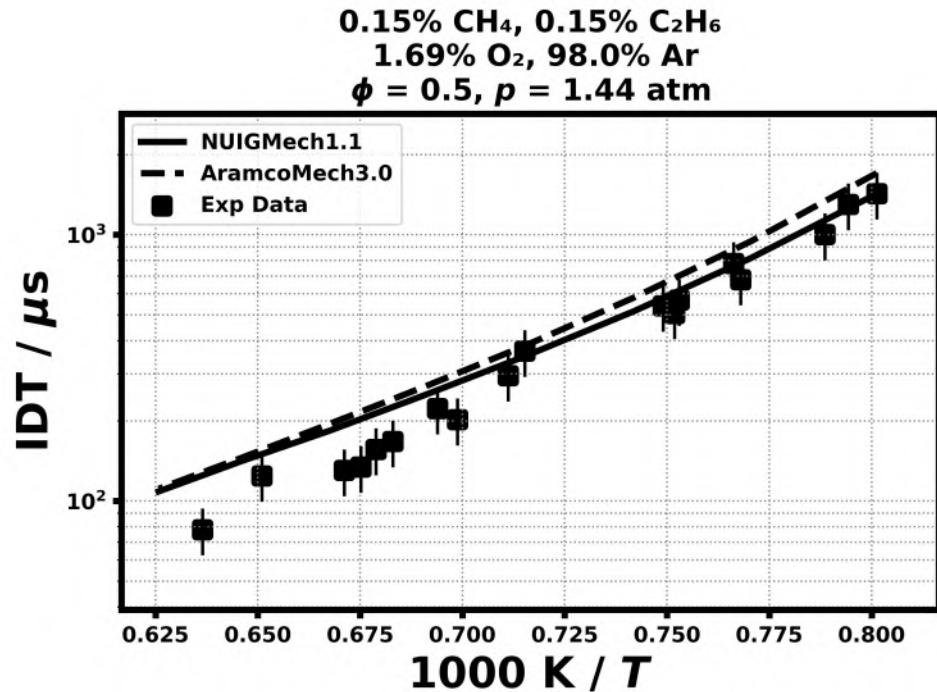
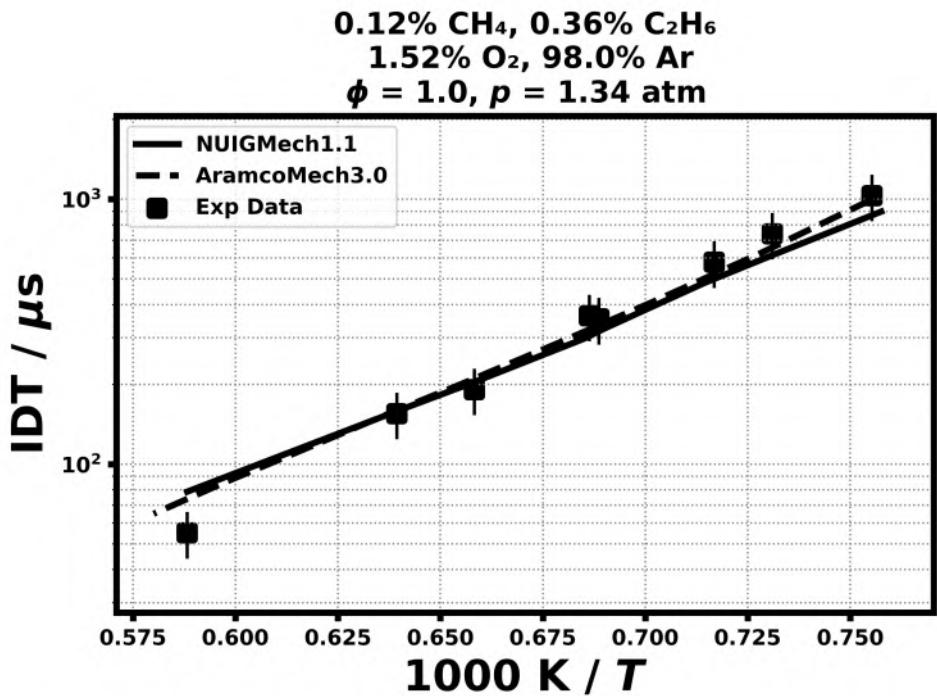
Shock tube ignition delay time

9.1) J.Huang et. al., Inc. Int J Chem Kinet 38: 221–233, 2006.

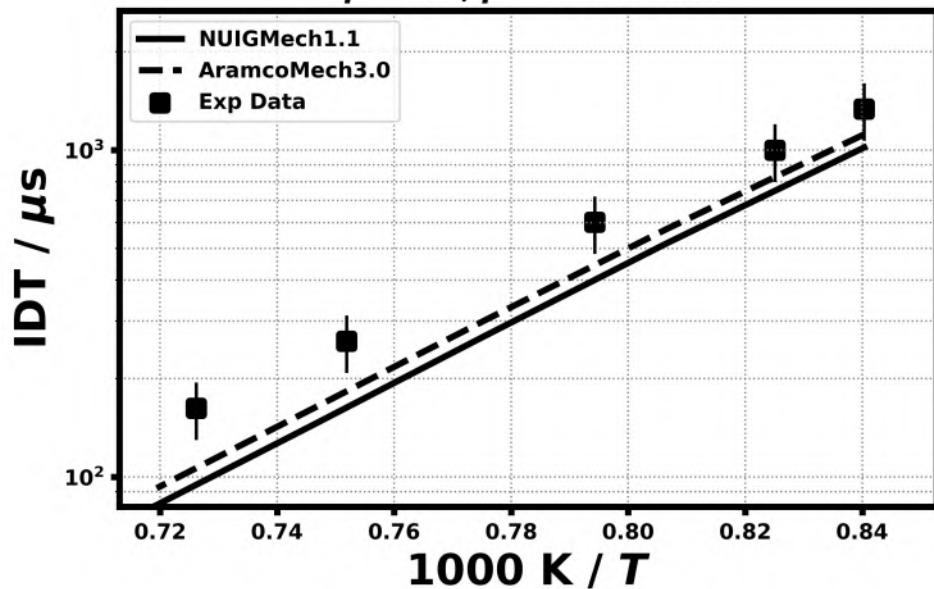


9.2) C. J. Aul et. al., Combust. Flame 160 (2013) 1153–1167.

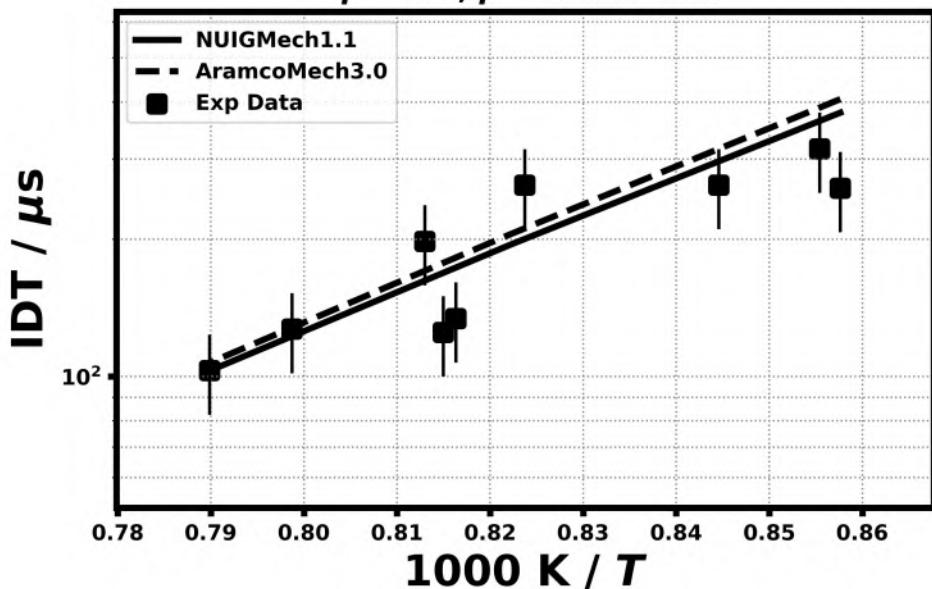


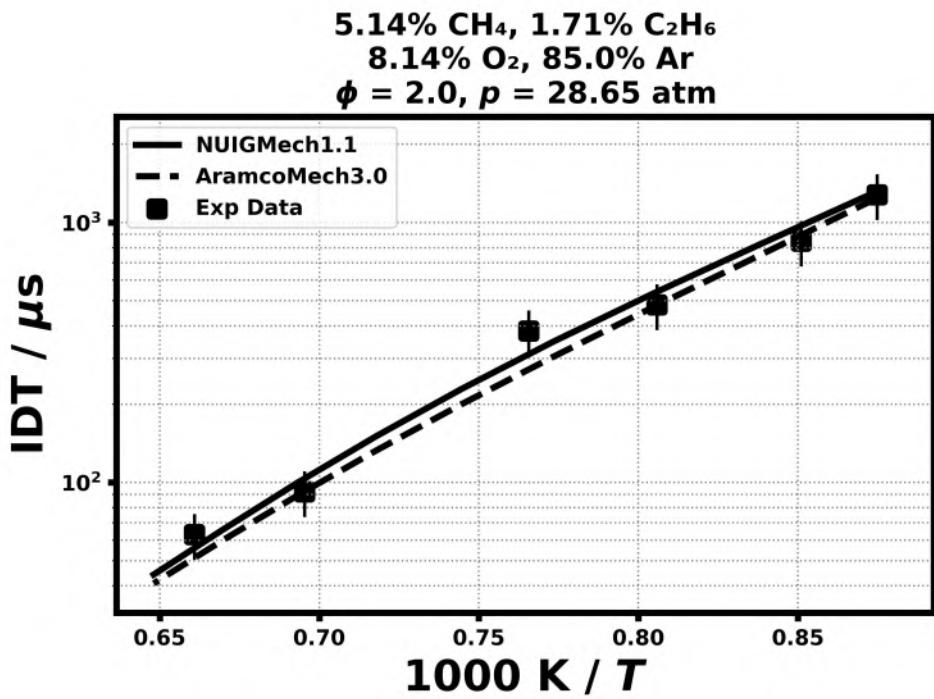


$0.67\% \text{CH}_4, 0.67\% \text{C}_2\text{H}_6$
 $3.66\% \text{O}_2, 95.0\% \text{Ar}$
 $\phi = 1.0, p = 31.61 \text{ atm}$

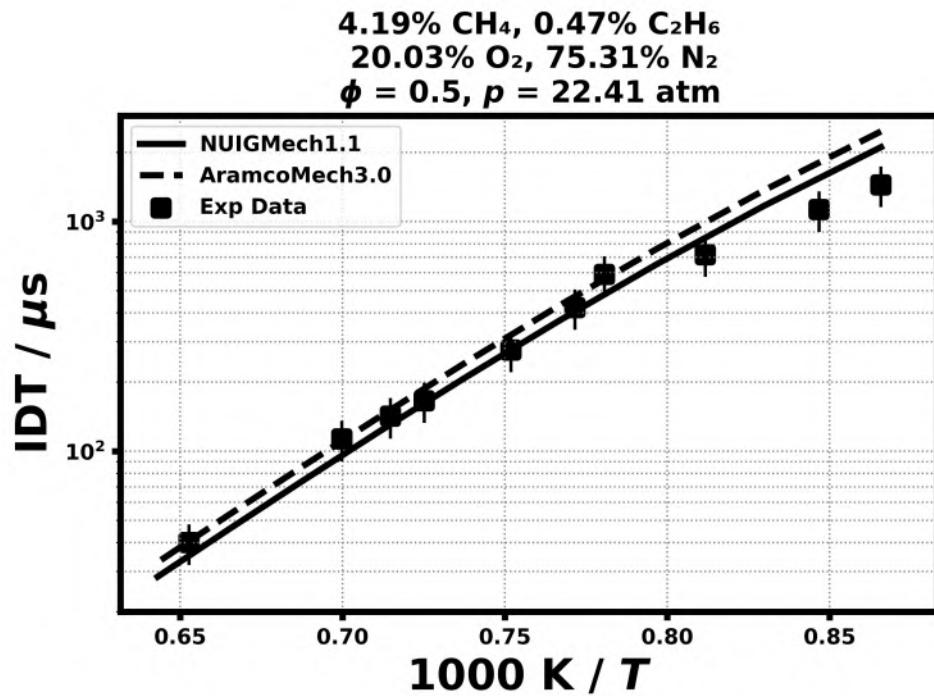


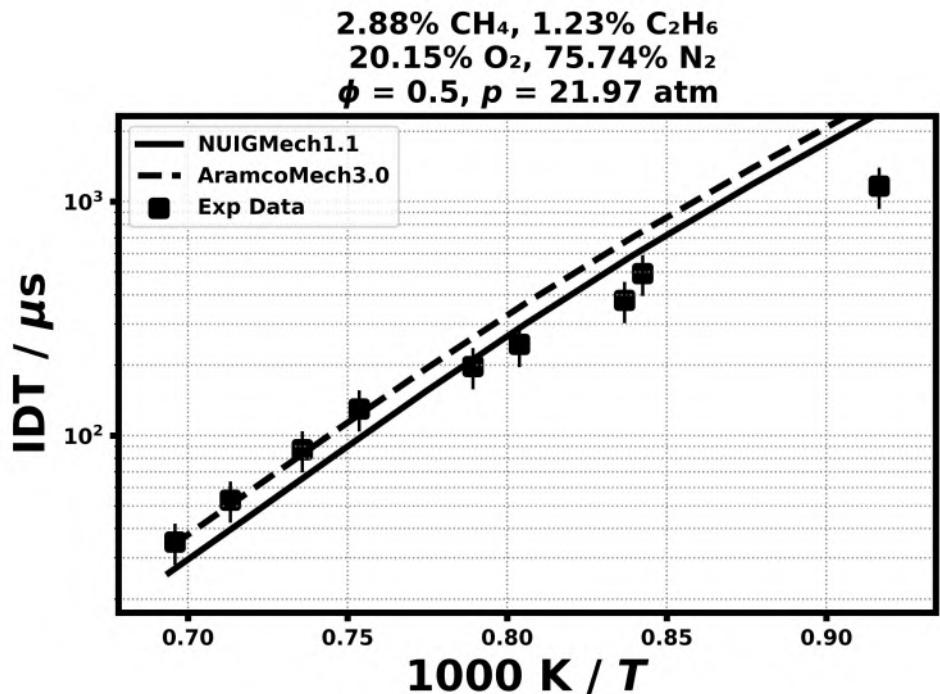
$0.91\% \text{CH}_4, 2.73\% \text{C}_2\text{H}_6$
 $11.36\% \text{O}_2, 85.0\% \text{Ar}$
 $\phi = 1.0, p = 31.01 \text{ atm}$





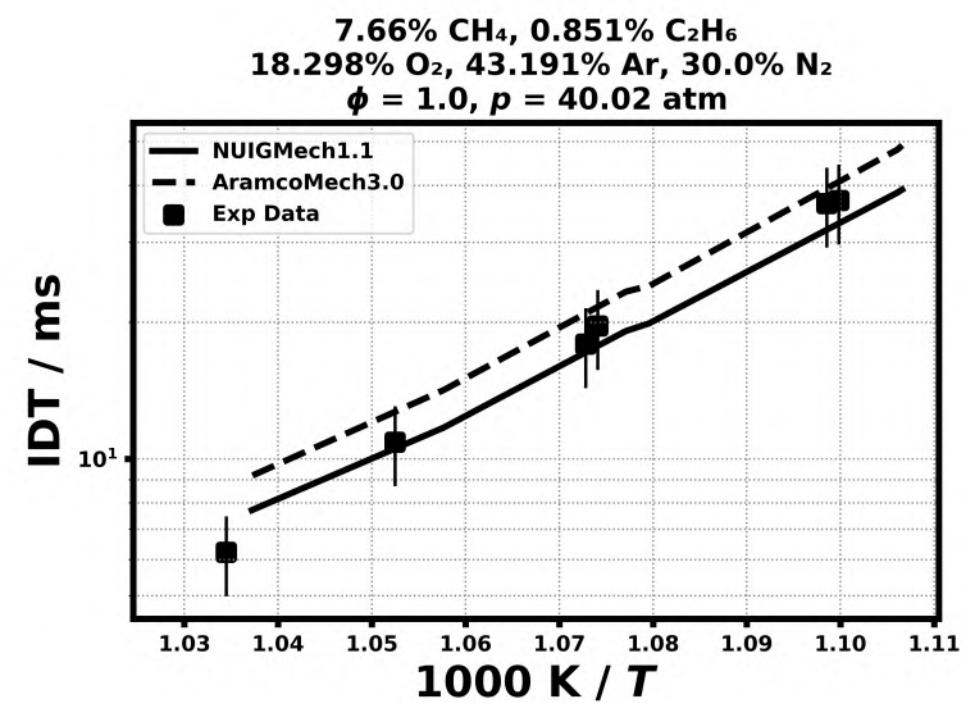
9.3) E. L.Petersen et. al., J. Eng. Gas Turbines Power. Oct 2007, 129(4): 937-944.





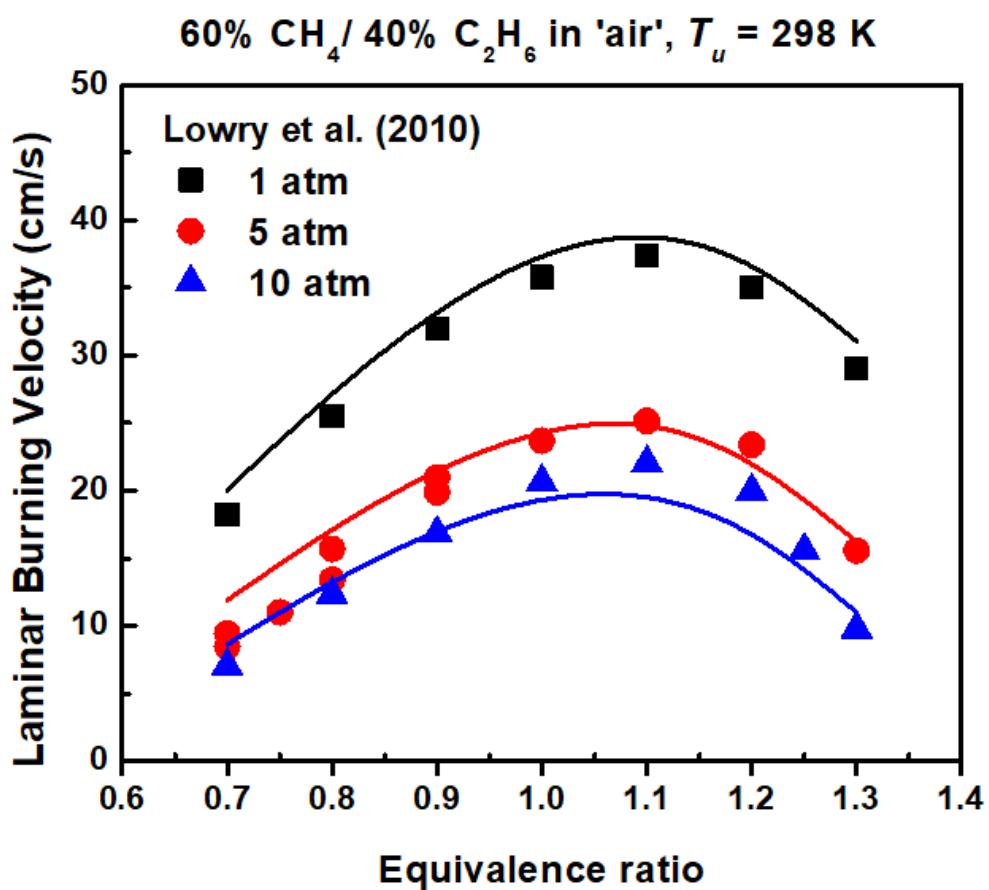
RCM Ignition delay time

9.4) S. Gersen et. al., Proc. Combust. 33, 2010.



Laminar flame speed

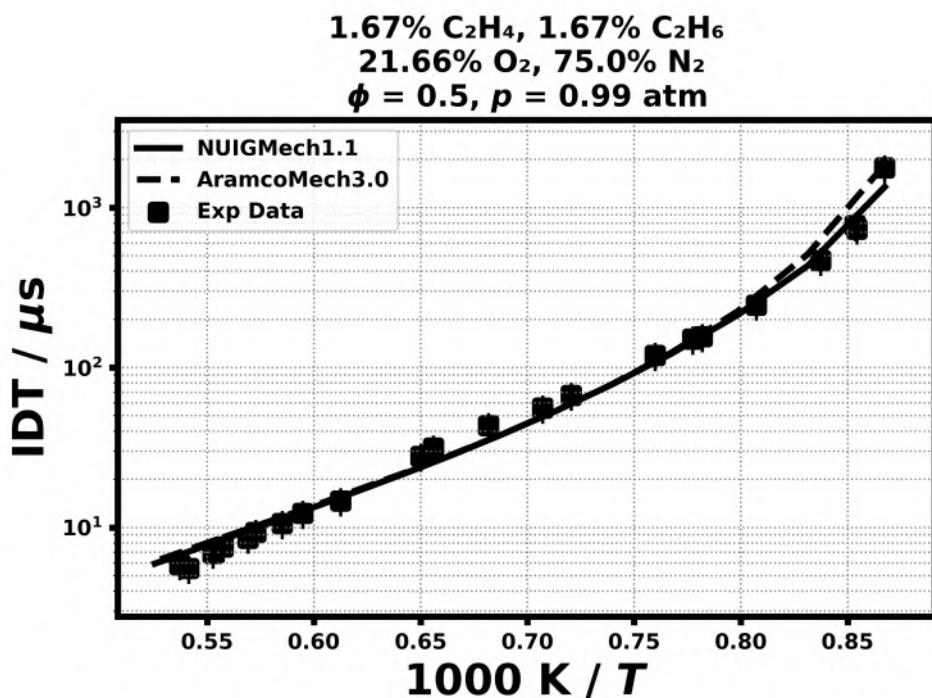
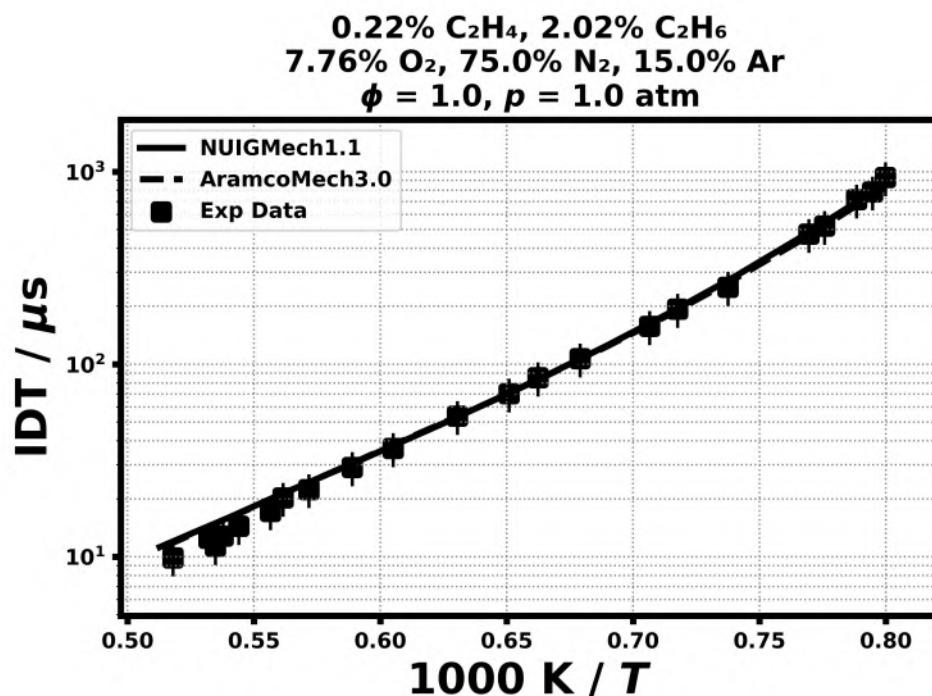
Lowry, W., de Vries, J., Krejci, M., Petersen, E., Serinyel, Z., Metcalfe, W., Bourque, G., Jornal of Engineering for Gas Turbines and Power, 133(9) (2011).



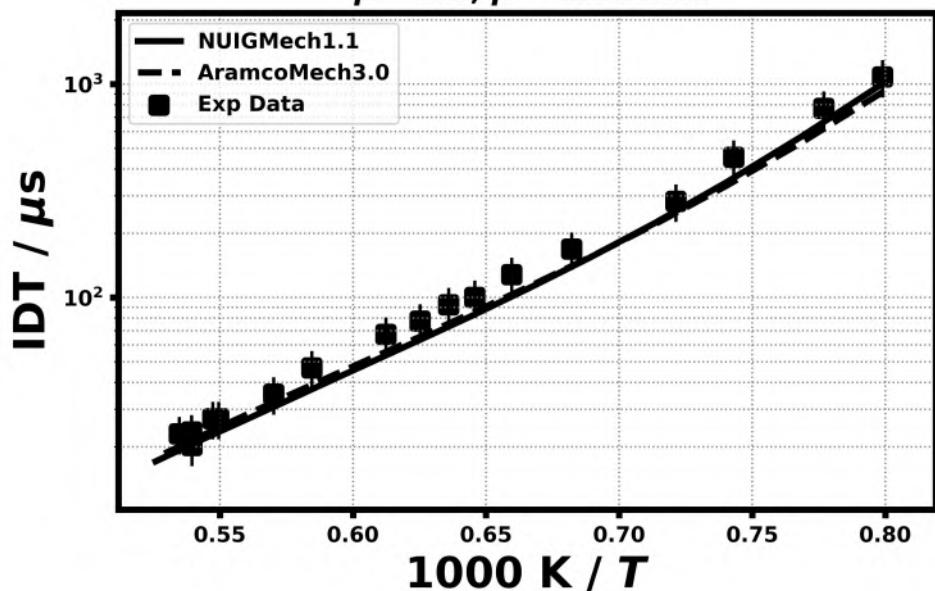
10. Validation of C₂H₄/C₂H₆

Shock tube ignition delay time

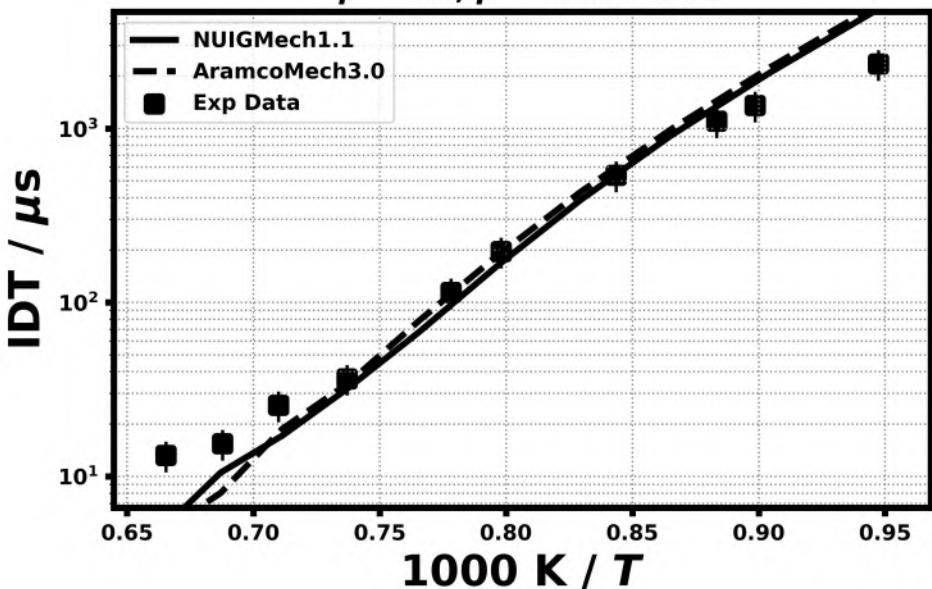
10.1) M. Baigmohammadi et. al., Energy and Fuels 34 (7) (2020) 8808-8823.

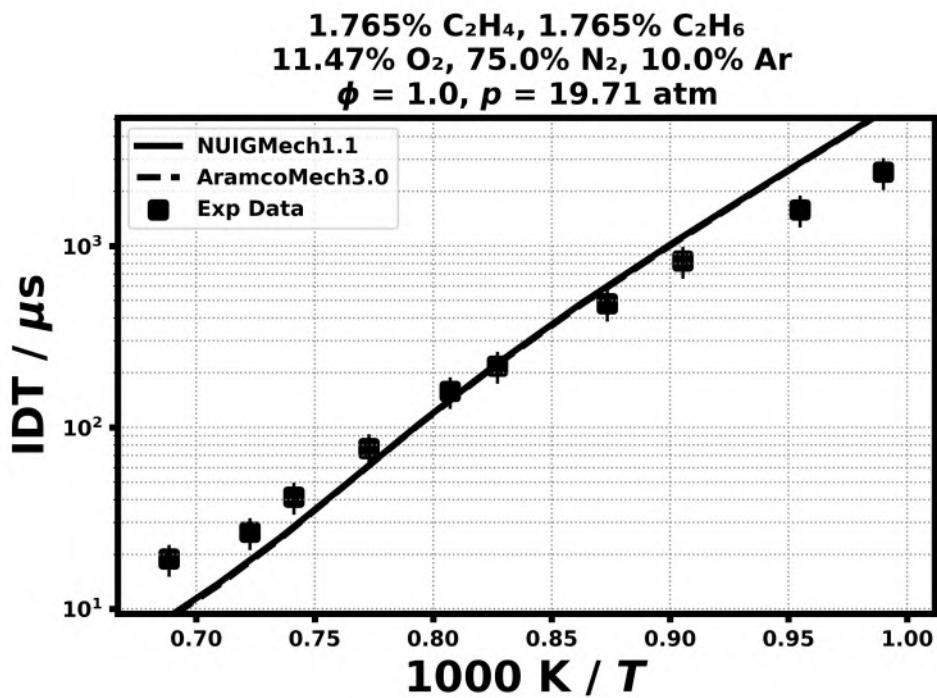
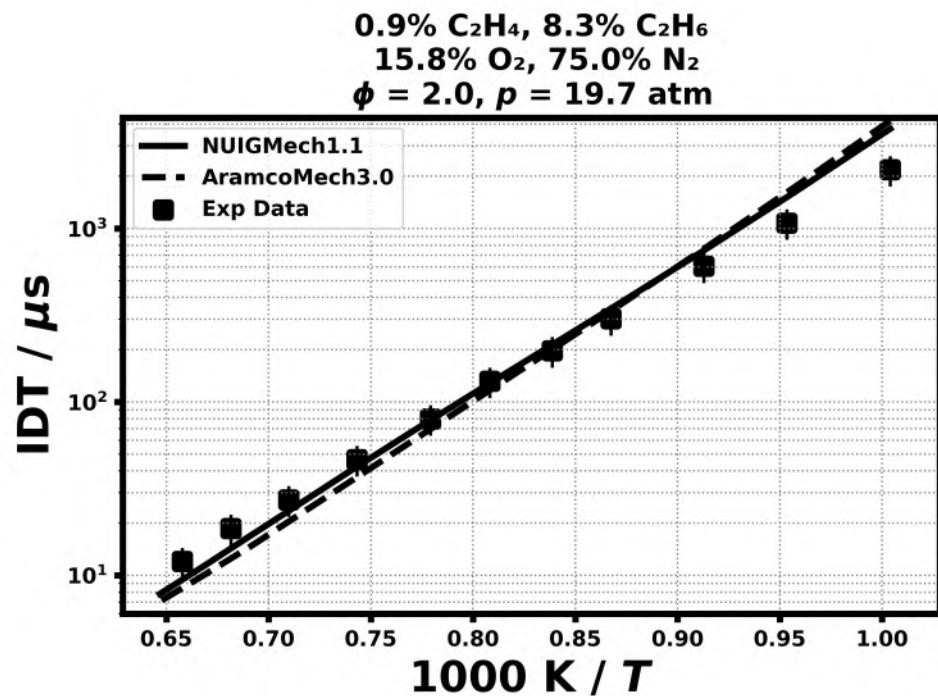


$1.7\% \text{ C}_2\text{H}_4, 3.9\% \text{ C}_2\text{H}_6$
 $9.4\% \text{ O}_2, 75.0\% \text{ N}_2, 10.0\% \text{ Ar}$
 $\phi = 2.0, p = 0.98 \text{ atm}$

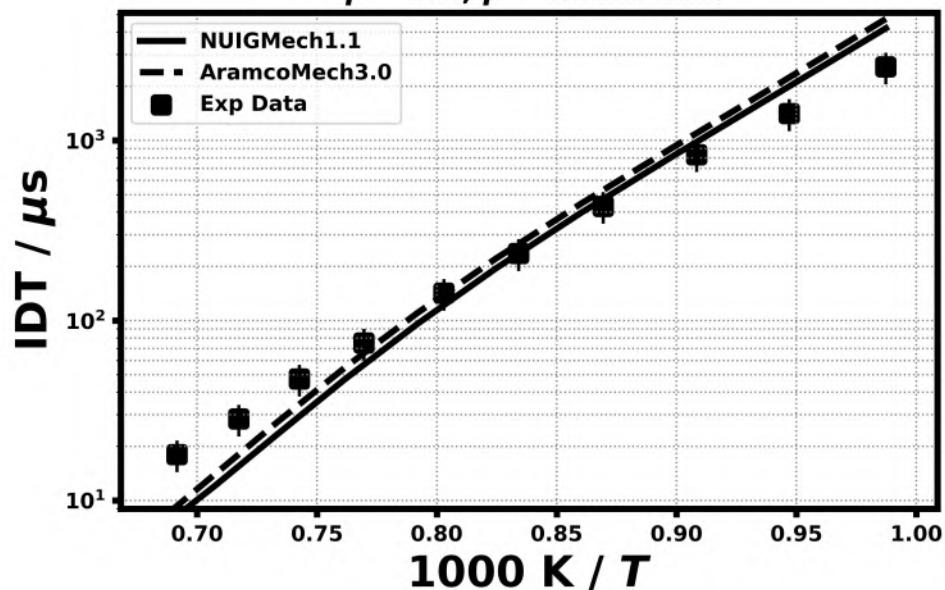


$0.4\% \text{ C}_2\text{H}_4, 0.9\% \text{ C}_2\text{H}_6$
 $8.7\% \text{ O}_2, 75.0\% \text{ N}_2, 15.0\% \text{ Ar}$
 $\phi = 0.5, p = 19.73 \text{ atm}$

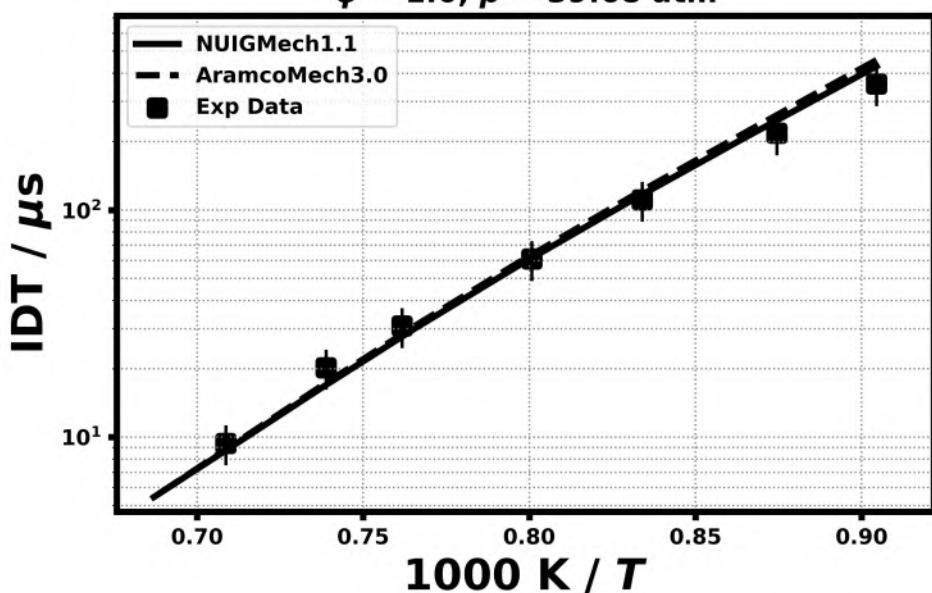


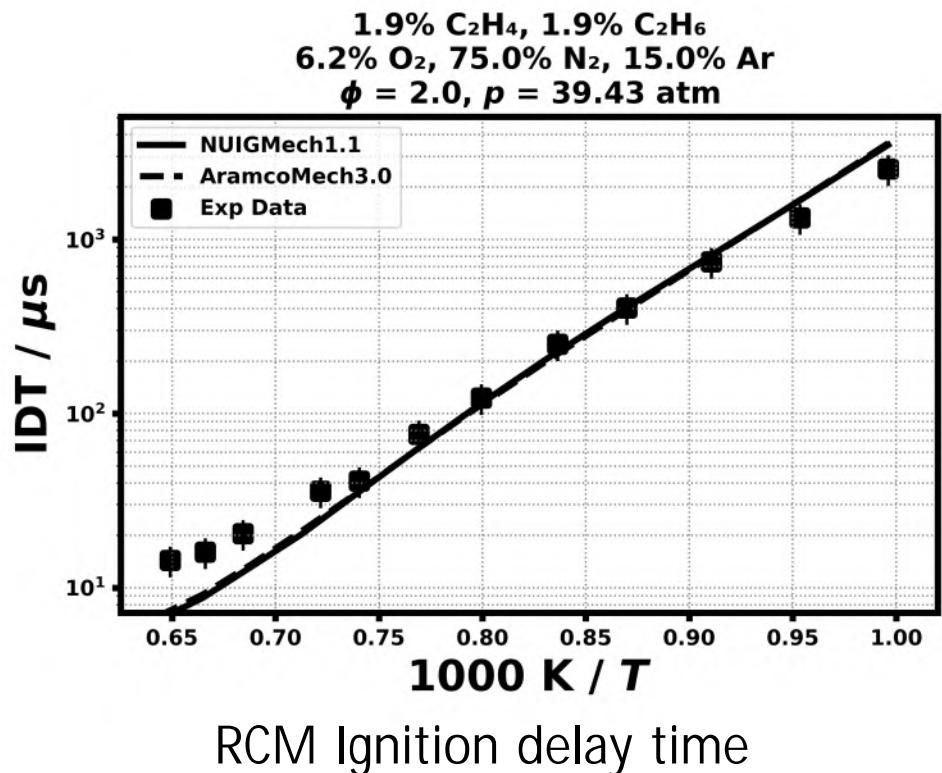


$0.2\% \text{C}_2\text{H}_4, 1.7\% \text{C}_2\text{H}_6$
 $13.1\% \text{O}_2, 75.0\% \text{N}_2, 10.0\% \text{Ar}$
 $\phi = 0.5, p = 39.53 \text{ atm}$

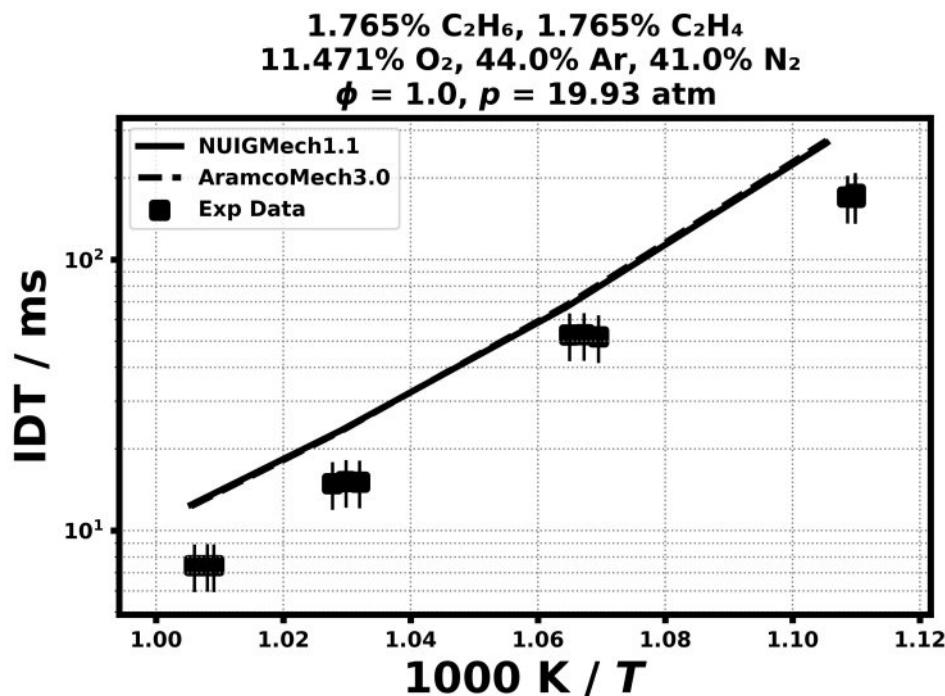


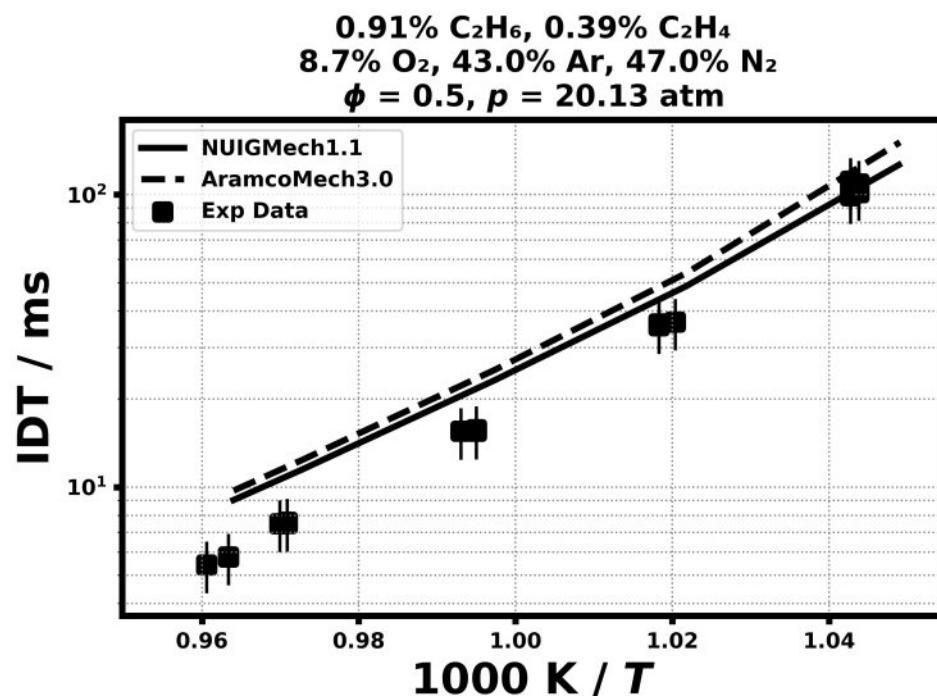
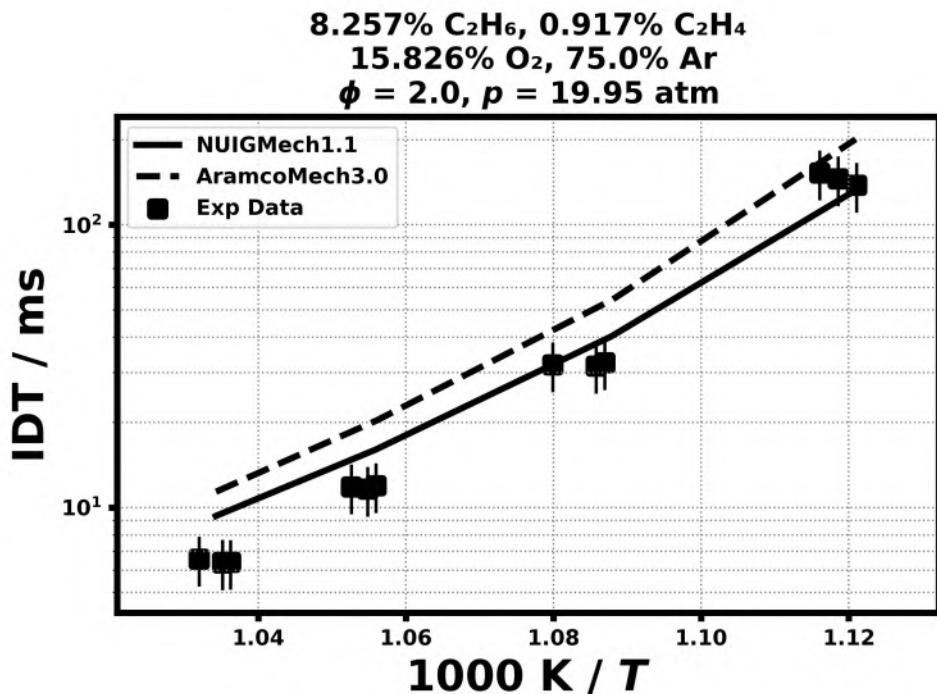
$1.724\% \text{C}_2\text{H}_4, 4.023\% \text{C}_2\text{H}_6$
 $19.253\% \text{O}_2, 75.0\% \text{N}_2$
 $\phi = 1.0, p = 39.68 \text{ atm}$



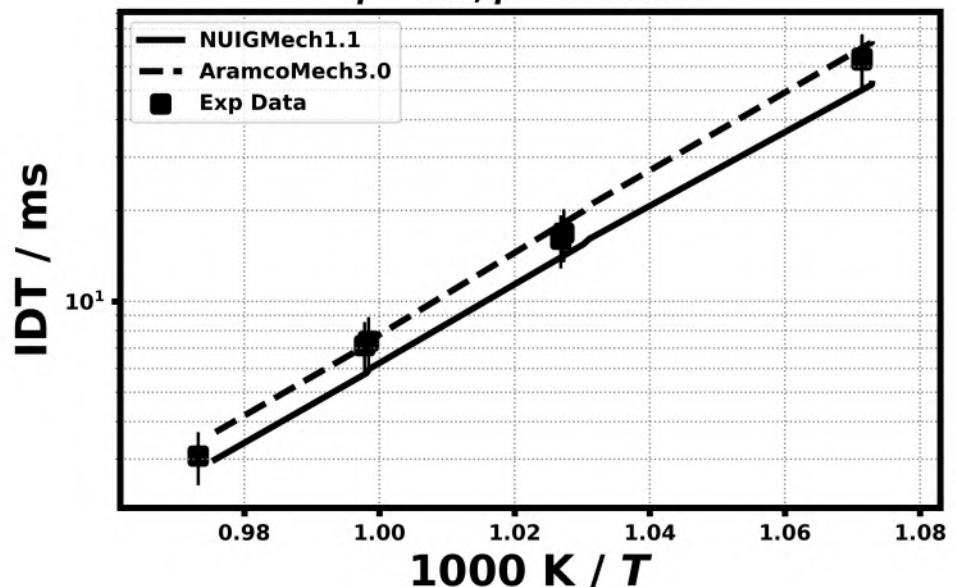


10.2) M. Baigmohammadi et. al., Energy and Fuels 34 (7) (2020) 8808-8823.

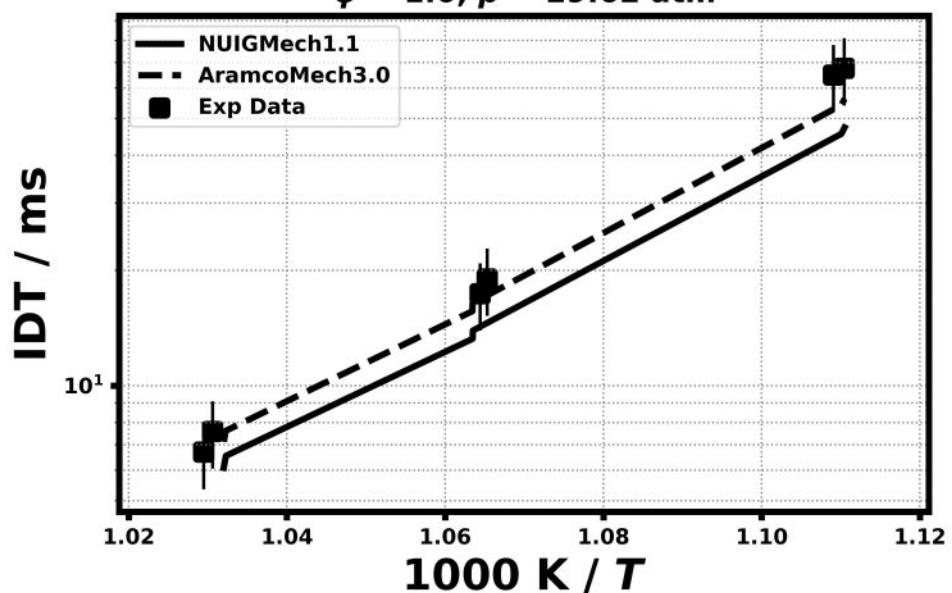


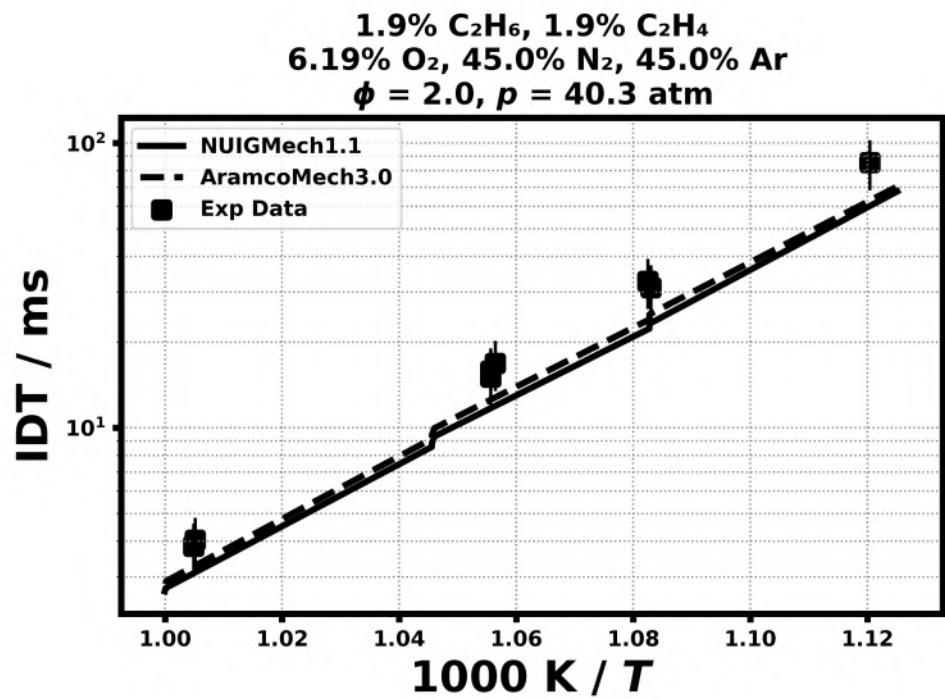


$1.709\% \text{ C}_2\text{H}_6, 0.19\% \text{ C}_2\text{H}_4$
 $13.101\% \text{ O}_2, 59.5\% \text{ N}_2, 25.5\% \text{ Ar}$
 $\phi = 0.5, p = 39.8 \text{ atm}$



$4.023\% \text{ C}_2\text{H}_6, 1.724\% \text{ C}_2\text{H}_4$
 $19.253\% \text{ O}_2, 75.0\% \text{ Ar}$
 $\phi = 1.0, p = 29.62 \text{ atm}$



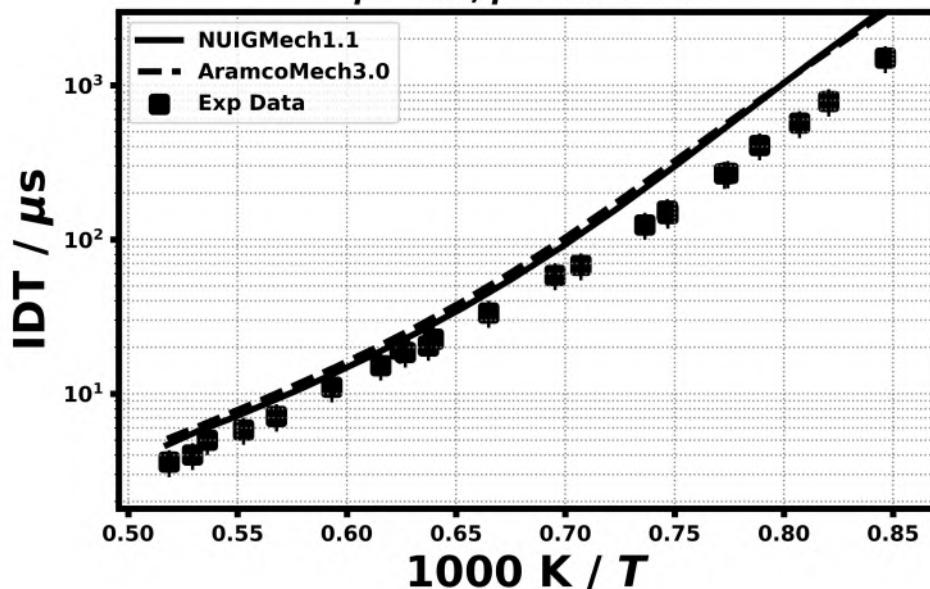


11. Validation of C₂H₄/C₃H₈

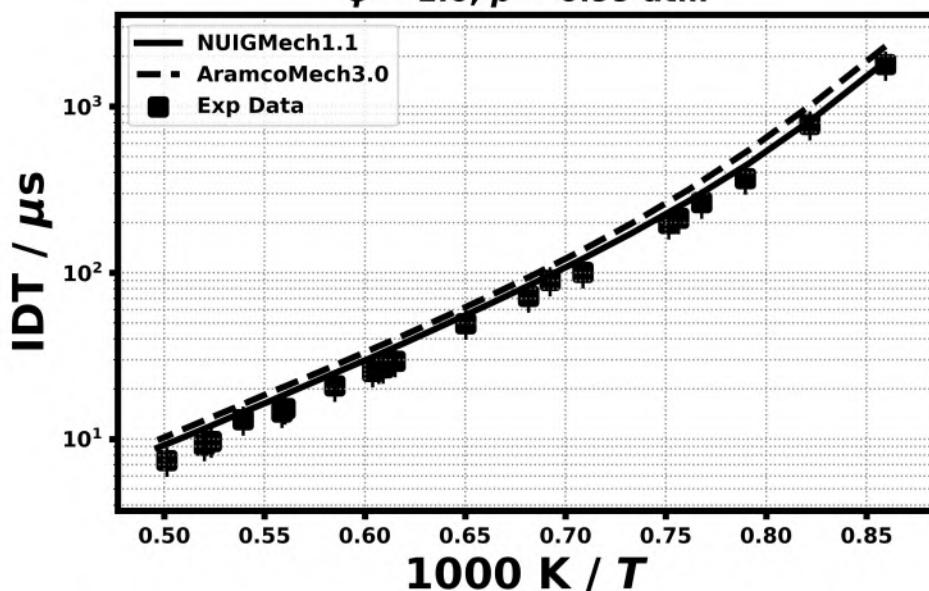
Shock tube ignition delay time

11.1) S. Martinez et. al., Combust. Flame [under review].

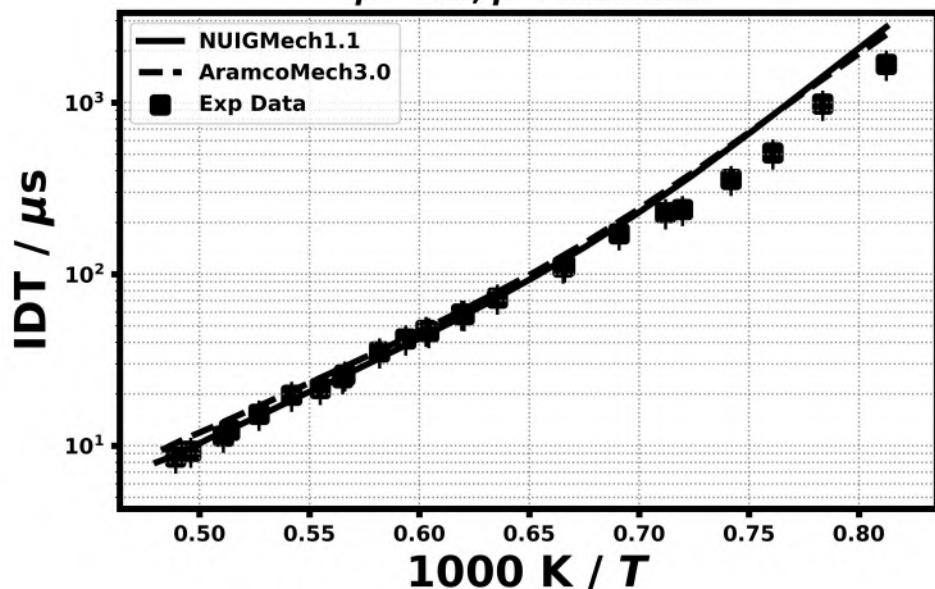
1.4% C₂H₄, 1.4% C₃H₈
22.2% O₂, 75.0% N₂
 $\phi = 0.5, p = 0.99 \text{ atm}$



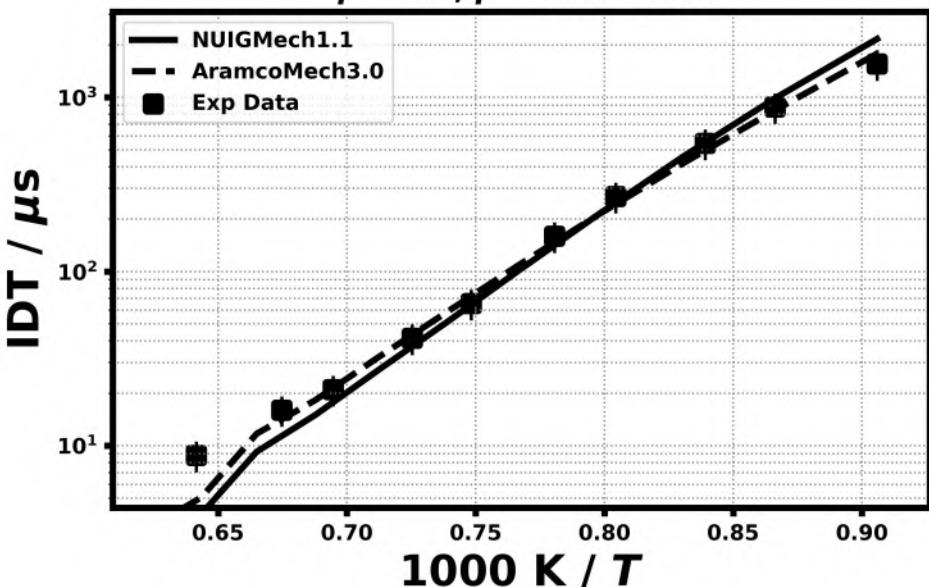
2.14% C₂H₄, 0.24% C₃H₈
7.62% O₂, 75.0% N₂, 15.0% Ar
 $\phi = 1.0, p = 0.99 \text{ atm}$



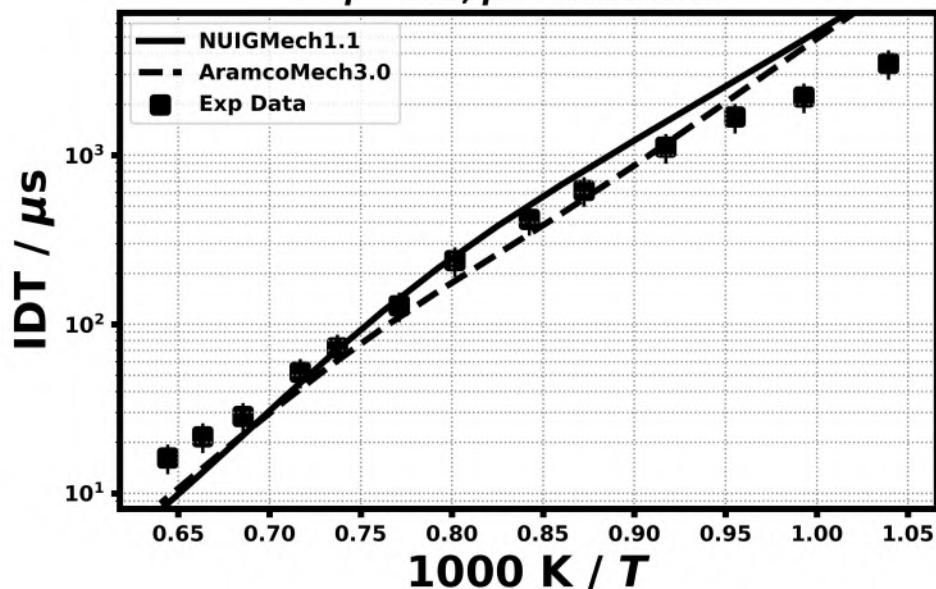
$3.75\% \text{ C}_2\text{H}_4, 1.61\% \text{ C}_3\text{H}_8$
 $9.64\% \text{ O}_2, 75.0\% \text{ N}_2, 10.0\% \text{ Ar}$
 $\phi = 2.0, p = 0.98 \text{ atm}$



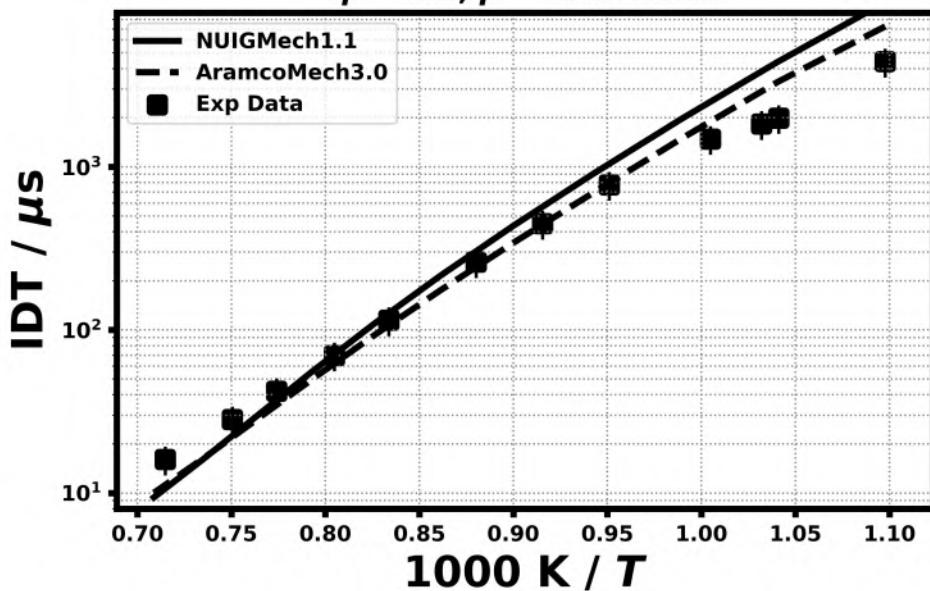
$0.85\% \text{ C}_2\text{H}_4, 0.36\% \text{ C}_3\text{H}_8$
 $8.79\% \text{ O}_2, 75.0\% \text{ N}_2, 15.0\% \text{ Ar}$
 $\phi = 0.5, p = 19.52 \text{ atm}$



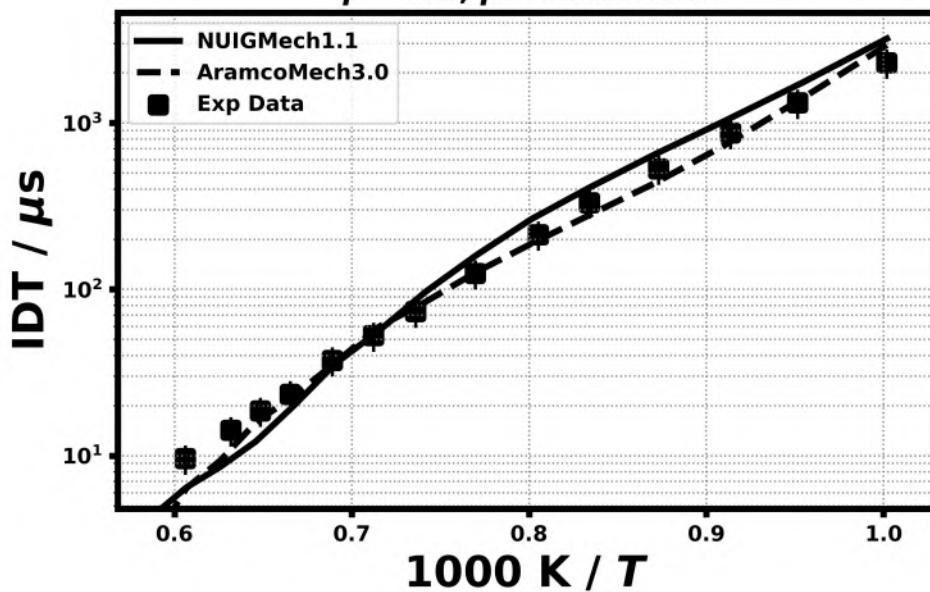
$1.5\% \text{C}_2\text{H}_4, 1.5\% \text{C}_3\text{H}_8$
 $12.0\% \text{O}_2, 75.0\% \text{N}_2, 10.0\% \text{Ar}$
 $\phi = 1.0, p = 19.75 \text{ atm}$



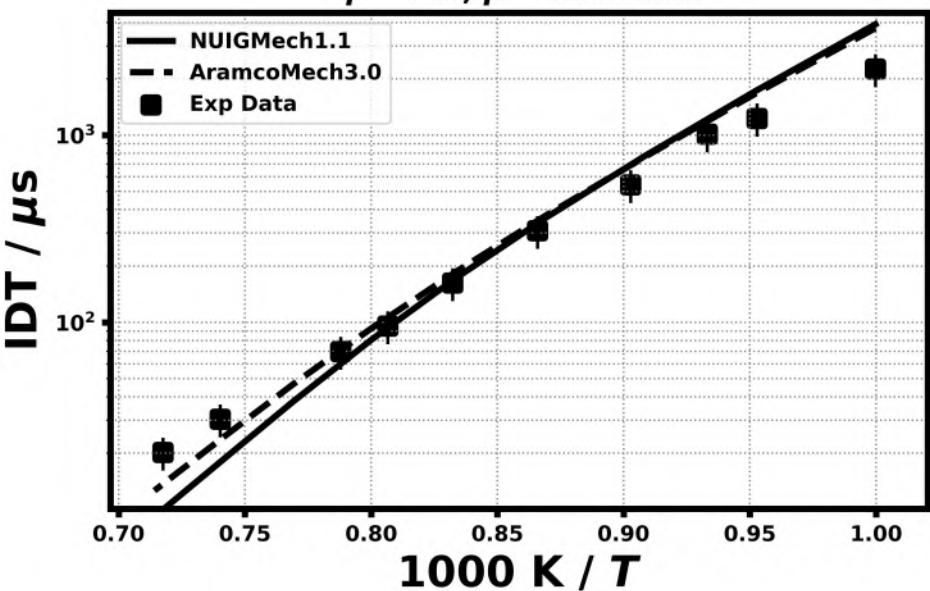
$8.6\% \text{C}_2\text{H}_4, 1.0\% \text{C}_3\text{H}_8$
 $15.4\% \text{O}_2, 75.0\% \text{N}_2$
 $\phi = 2.0, p = 19.74 \text{ atm}$

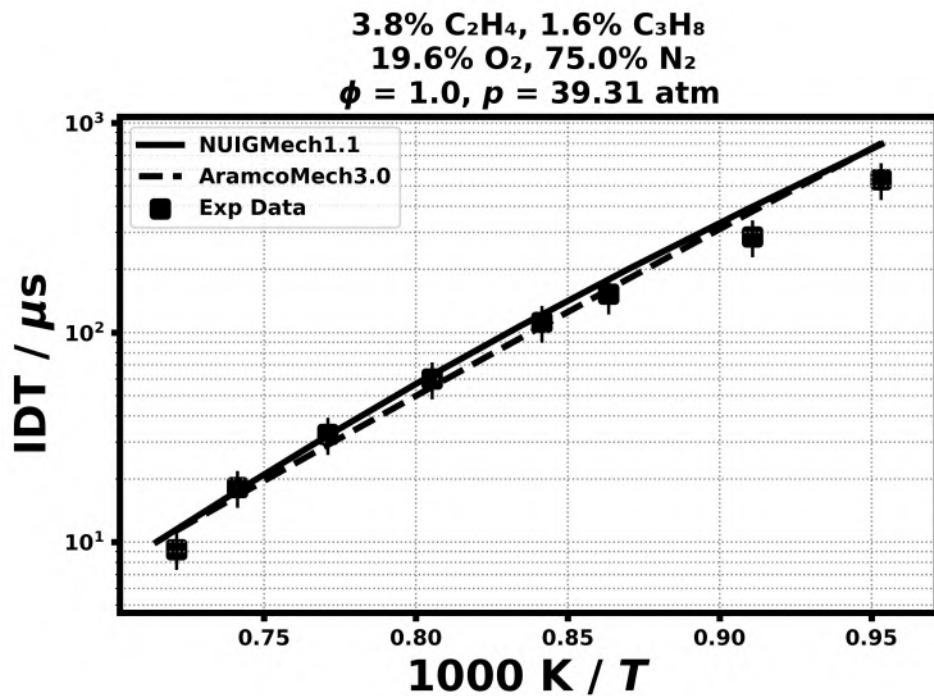


$1.67\% \text{ C}_2\text{H}_4, 1.67\% \text{ C}_3\text{H}_8$
 $6.66\% \text{ O}_2, 75.0\% \text{ N}_2, 15.0\% \text{ Ar}$
 $\phi = 2.0, p = 39.35 \text{ atm}$

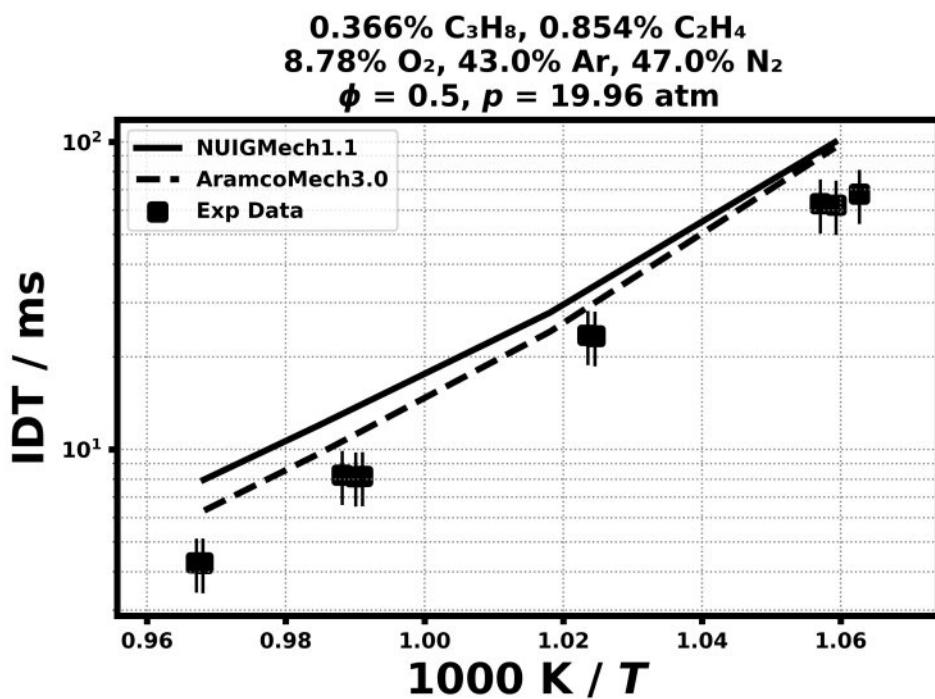


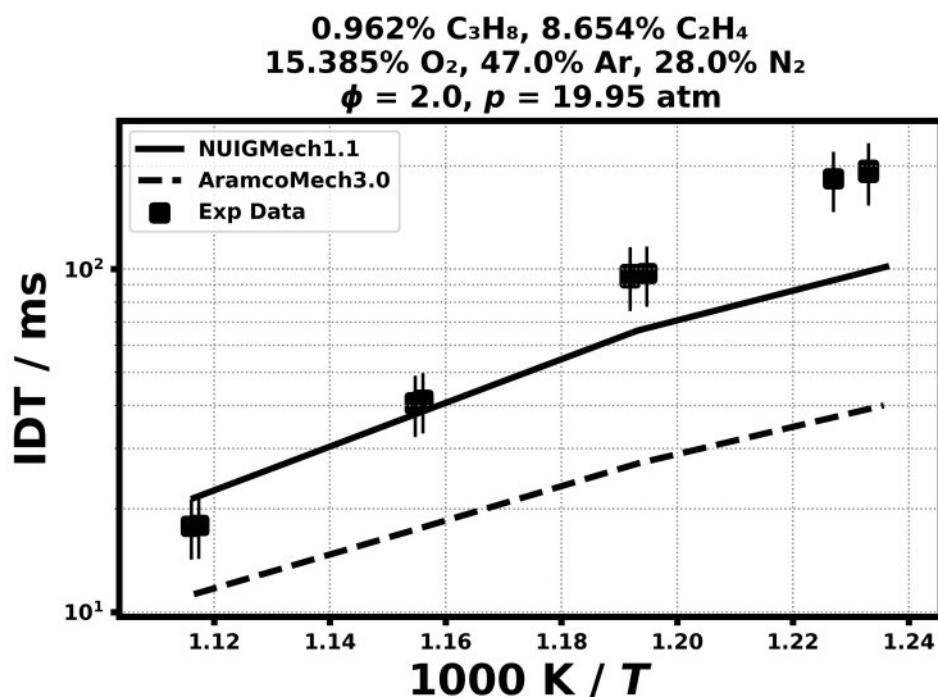
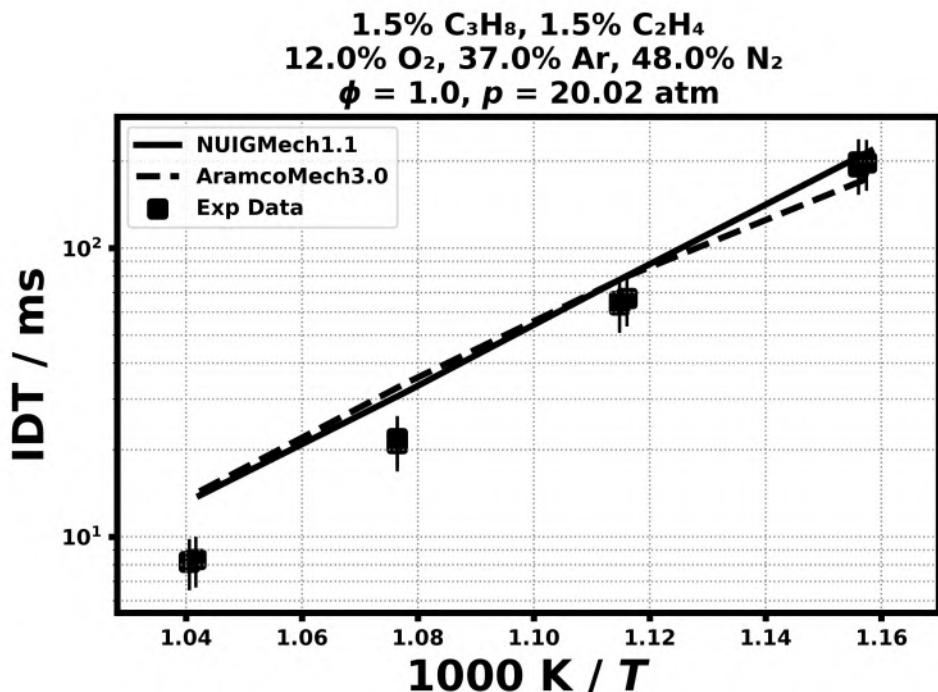
$1.8\% \text{ C}_2\text{H}_4, 0.2\% \text{ C}_3\text{H}_8$
 $13.0\% \text{ O}_2, 75.0\% \text{ N}_2, 10.0\% \text{ Ar}$
 $\phi = 0.5, p = 39.1 \text{ atm}$



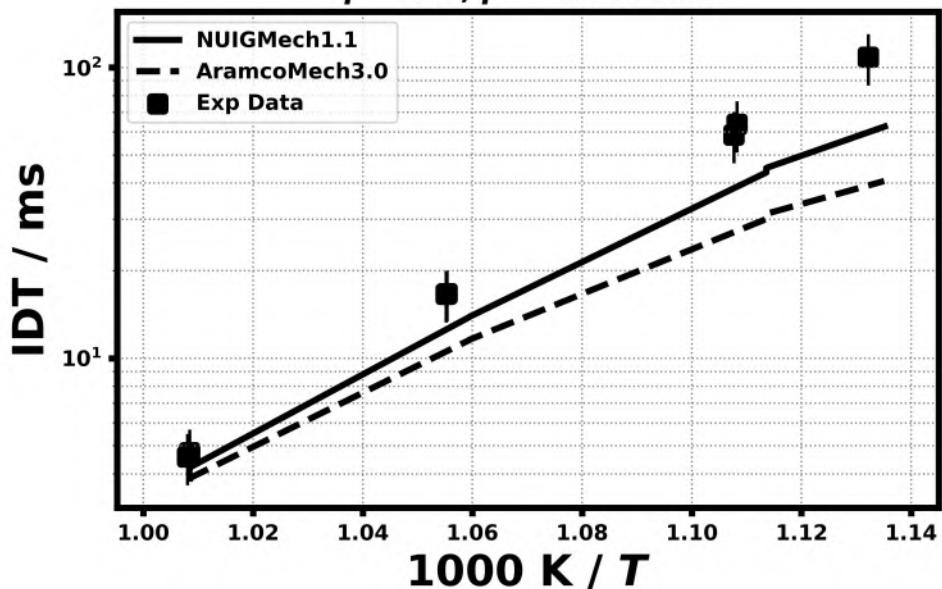


11.2) S. Martinez et. al., Combust. Flame [under review].

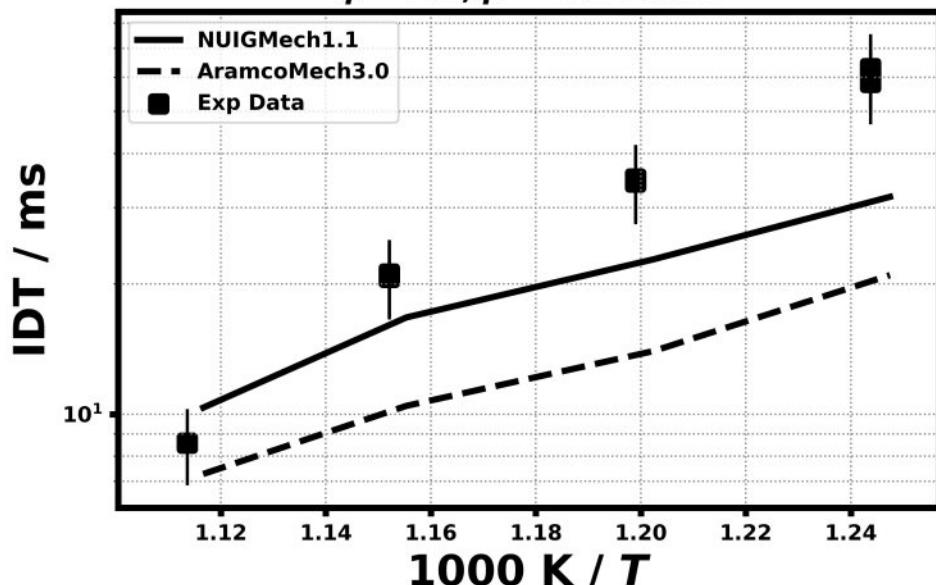




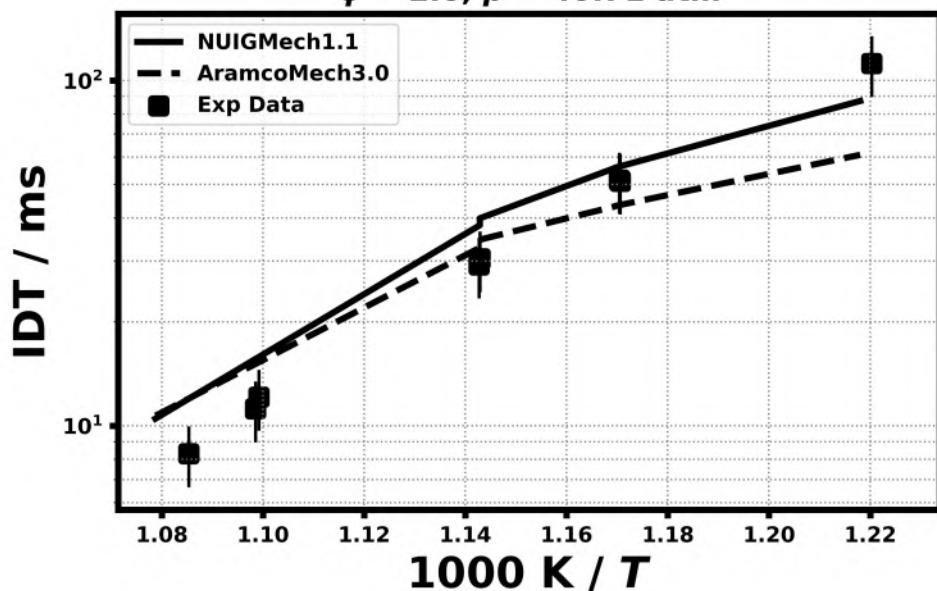
$1.824\% \text{C}_2\text{H}_4, 0.203\% \text{C}_3\text{H}_8$
 $12.973\% \text{O}_2, 59.5\% \text{N}_2, 25.5\% \text{Ar}$
 $\phi = 0.5, p = 40.05 \text{ atm}$



$1.63\% \text{C}_3\text{H}_8, 3.804\% \text{C}_2\text{H}_4$
 $19.565\% \text{O}_2, 28.0\% \text{N}_2, 47.0\% \text{Ar}$
 $\phi = 1.0, p = 40.12 \text{ atm}$



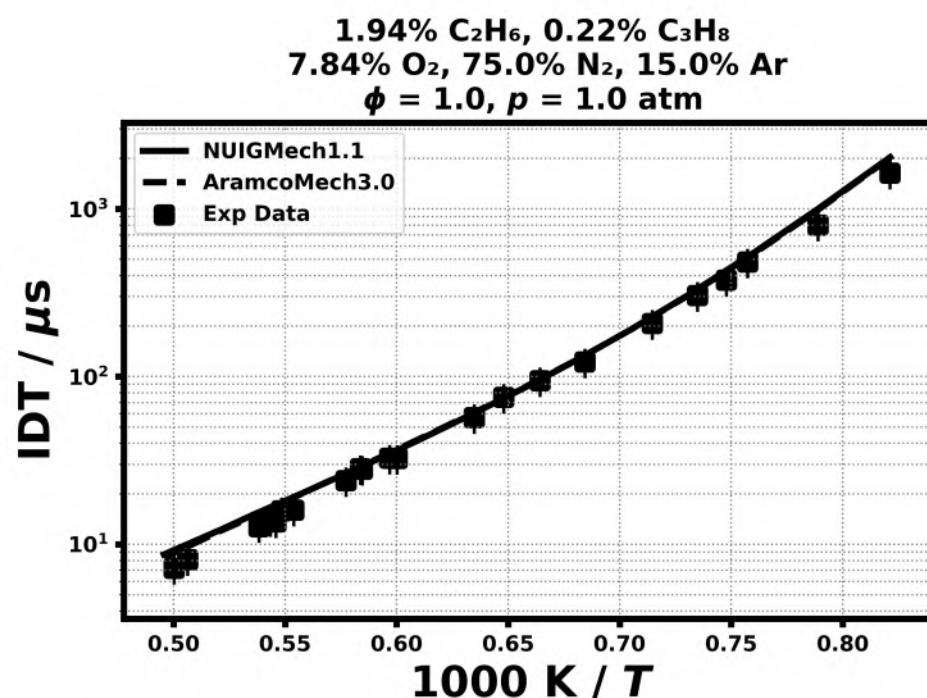
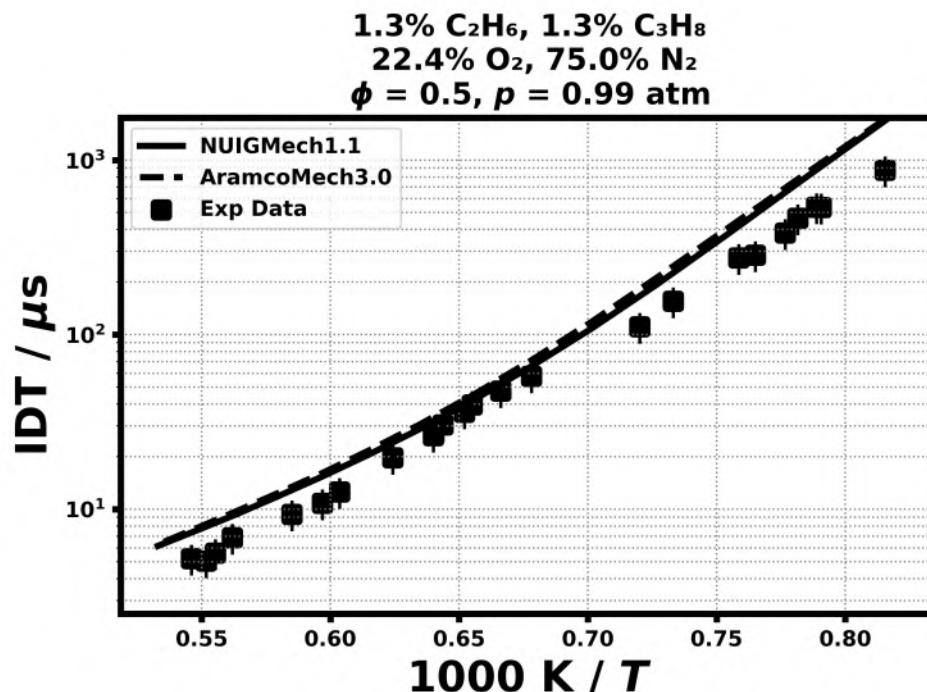
1.67% C₂H₄, 1.67% C₃H₈
6.669% O₂, 62.994% N₂, 26.997% Ar
 $\phi = 2.0, p = 40.71 \text{ atm}$



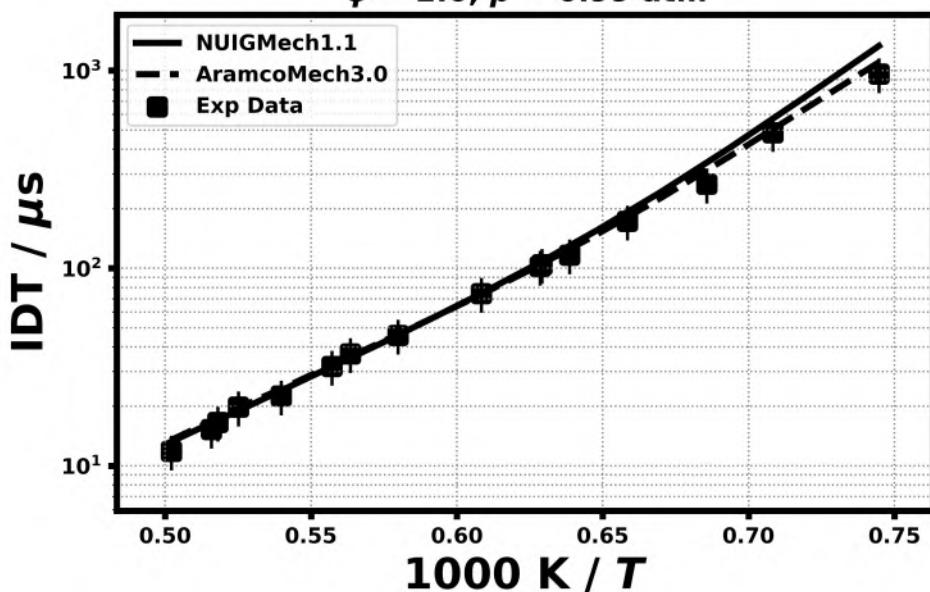
12. Validation of C₂H₆/C₃H₈

Shock tube ignition delay time

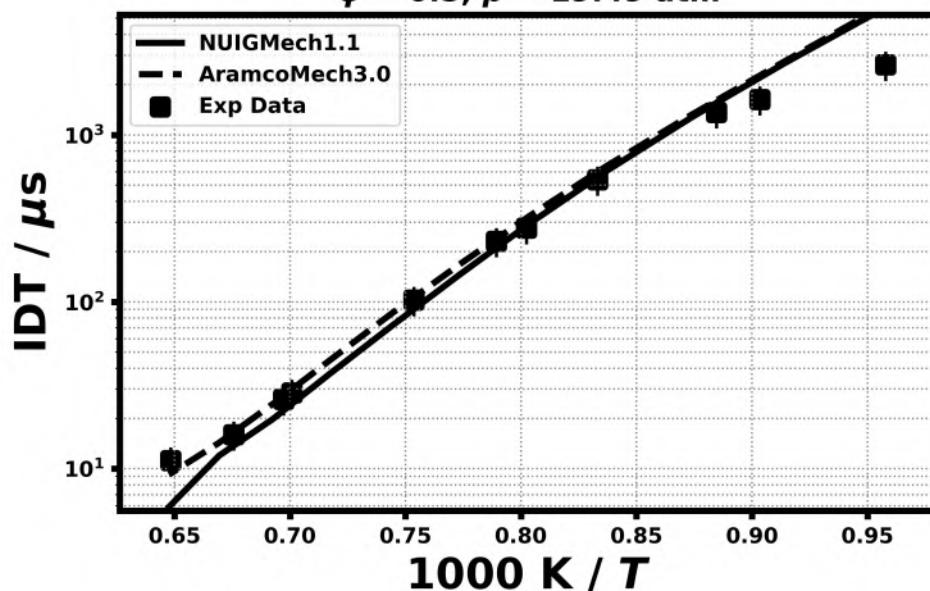
12.1) S. Martinez et. al., Combust. Flame [under review].



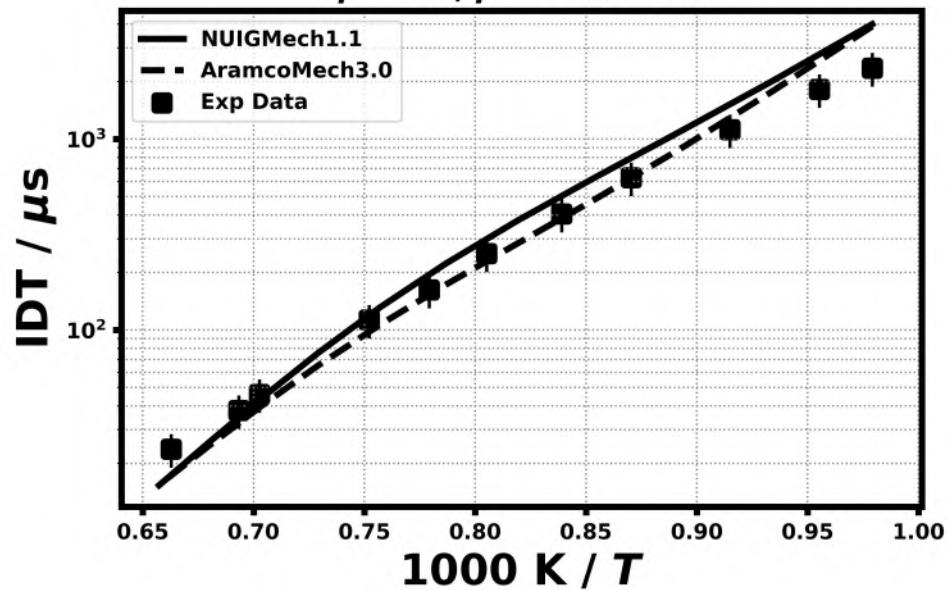
$3.53\% \text{ C}_2\text{H}_6, 1.51\% \text{ C}_3\text{H}_8$
 $9.96\% \text{ O}_2, 75.0\% \text{ N}_2, 10.0\% \text{ Ar}$
 $\phi = 2.0, p = 0.99 \text{ atm}$



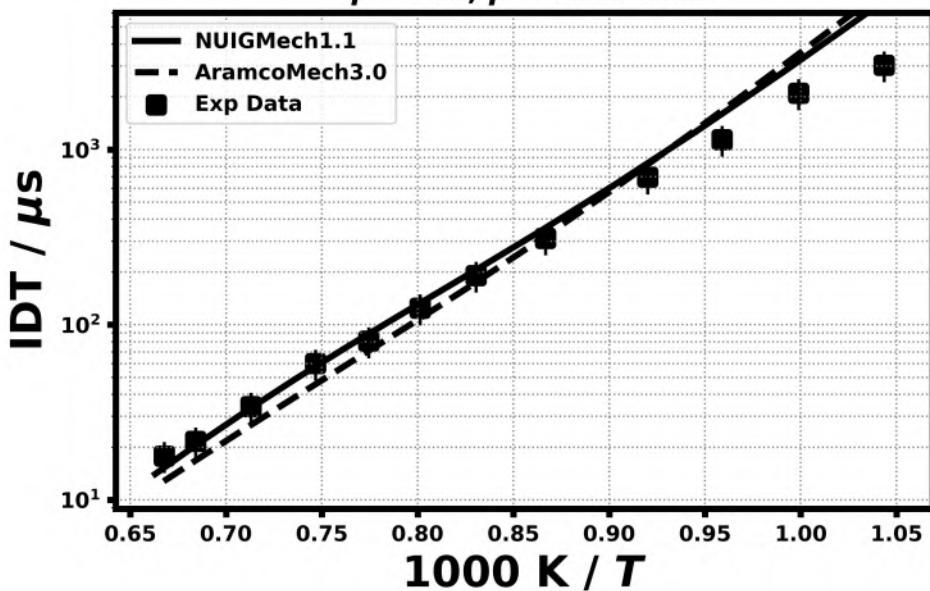
$0.79\% \text{ C}_2\text{H}_6, 0.34\% \text{ C}_3\text{H}_8$
 $8.87\% \text{ O}_2, 75.0\% \text{ N}_2, 15.0\% \text{ Ar}$
 $\phi = 0.5, p = 19.49 \text{ atm}$



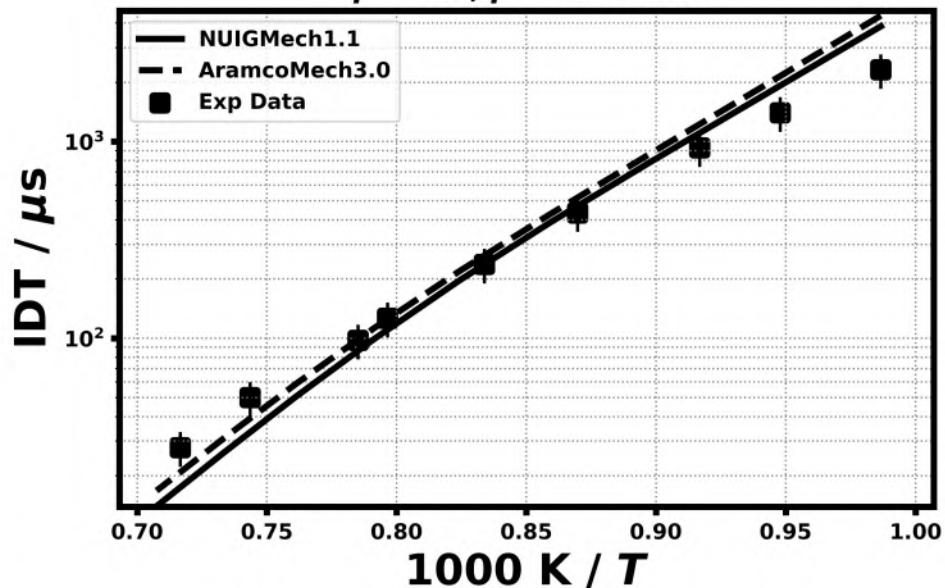
$1.43\% \text{ C}_2\text{H}_6, 1.43\% \text{ C}_3\text{H}_8$
 $12.14\% \text{ O}_2, 75.0\% \text{ N}_2, 10.0\% \text{ Ar}$
 $\phi = 1.0, p = 19.69 \text{ atm}$



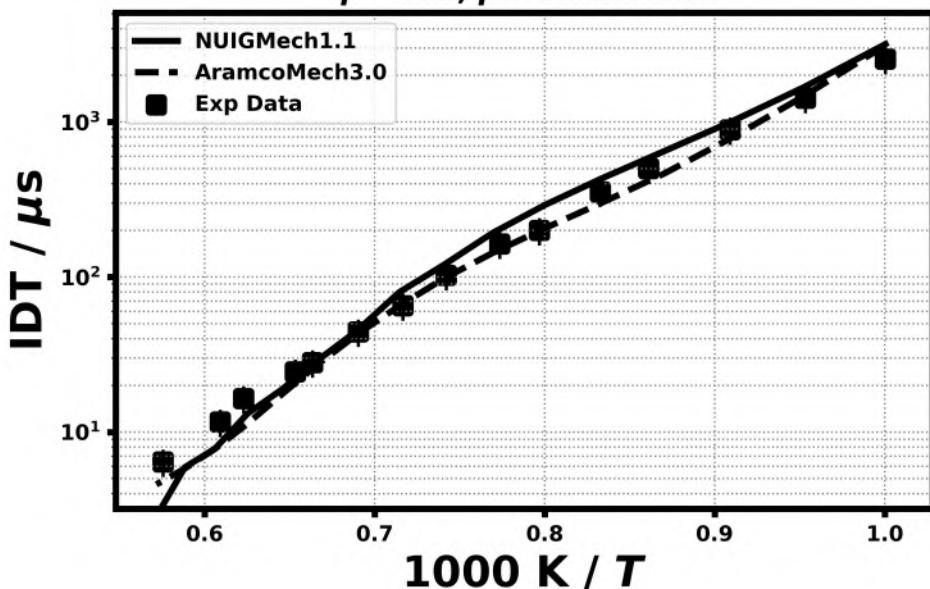
$8.0\% \text{ C}_2\text{H}_6, 0.9\% \text{ C}_3\text{H}_8$
 $16.1\% \text{ O}_2, 75.0\% \text{ N}_2$
 $\phi = 2.0, p = 19.7 \text{ atm}$

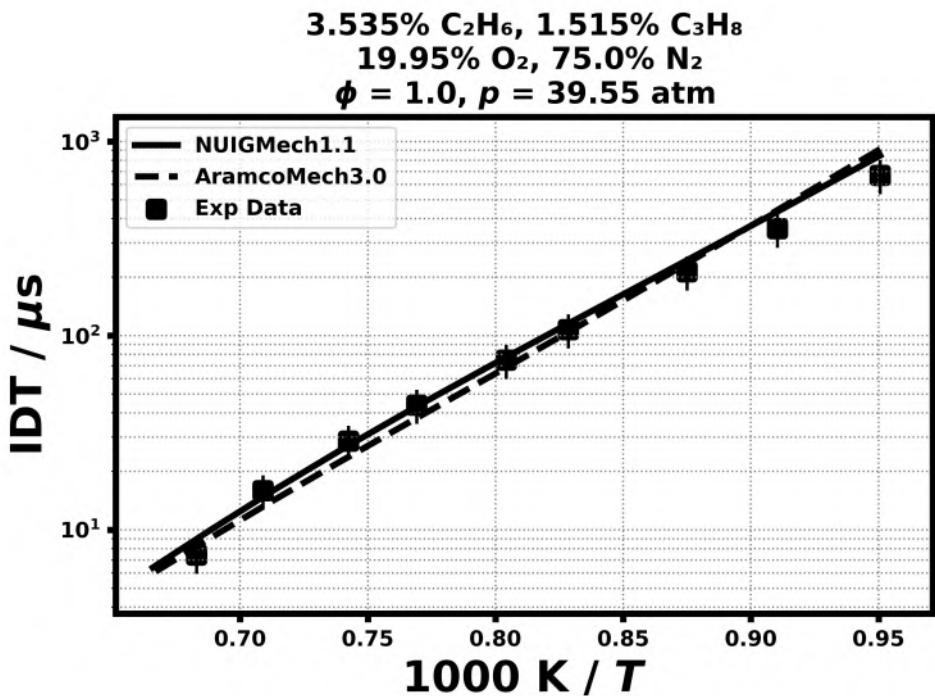


$1.6\% \text{C}_2\text{H}_6, 0.2\% \text{C}_3\text{H}_8$
 $13.2\% \text{O}_2, 75.0\% \text{N}_2, 10.0\% \text{Ar}$
 $\phi = 0.5, p = 39.4 \text{ atm}$



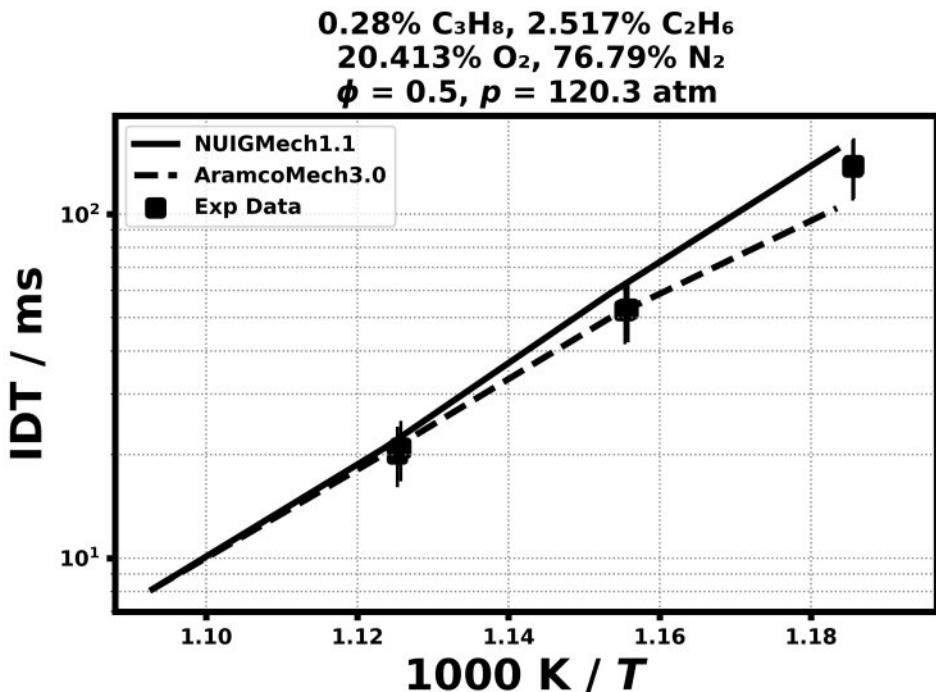
$1.6\% \text{C}_2\text{H}_6, 1.6\% \text{C}_3\text{H}_8$
 $6.8\% \text{O}_2, 75.0\% \text{N}_2, 15.0\% \text{Ar}$
 $\phi = 2.0, p = 39.54 \text{ atm}$



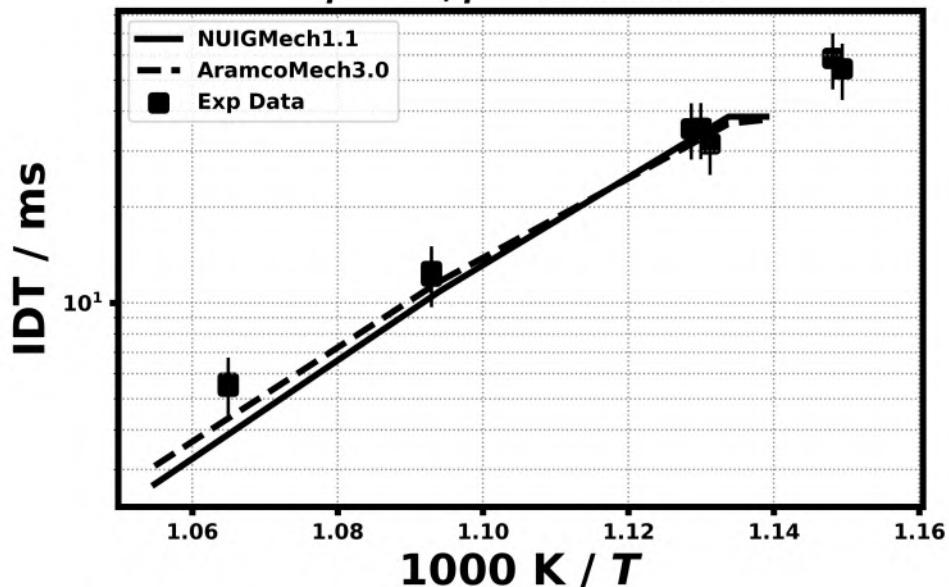


RCM Ignition delay time

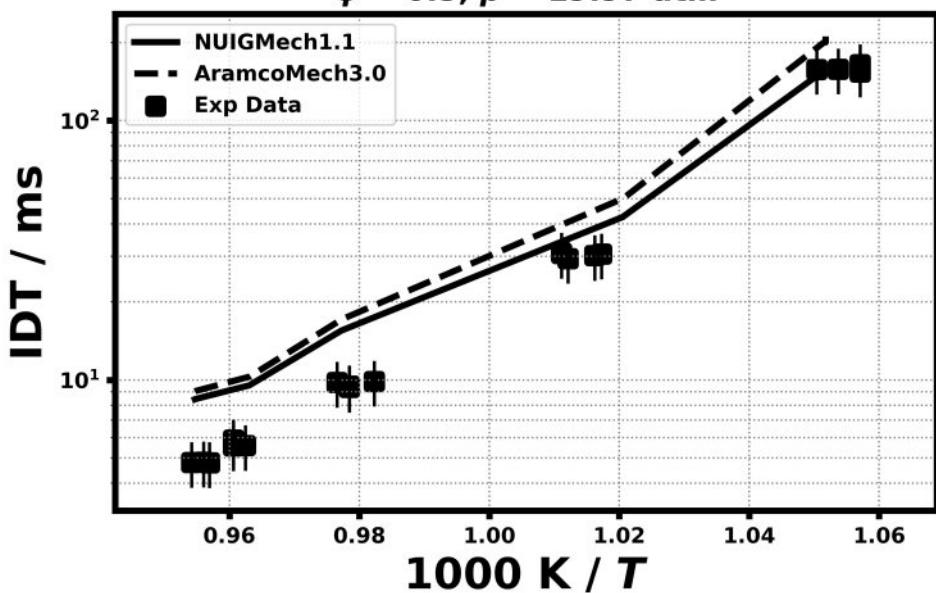
12.2) S. Martinez et. al., Combust. Flame [under review].

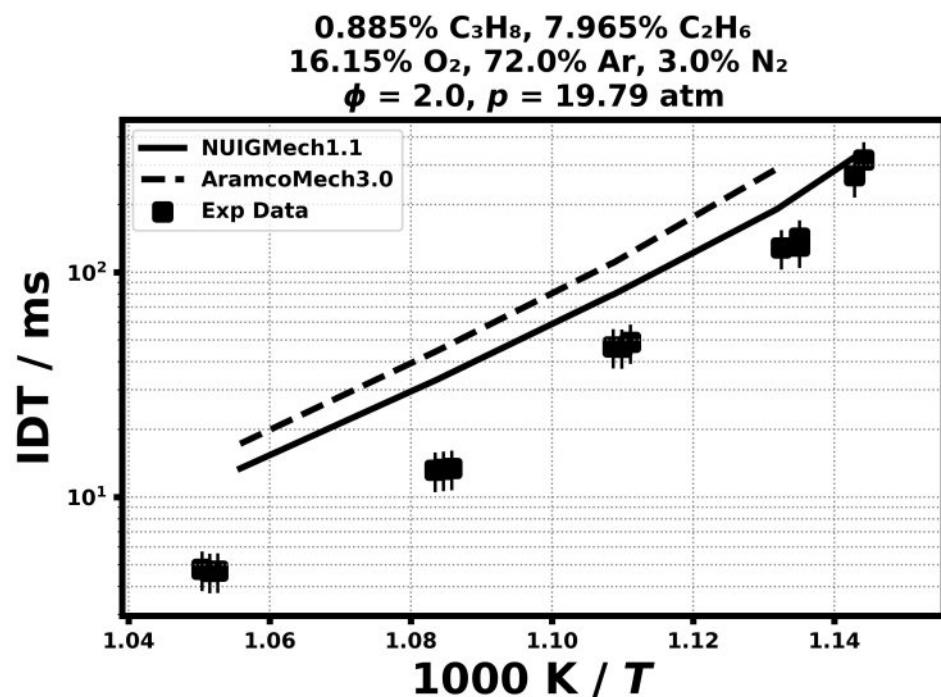
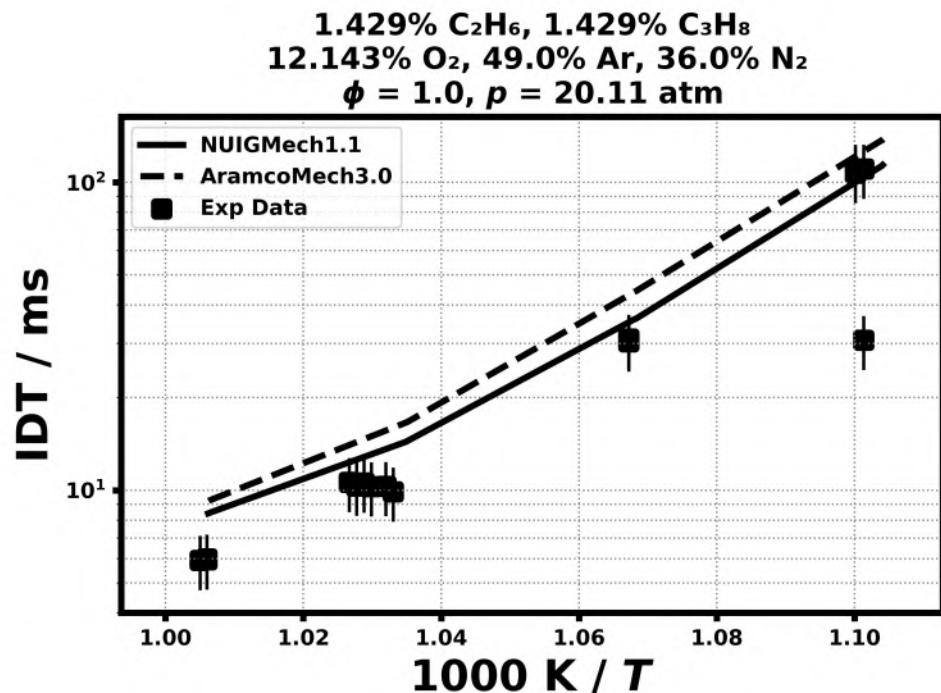


$0.206\% \text{ C}_3\text{H}_8, 1.858\% \text{ C}_2\text{H}_6$
 $7.534\% \text{ O}_2, 81.362\% \text{ N}_2, 9.04\% \text{ Ar}$
 $\phi = 1.0, p = 134.55 \text{ atm}$

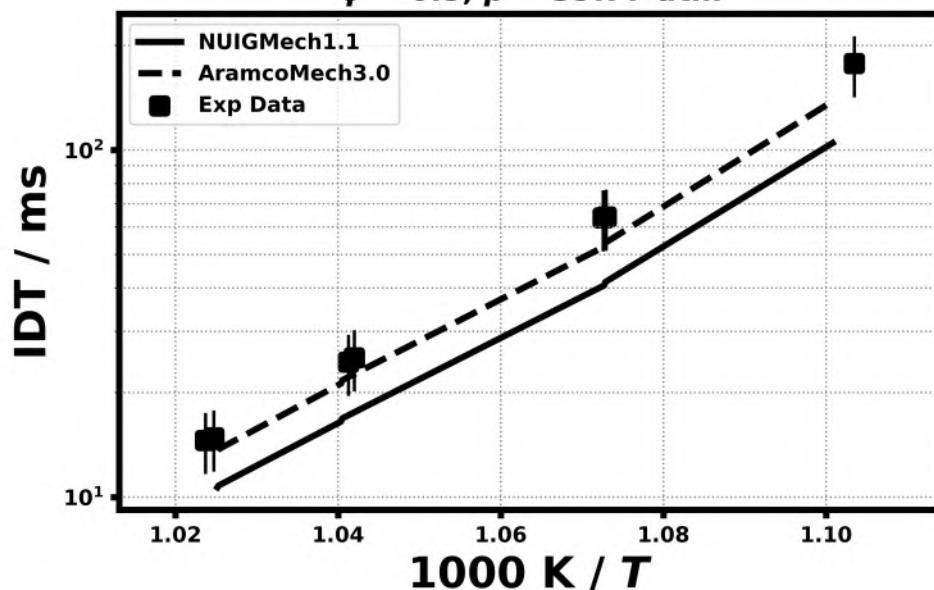


$0.337\% \text{ C}_3\text{H}_8, 0.787\% \text{ C}_2\text{H}_6$
 $8.876\% \text{ O}_2, 44.0\% \text{ Ar}, 46.0\% \text{ N}_2$
 $\phi = 0.5, p = 19.97 \text{ atm}$

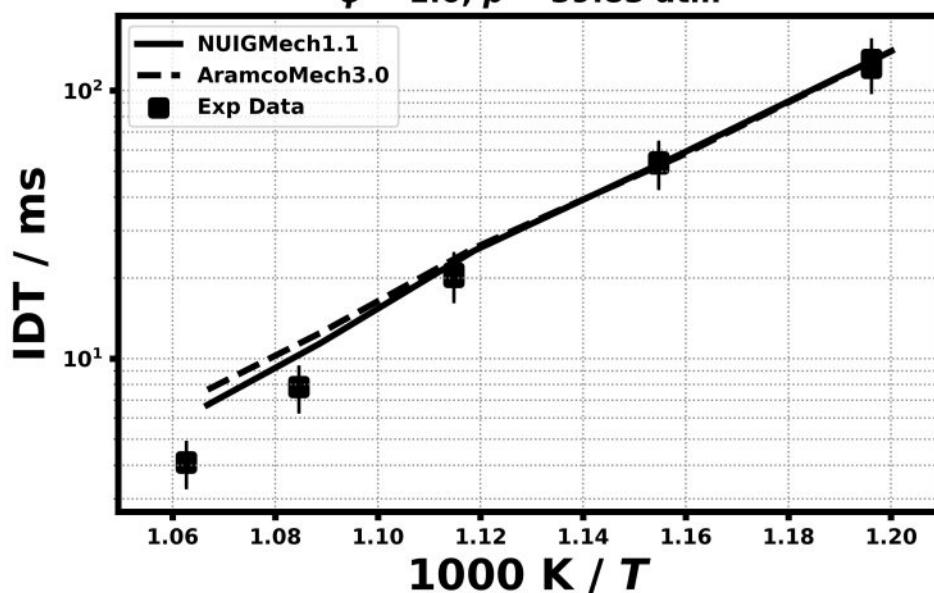




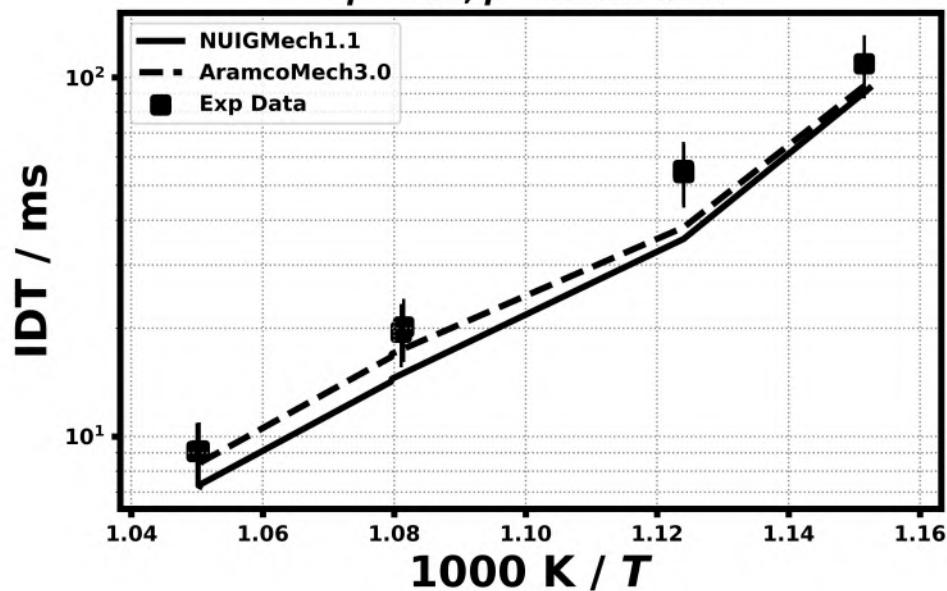
$1.627\% \text{C}_2\text{H}_6, 0.181\% \text{C}_3\text{H}_8$
 $13.193\% \text{O}_2, 59.499\% \text{N}_2, 25.5\% \text{Ar}$
 $\phi = 0.5, p = 39.77 \text{ atm}$



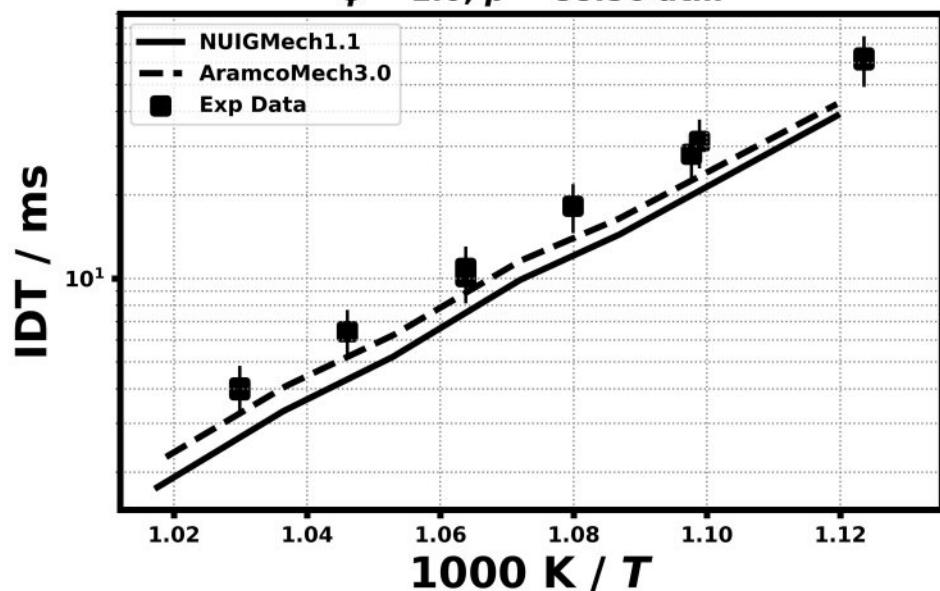
$1.515\% \text{C}_3\text{H}_8, 3.535\% \text{C}_2\text{H}_6$
 $19.949\% \text{O}_2, 52.0\% \text{Ar}, 23.0\% \text{N}_2$
 $\phi = 1.0, p = 39.83 \text{ atm}$



$1.6\% \text{C}_2\text{H}_6, 1.6\% \text{C}_3\text{H}_8$
 $6.8\% \text{O}_2, 54.0\% \text{N}_2, 36.0\% \text{Ar}$
 $\phi = 2.0, p = 39.92 \text{ atm}$



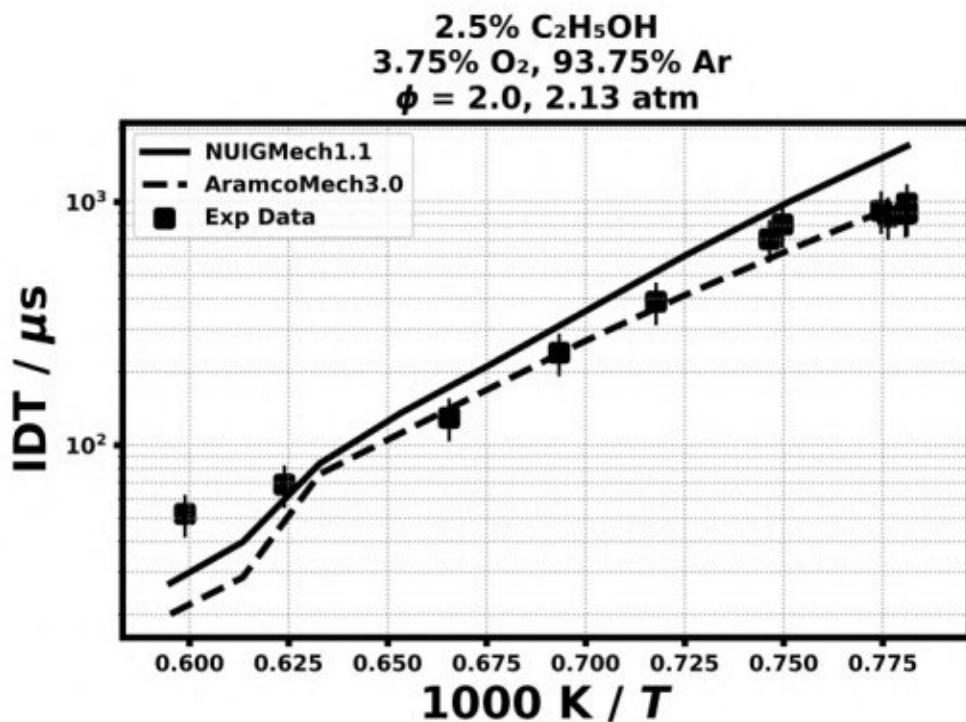
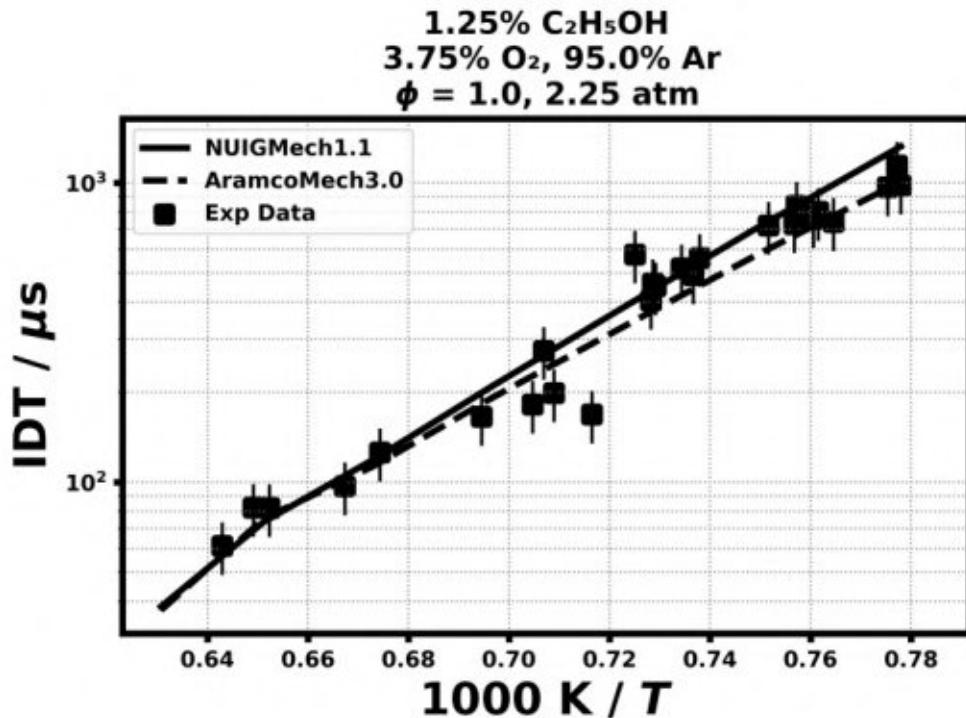
$0.206\% \text{C}_3\text{H}_8, 1.858\% \text{C}_2\text{H}_6$
 $7.534\% \text{O}_2, 45.201\% \text{N}_2, 45.201\% \text{Ar}$
 $\phi = 1.0, p = 88.56 \text{ atm}$



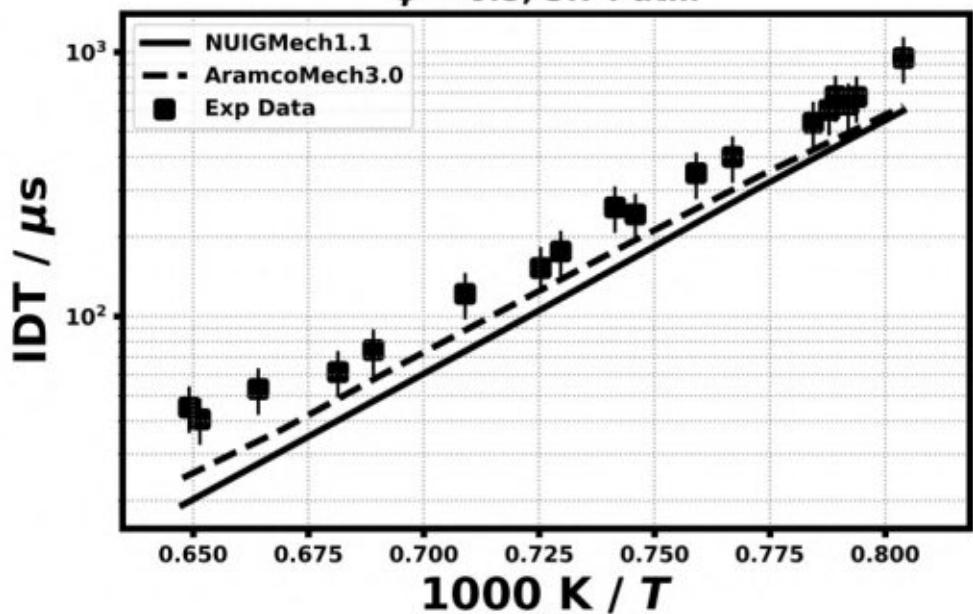
13. Validation for C₂H₅OH

Shock tube ignition delay time

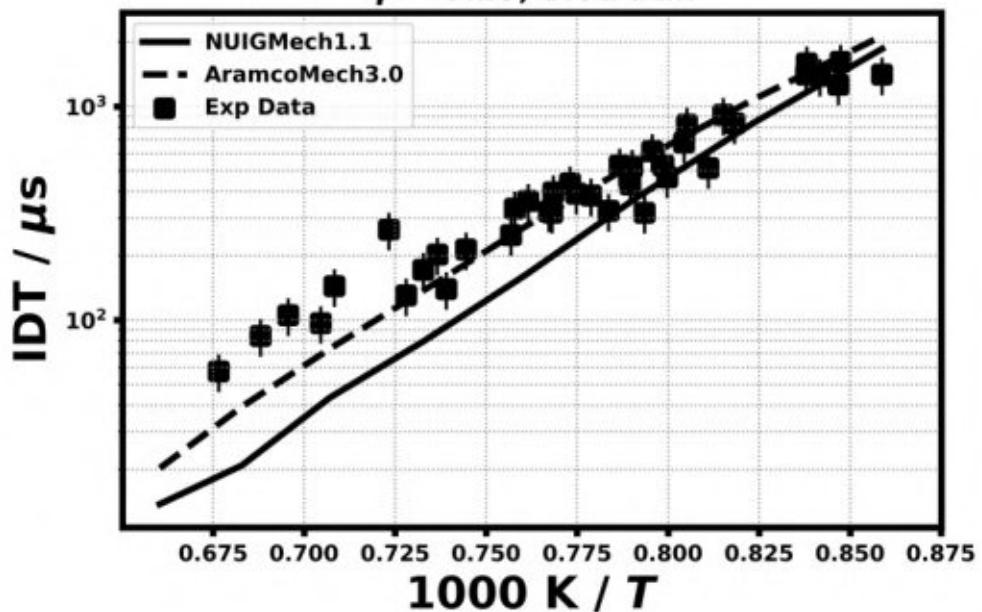
13.1) F.R. Gillespie, Phd Thesis, National Univ. Ire. Galway, 2010

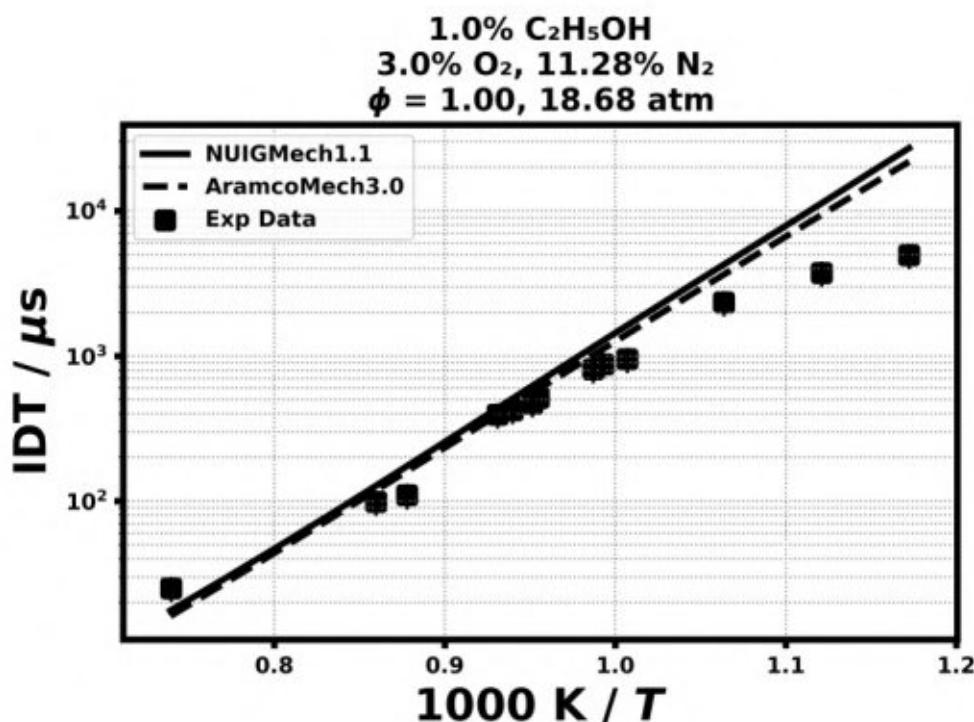
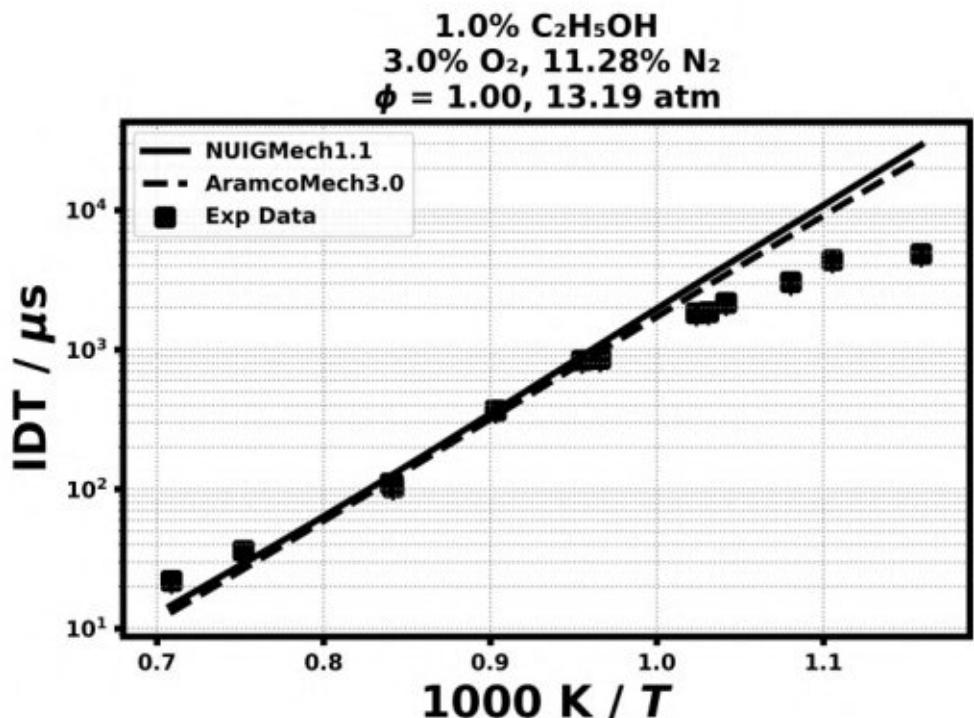


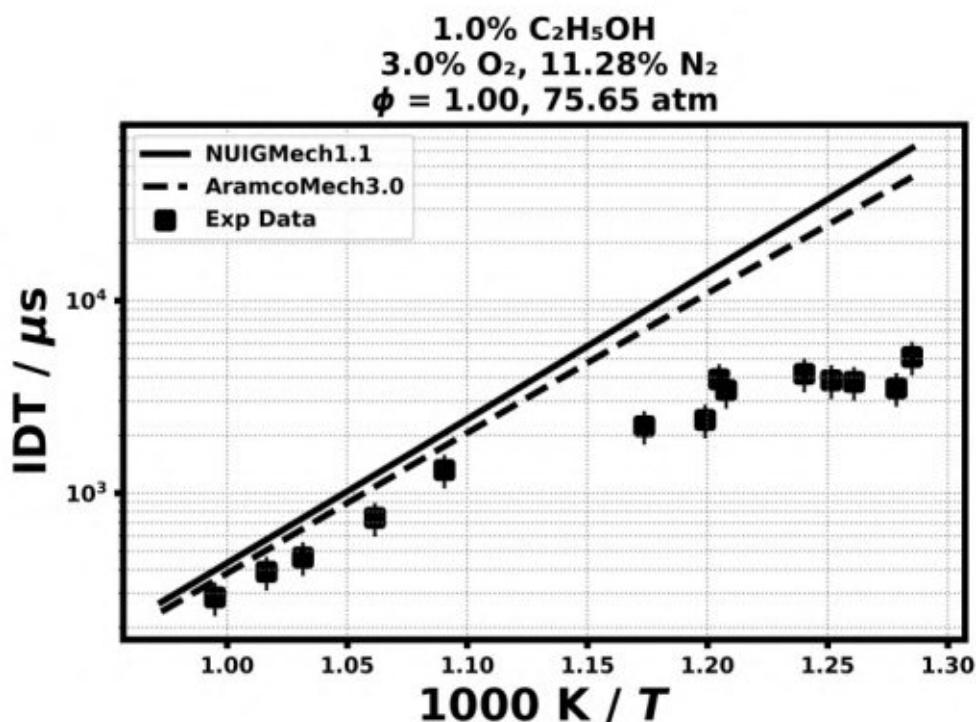
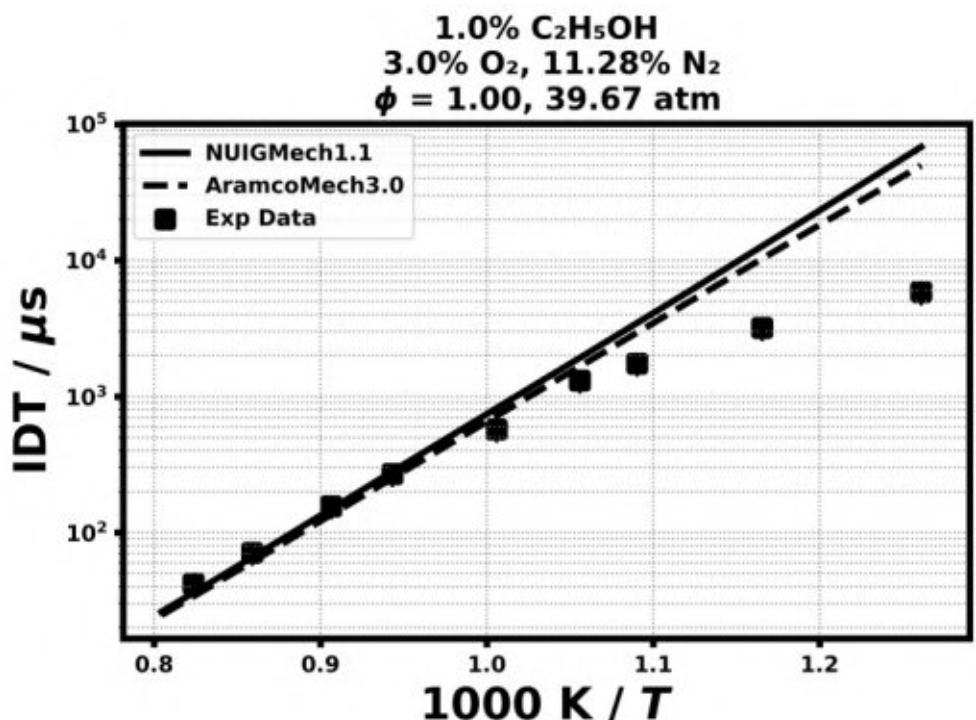
**1.25% C₂H₅OH
7.5% O₂, 91.25% Ar
 $\phi = 0.5, 3.74 \text{ atm}$**



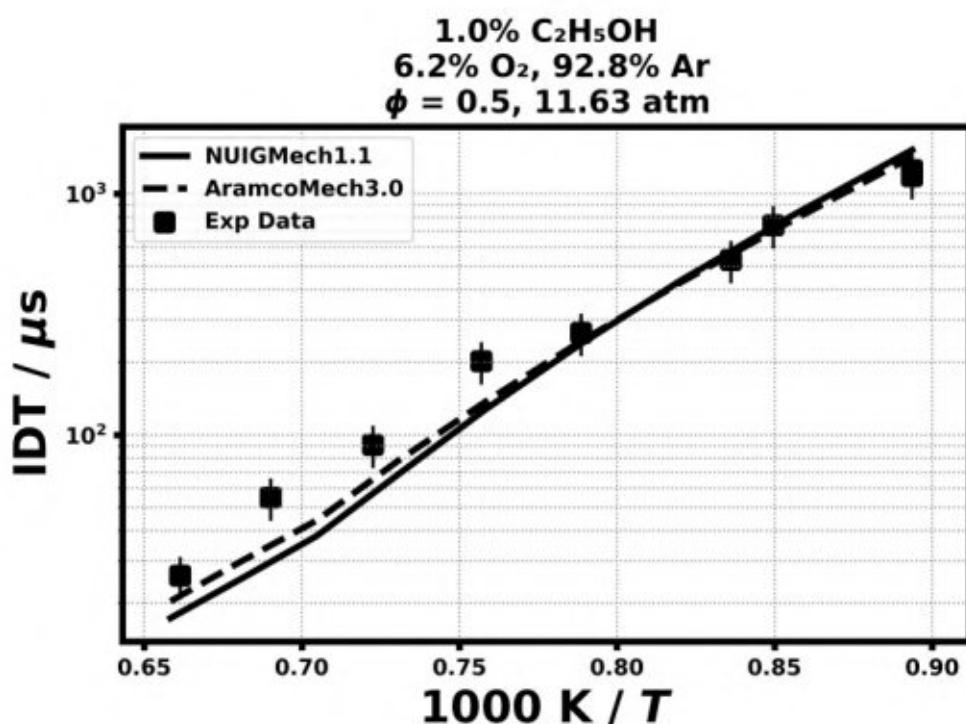
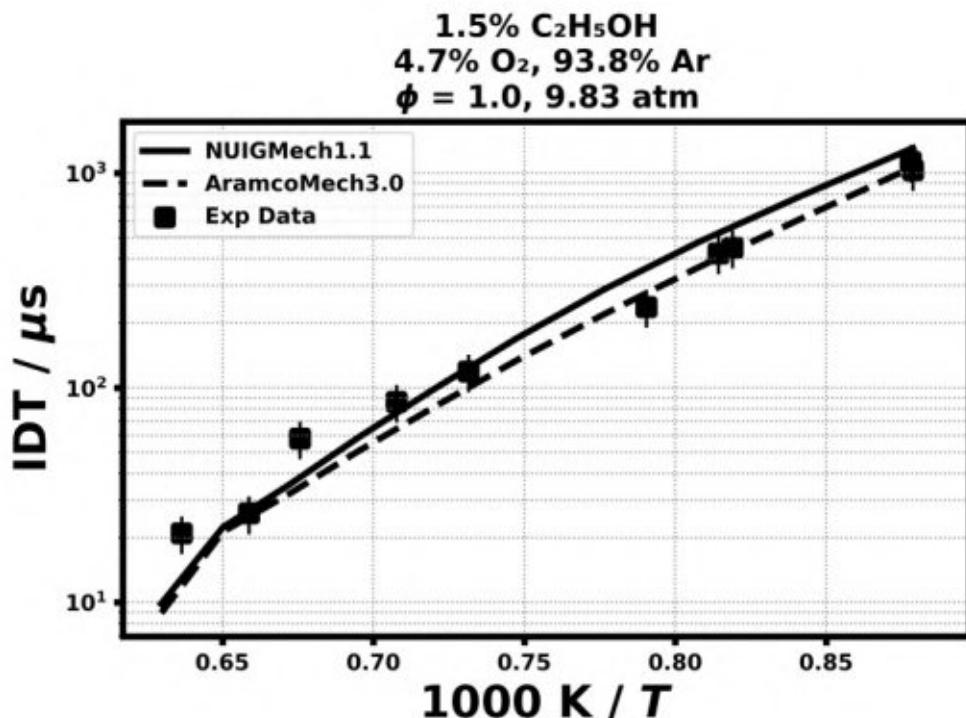
**0.625% C₂H₅OH
7.5% O₂, 91.875% Ar
 $\phi = 0.25, 5.01 \text{ atm}$**



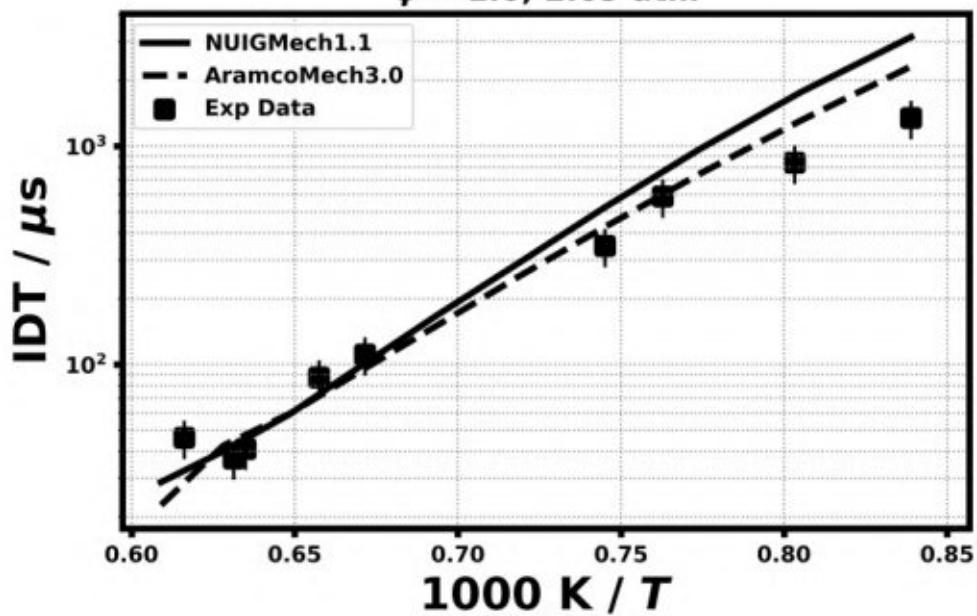




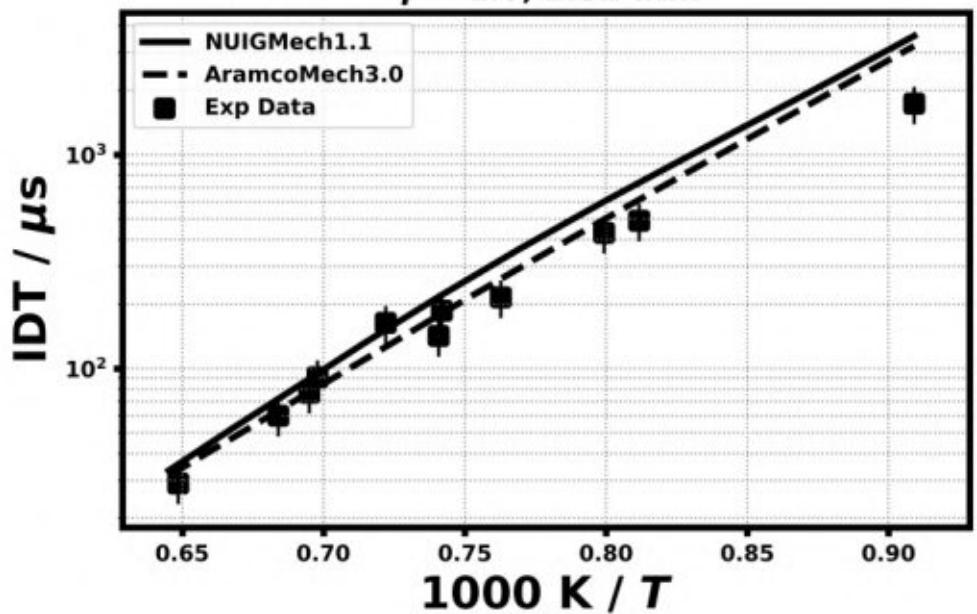
13.3) Noorani, K. E., Akih-Kumgeh, B., & Bergthorson, J. M., Energy & fuels, 24(11) (2010) 5834-5843.

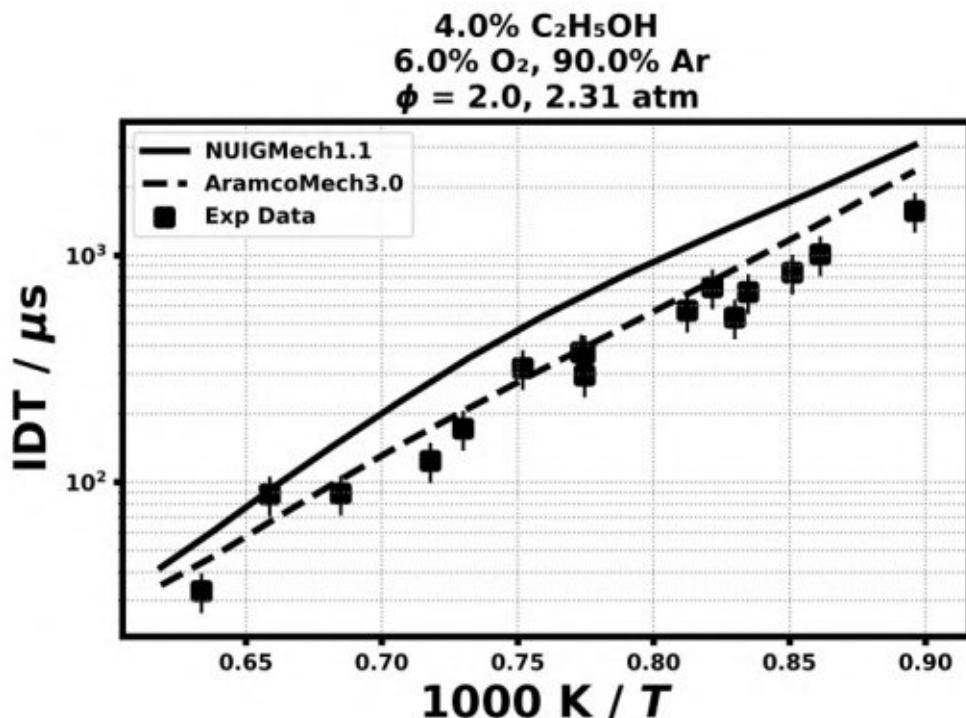


**1.5% C₂H₅OH
4.7% O₂, 93.8% Ar
 $\phi = 1.0, 2.09 \text{ atm}$**

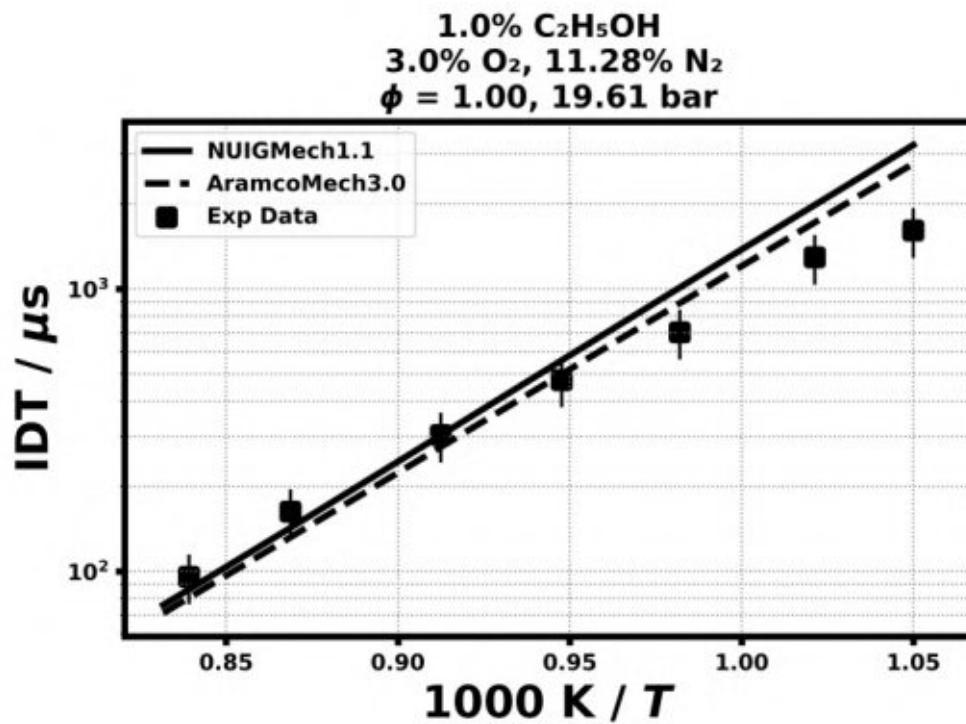


**2.9% C₂H₅OH
8.8% O₂, 88.3% Ar
 $\phi = 1.0, 2.32 \text{ atm}$**

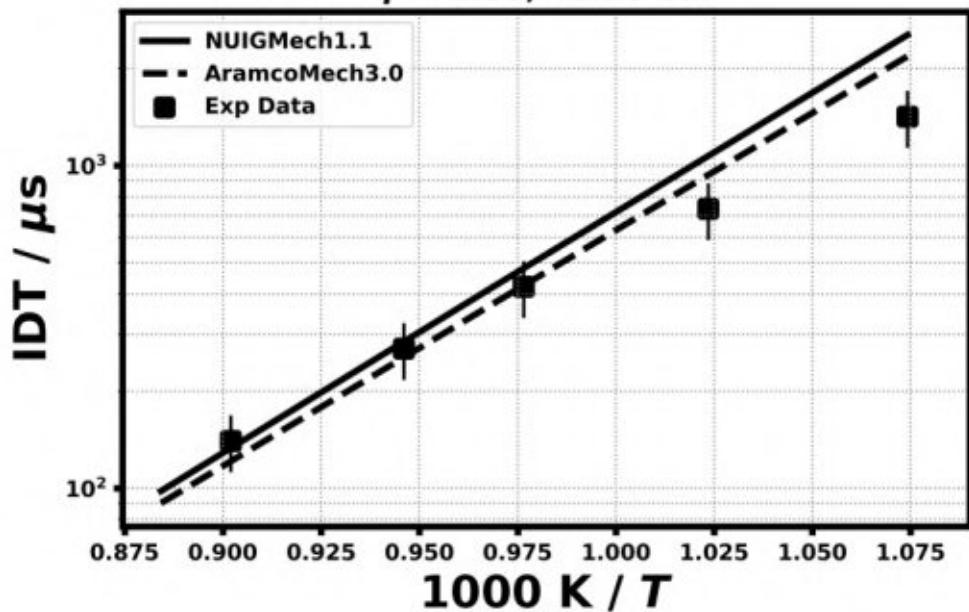




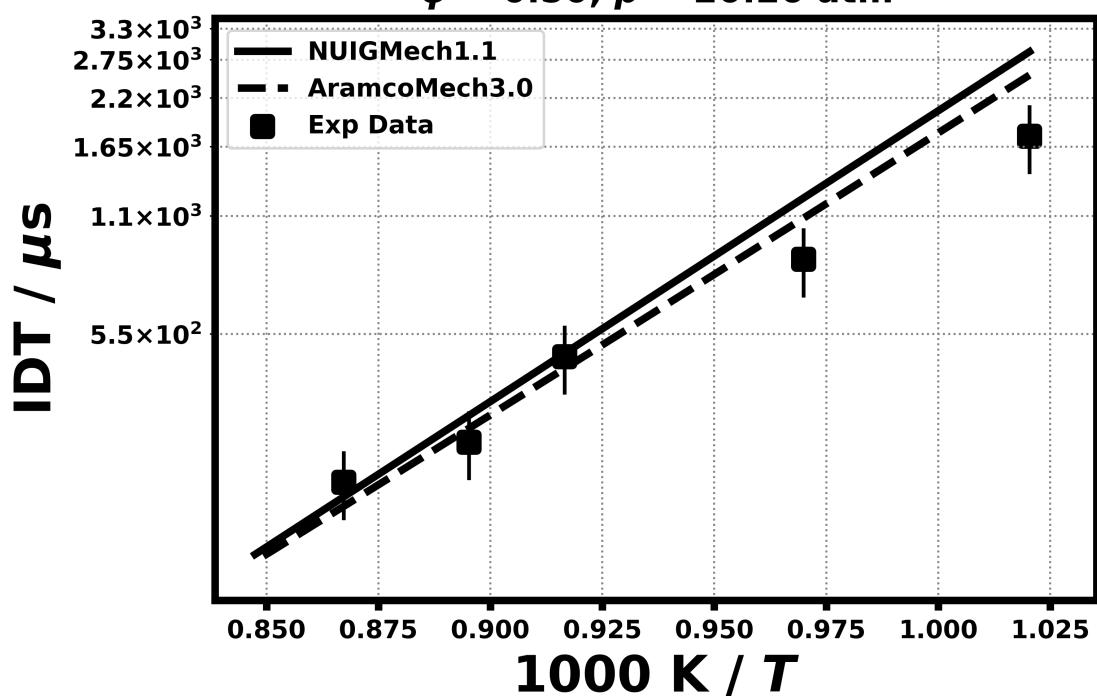
7.4) Zhang, Y., El-Merhubi, H., Lefort, B., Le Moyne, L., Curran, H. J., & Kéromnès, A., Combustion and Flame, 190 (2018) 74-86.

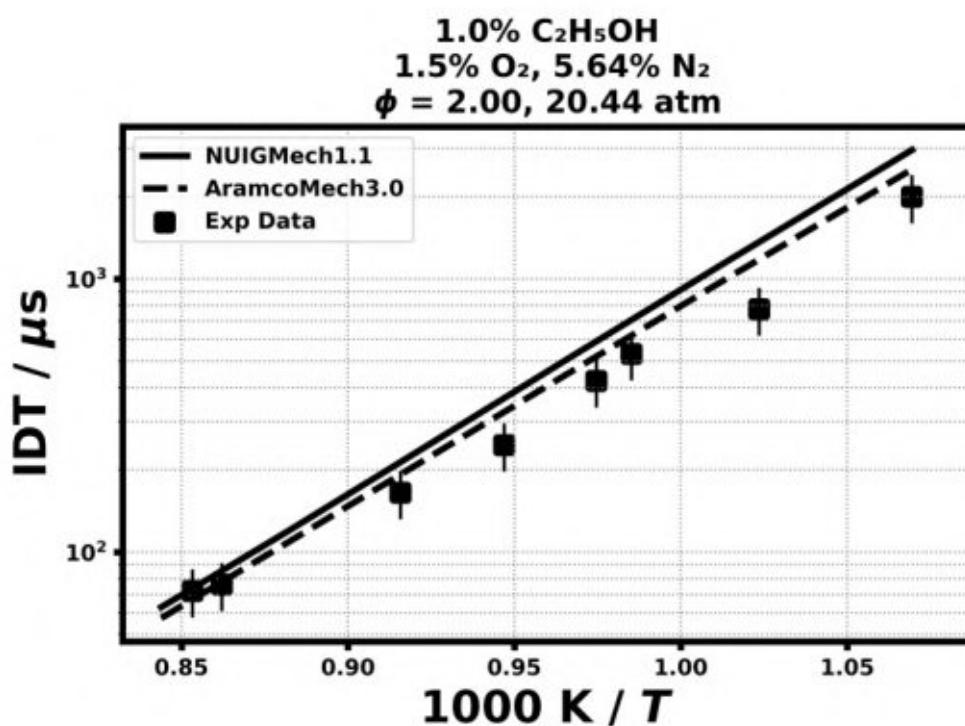
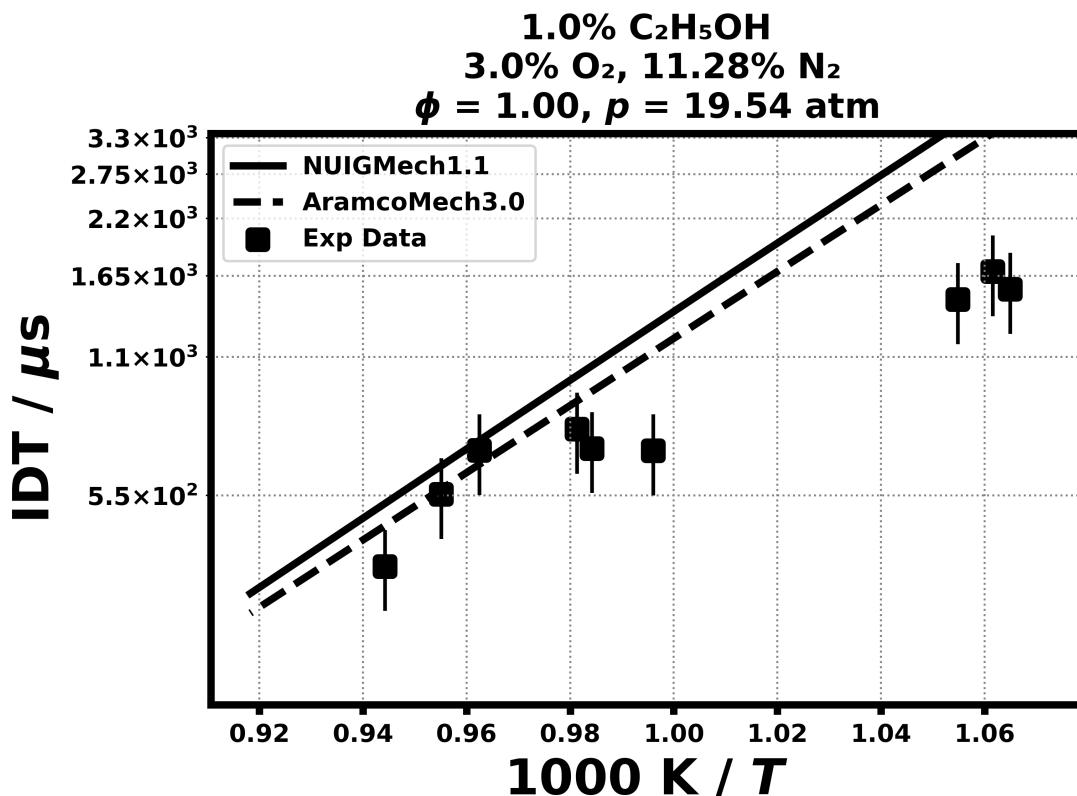


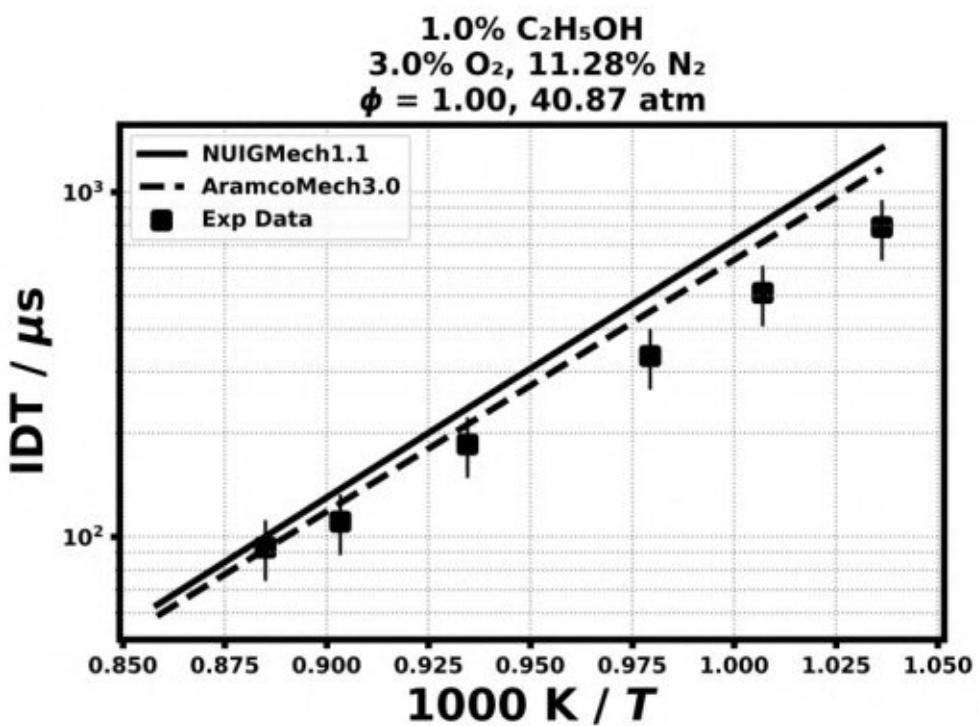
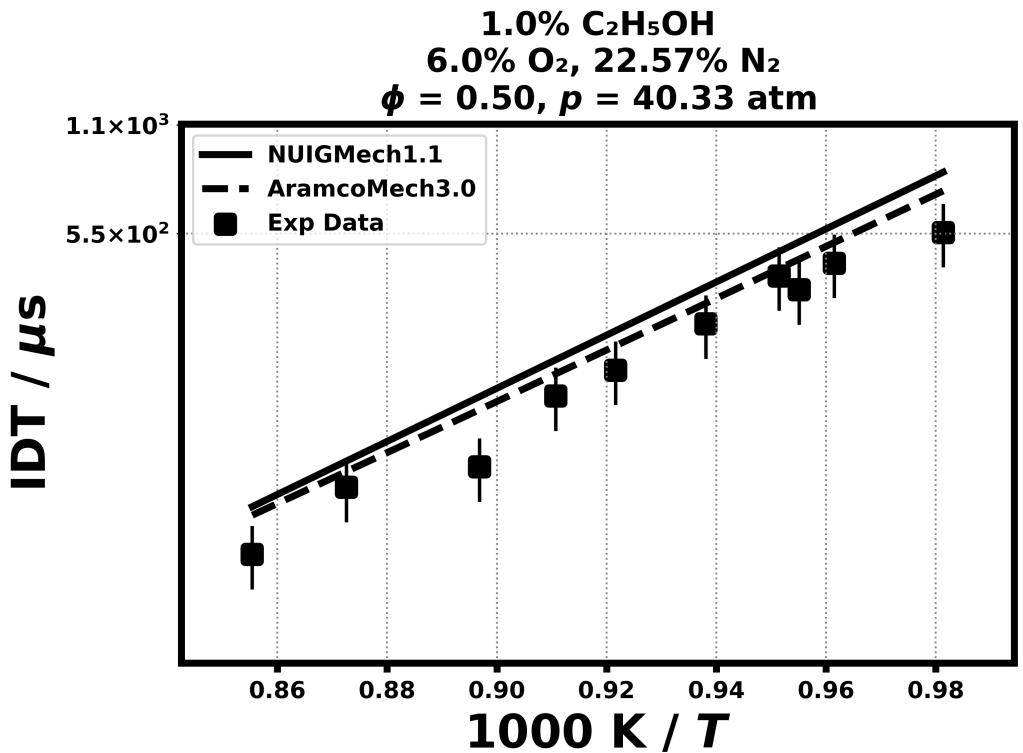
1.0% C₂H₅OH
3.0% O₂, 11.28% N₂
 $\phi = 1.00, 41.25 \text{ bar}$

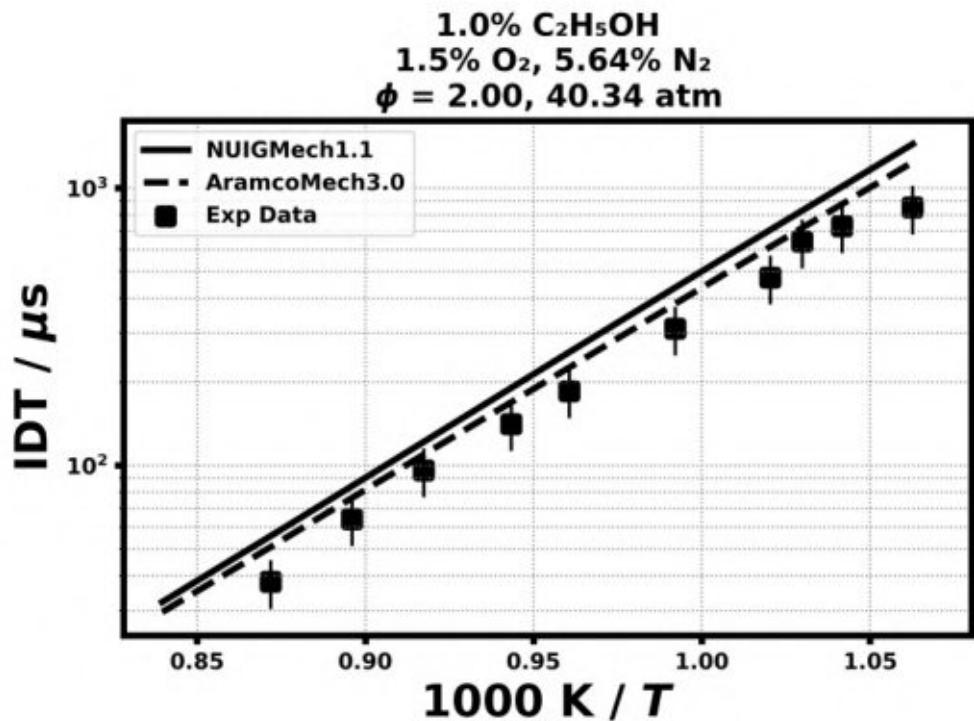


1.0% C₂H₅OH
6.0% O₂, 22.57% N₂
 $\phi = 0.50, p = 20.26 \text{ atm}$



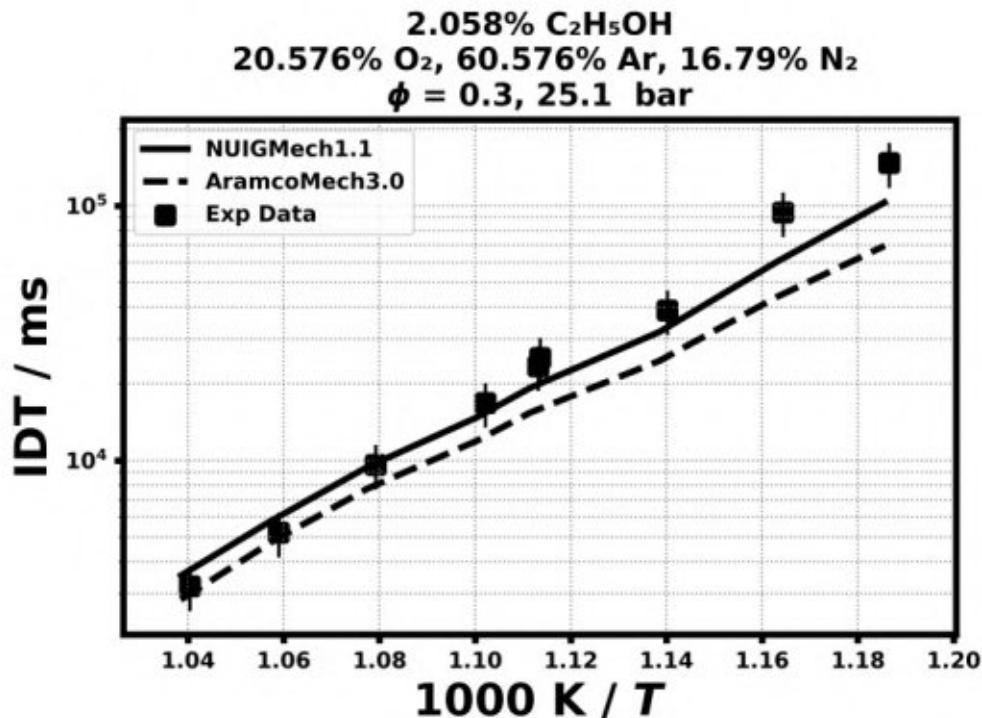




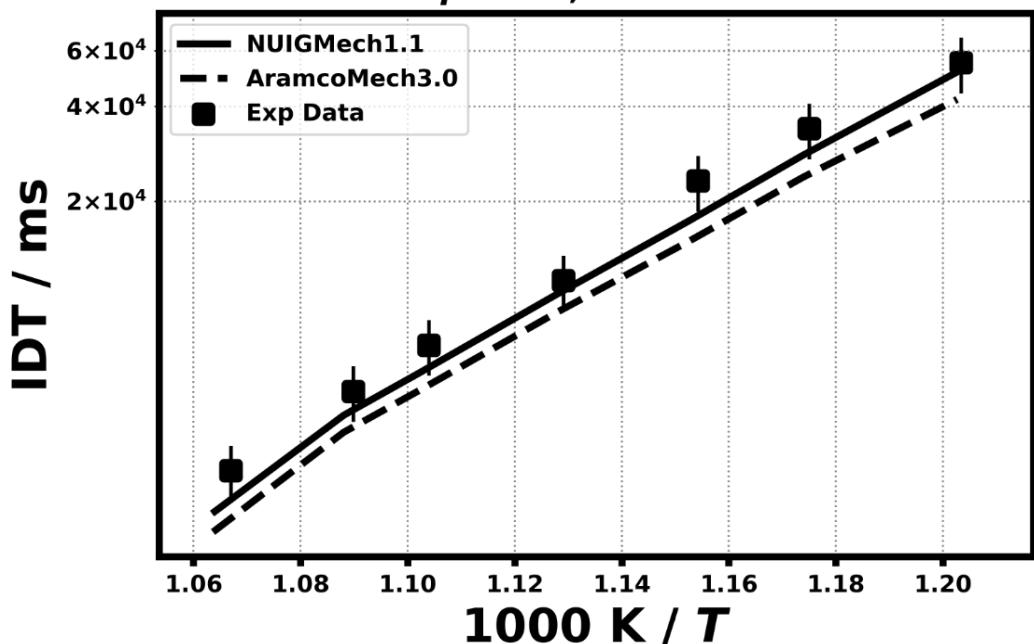


RCM Ignition delay times

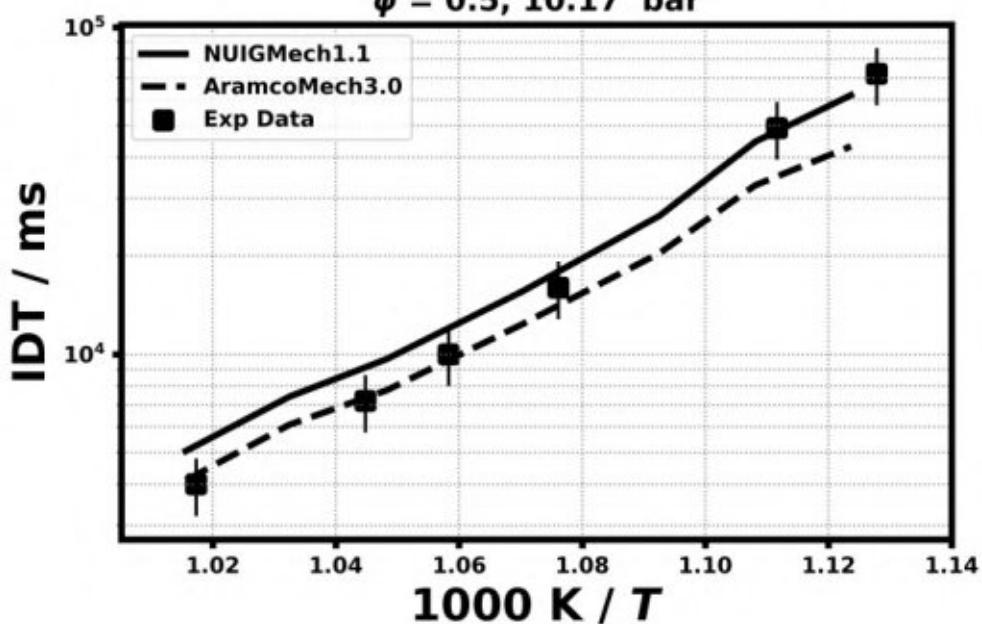
13.5) Mittal, G., Burke, S. M., Davies, V. A., Parajuli, B., Metcalfe, W. K., & Curran, H. J., Combustion and Flame, 161(5) (2014) 1164-1171.



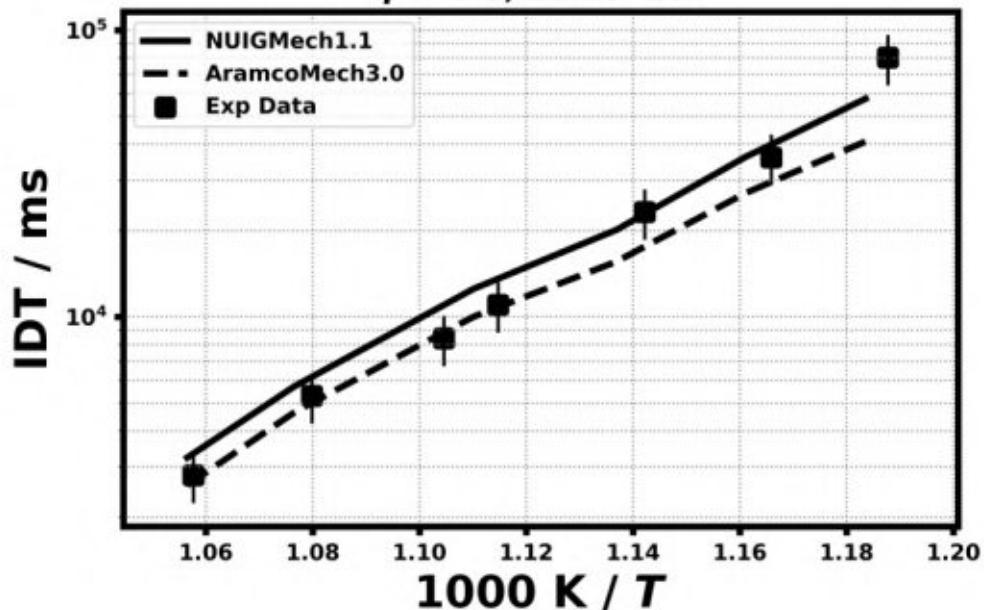
2.058% C₂H₅OH
20.576% O₂, 60.576% Ar, 16.79% N₂
 $\phi = 0.3, 50.0 \text{ bar}$



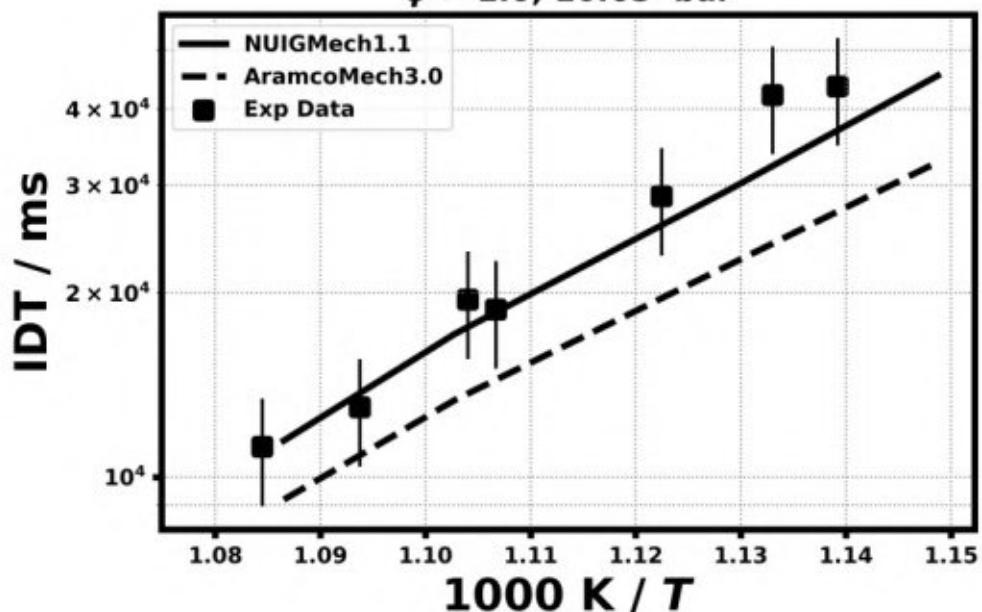
3.383% C₂H₅OH
20.298% O₂, 70.501% Ar, 5.819% N₂
 $\phi = 0.5, 10.17 \text{ bar}$



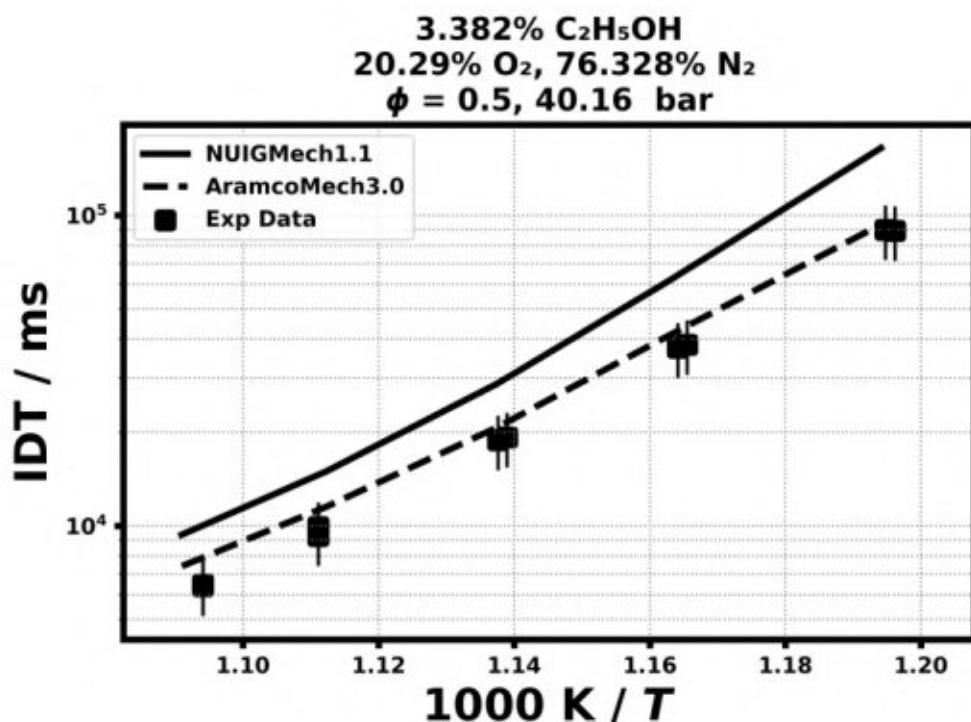
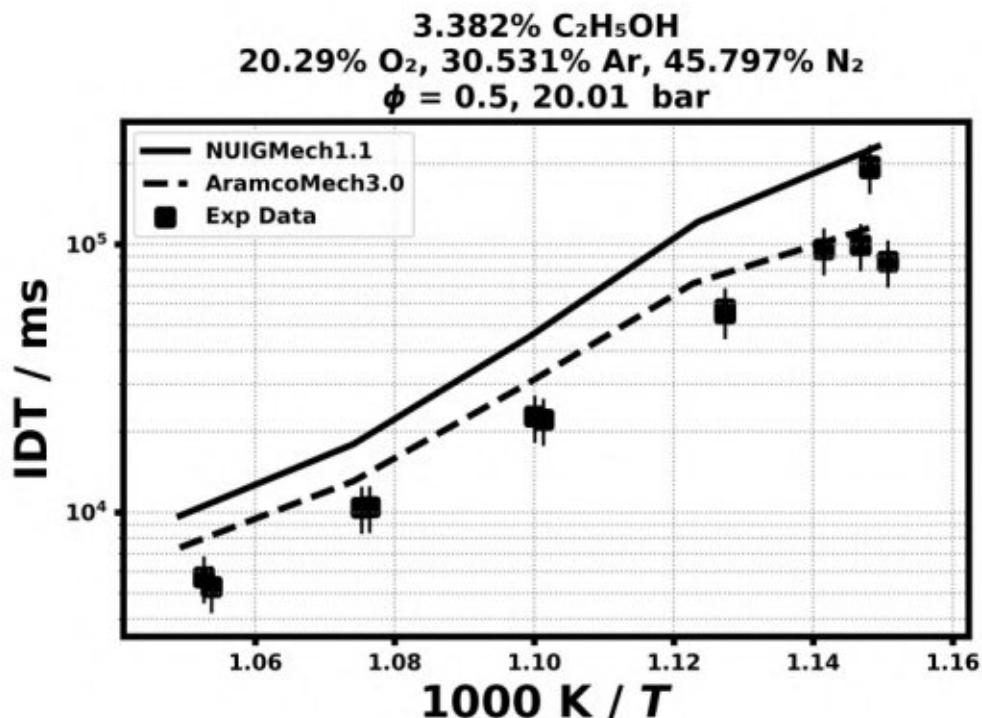
$3.383\% \text{ C}_2\text{H}_5\text{OH}$
 $20.298\% \text{ O}_2, 70.501\% \text{ Ar}, 5.819\% \text{ N}_2$
 $\phi = 0.5, 25.15 \text{ bar}$



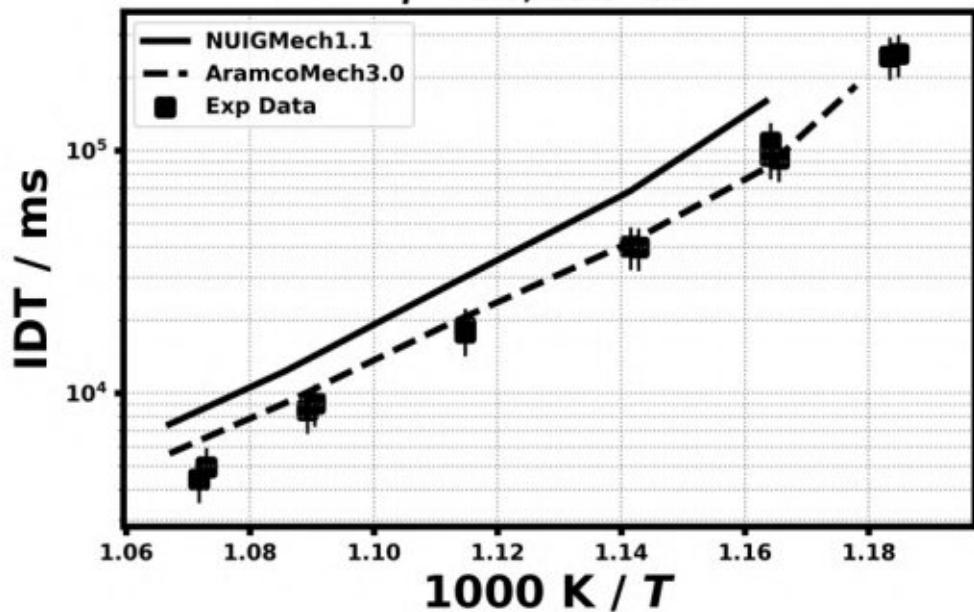
$6.545\% \text{ C}_2\text{H}_5\text{OH}$
 $19.634\% \text{ O}_2, 73.822\% \text{ Ar}$
 $\phi = 1.0, 10.65 \text{ bar}$



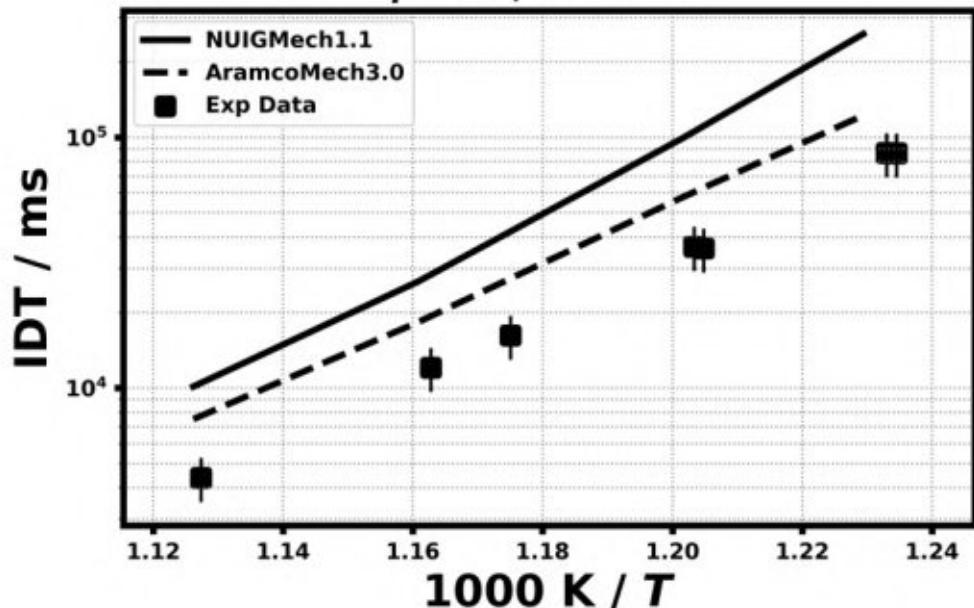
13.6) Zhang, Y., El-Merhubi, H., Lefort, B., Le Moyne, L., Curran, H. J., & Kéromnès, A. Combustion and Flame, 190 (2018) 74-86.



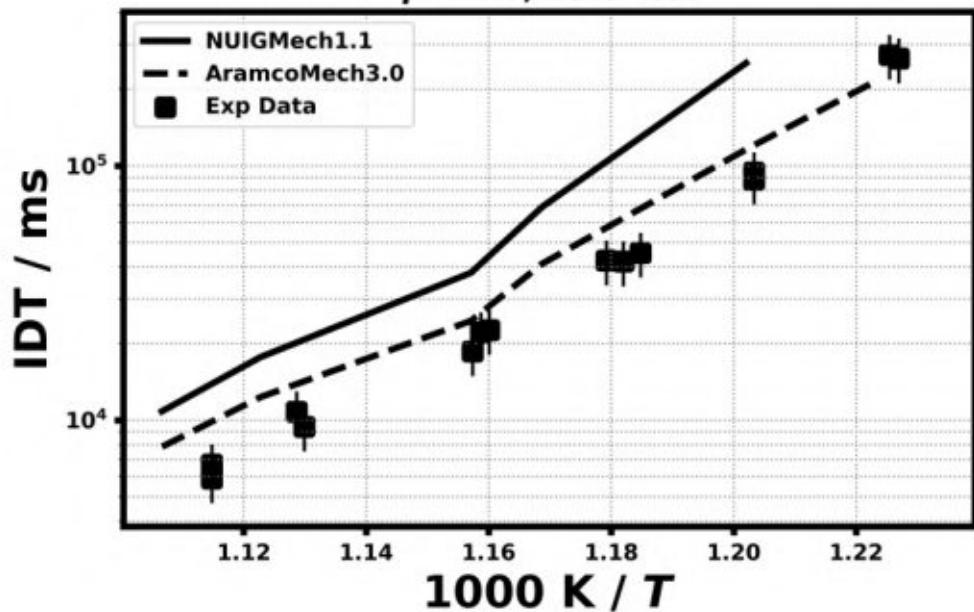
6.542% C₂H₅OH
19.626% O₂, 44.299% Ar, 29.532% N₂
 $\phi = 1.0, 19.9 \text{ bar}$



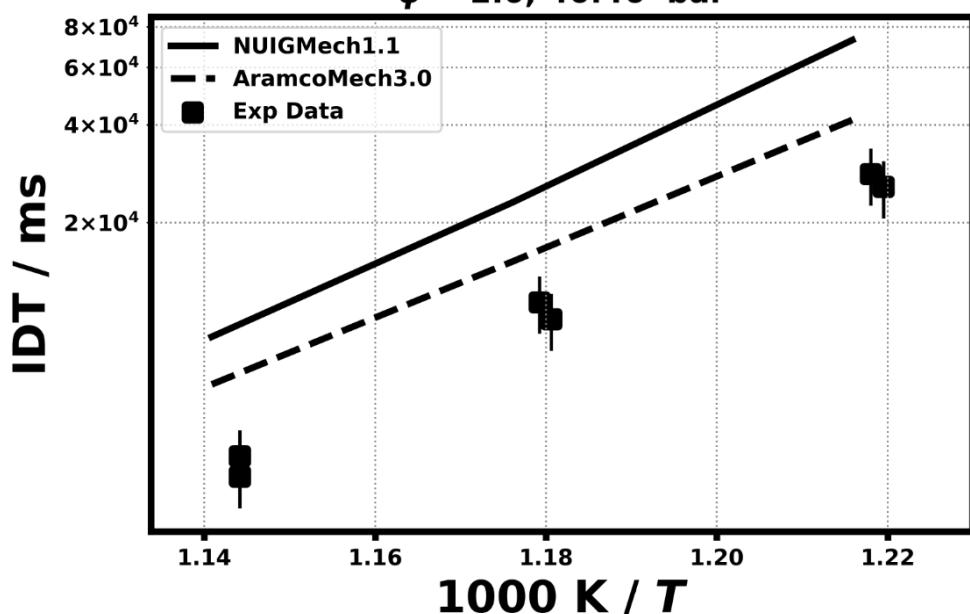
6.542% C₂H₅OH
19.626% O₂, 22.149% Ar, 51.682% N₂
 $\phi = 1.0, 40.27 \text{ bar}$



$12.281\% \text{ C}_2\text{H}_5\text{OH}$
 $18.421\% \text{ O}_2, 69.298\% \text{ Ar}$
 $\phi = 2.0, 19.8 \text{ bar}$

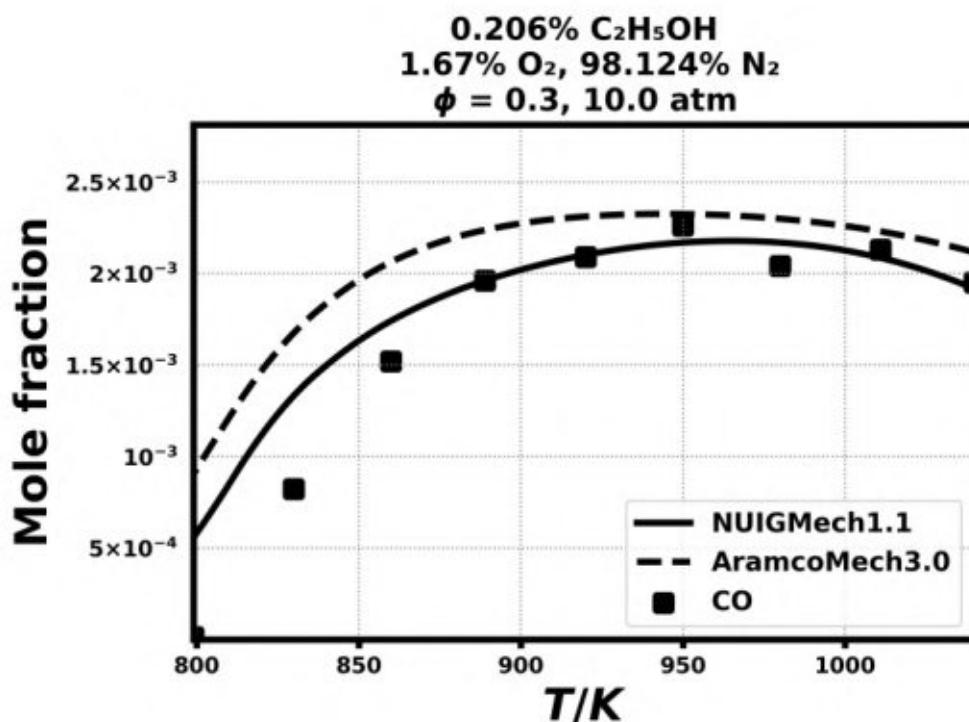
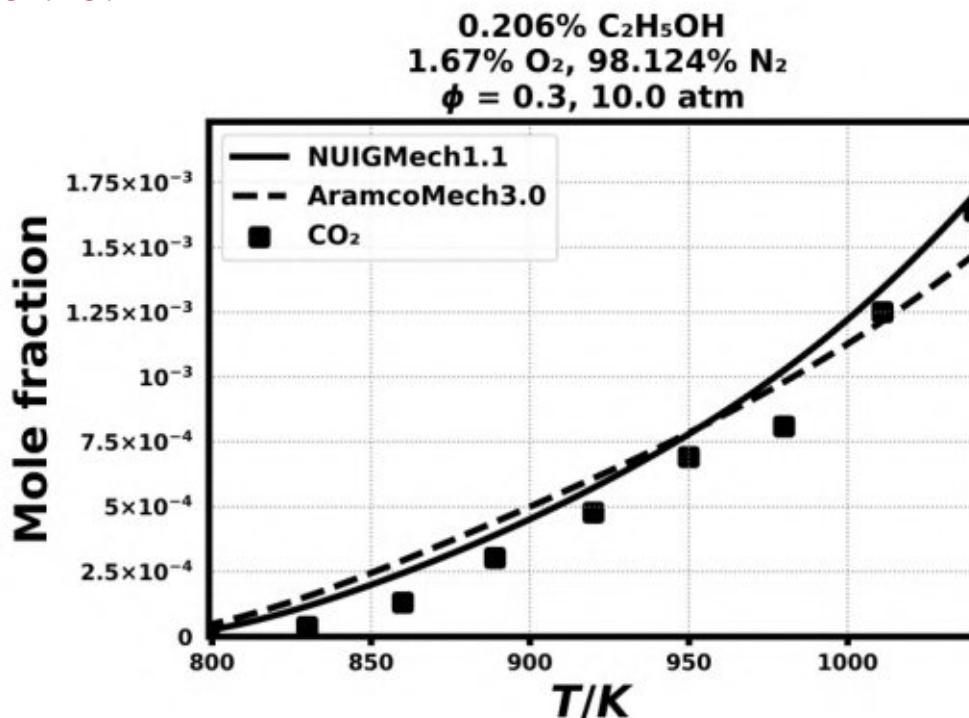


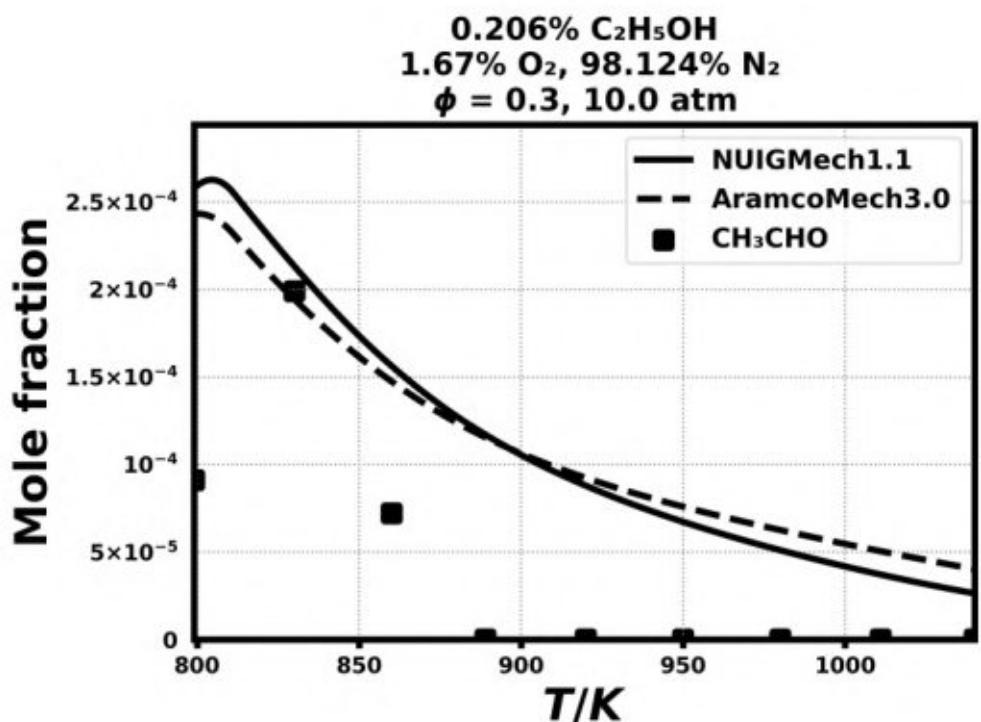
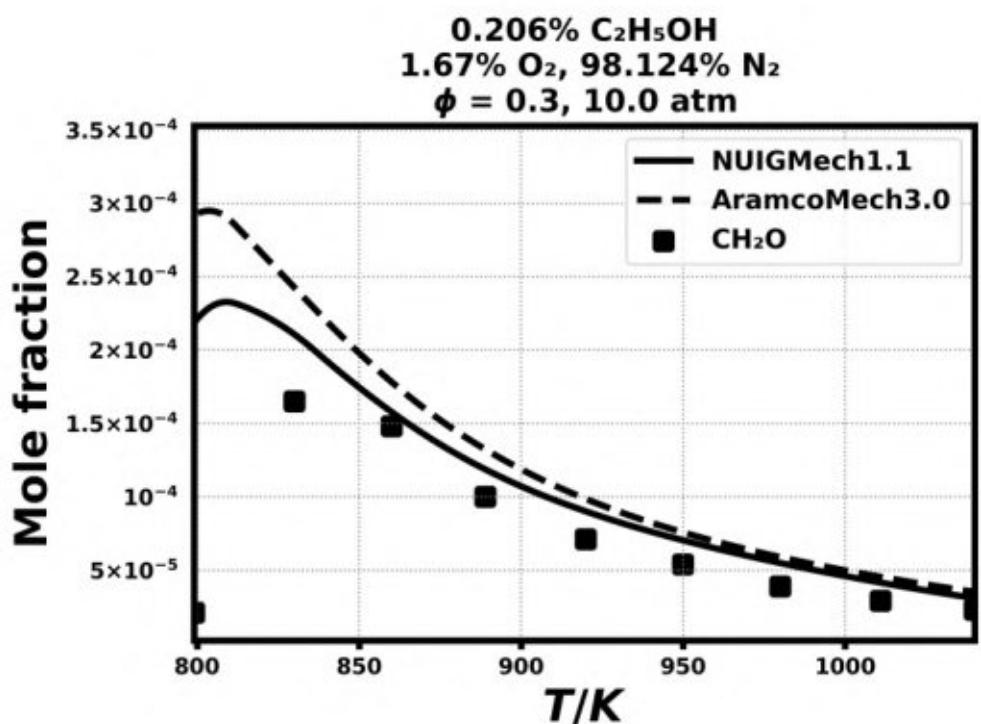
$12.308\% \text{ C}_2\text{H}_5\text{OH}$
 $18.462\% \text{ O}_2, 69.23\% \text{ Ar}$
 $\phi = 2.0, 40.46 \text{ bar}$



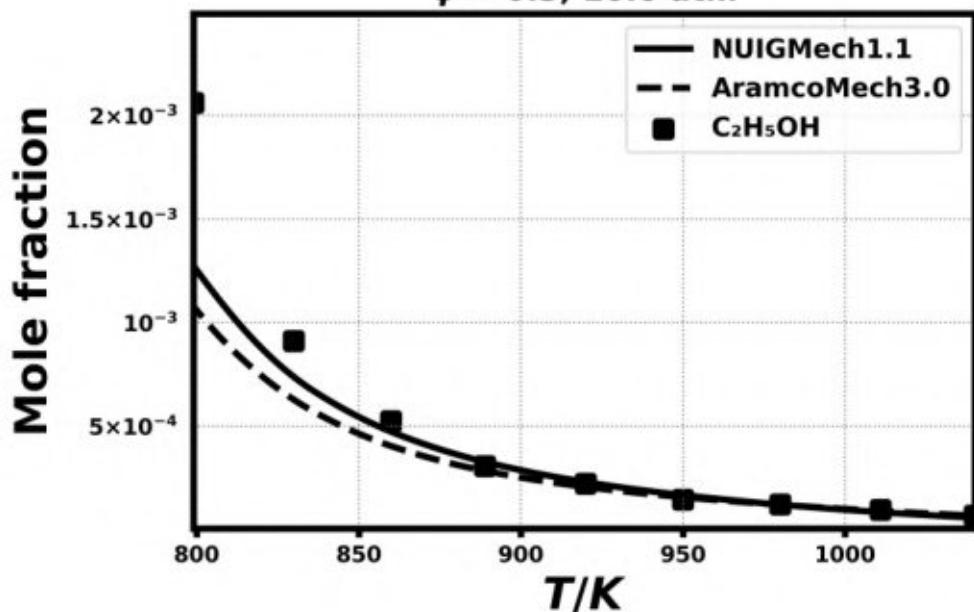
Speciation in Jet-stirred reactor

13.8) Leplat, N., Dagaut, P., Togbé, C., & Vandooren, J., Combustion and Flame, 158 (4) (2011) 705-725.

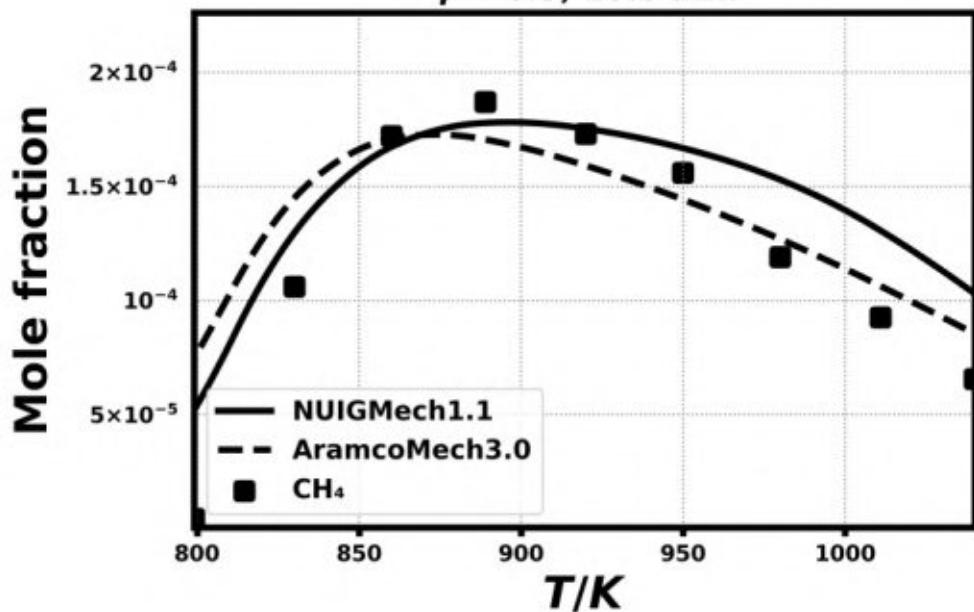




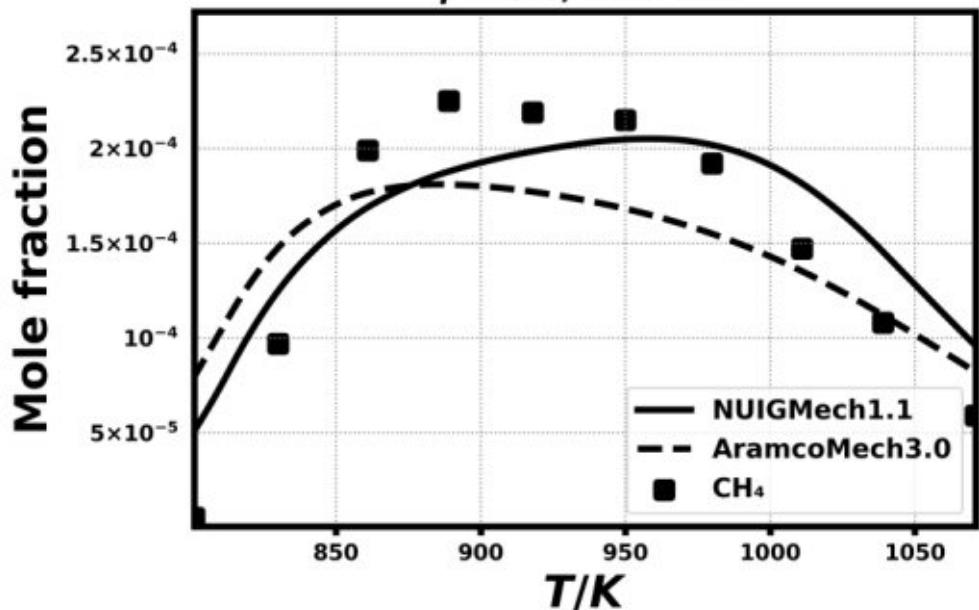
**0.206% C₂H₅OH
1.67% O₂, 98.124% N₂
 $\phi = 0.3, 10.0 \text{ atm}$**



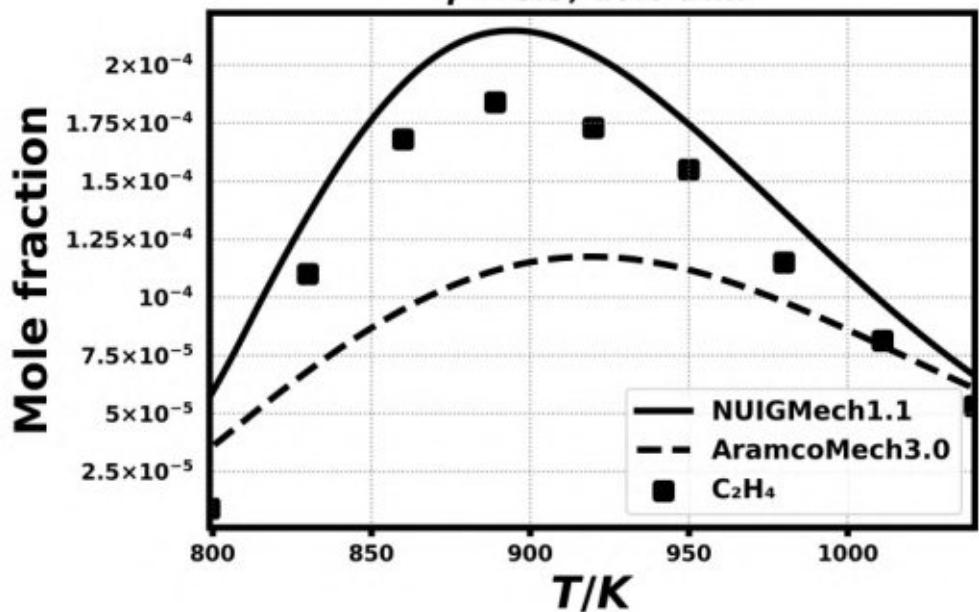
**0.206% C₂H₅OH
1.67% O₂, 98.124% N₂
 $\phi = 0.3, 10.0 \text{ atm}$**



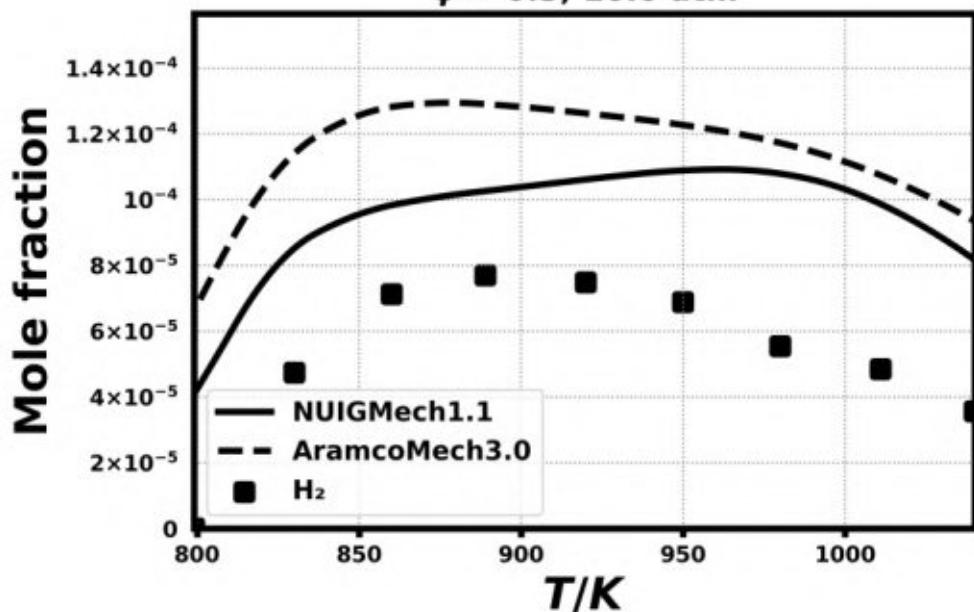
$0.186\% \text{C}_2\text{H}_5\text{OH}$
 $0.909\% \text{O}_2, 98.905\% \text{N}_2$
 $\phi = 0.6, 10.0 \text{ atm}$



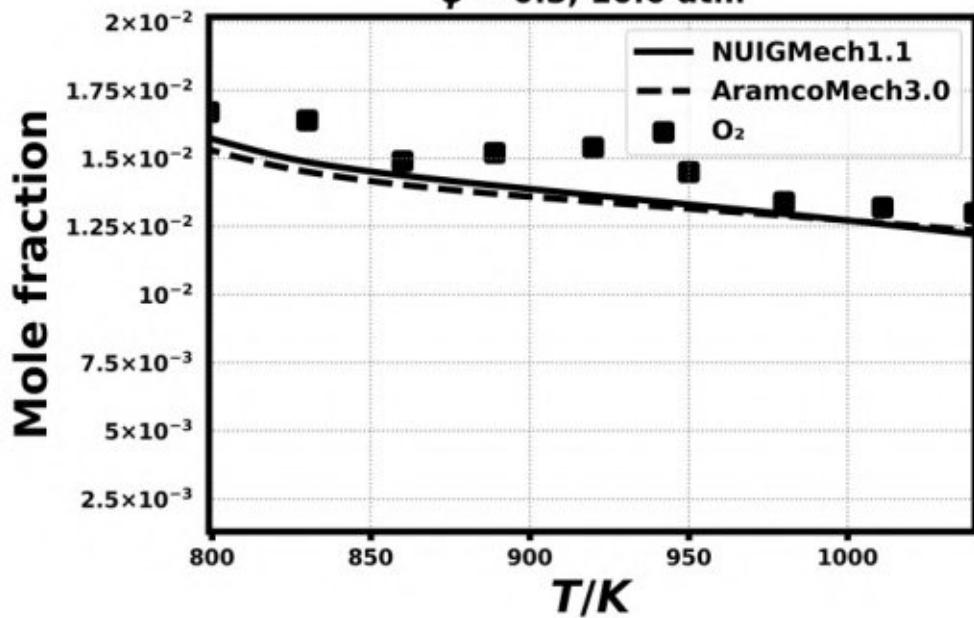
$0.206\% \text{C}_2\text{H}_5\text{OH}$
 $1.67\% \text{O}_2, 98.124\% \text{N}_2$
 $\phi = 0.3, 10.0 \text{ atm}$



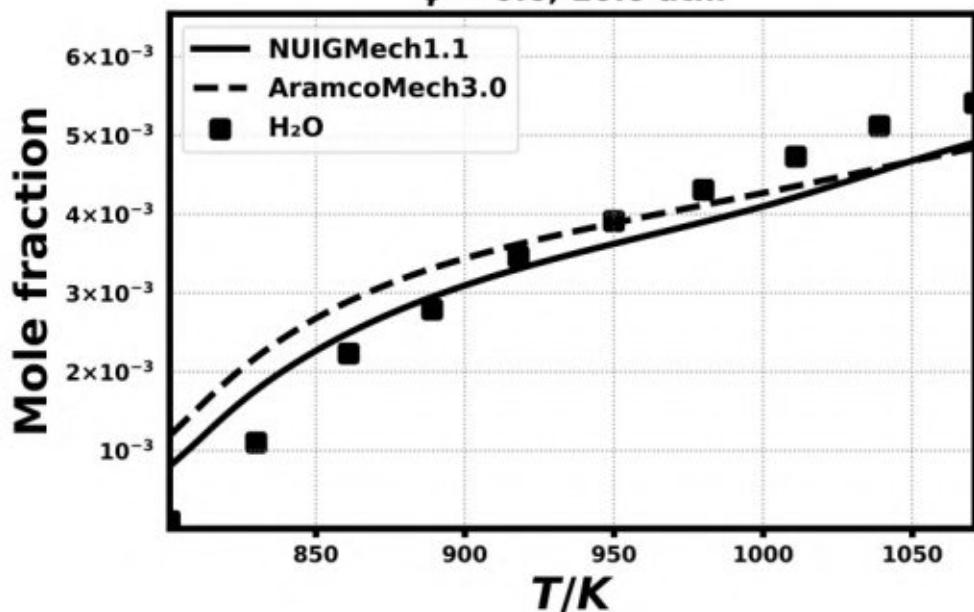
$0.206\% \text{ C}_2\text{H}_5\text{OH}$
 $1.67\% \text{ O}_2, 98.124\% \text{ N}_2$
 $\phi = 0.3, 10.0 \text{ atm}$



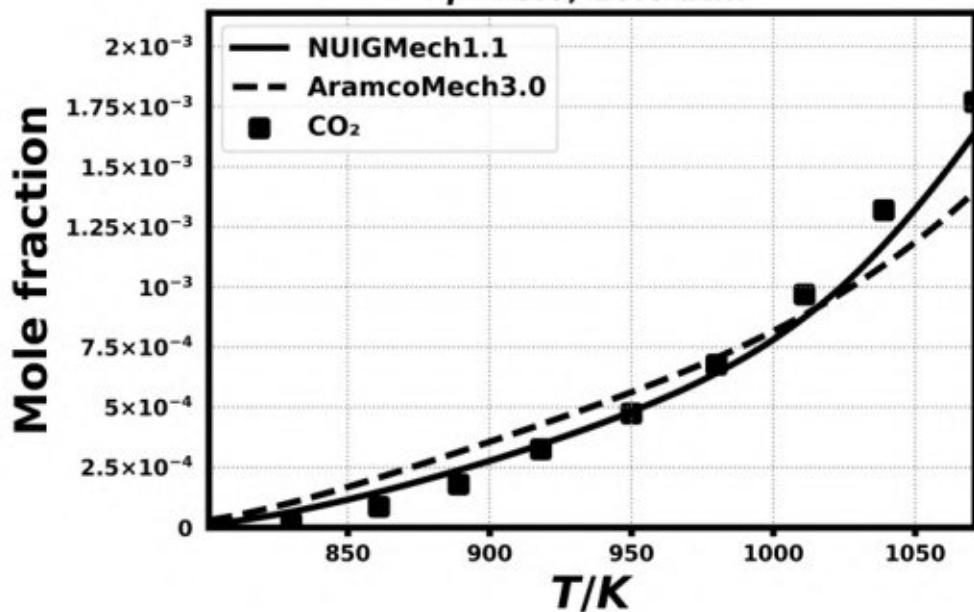
$0.206\% \text{ C}_2\text{H}_5\text{OH}$
 $1.67\% \text{ O}_2, 98.124\% \text{ N}_2$
 $\phi = 0.3, 10.0 \text{ atm}$



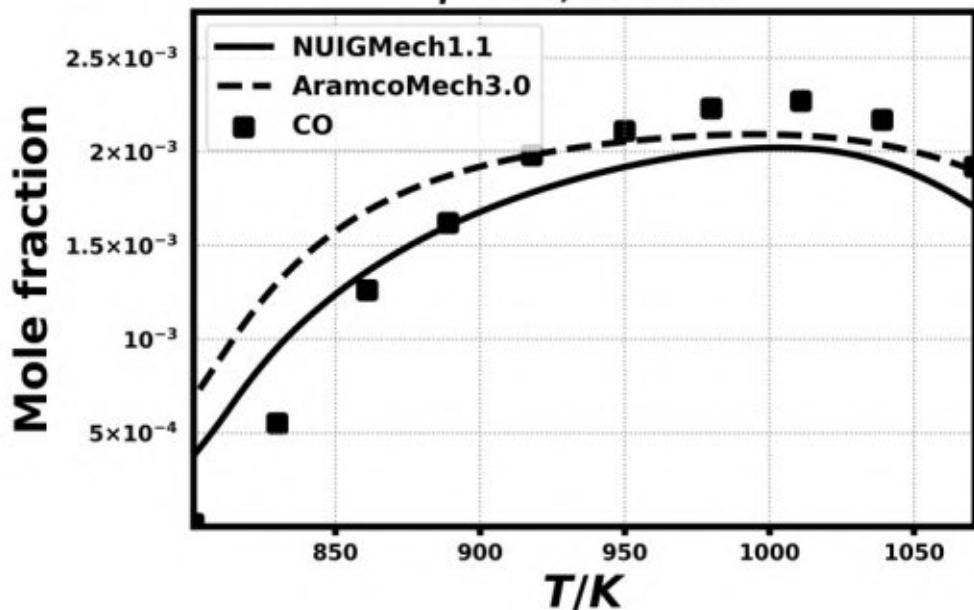
$0.186\% \text{ C}_2\text{H}_5\text{OH}$
 $0.909\% \text{ O}_2, 98.905\% \text{ N}_2$
 $\phi = 0.6, 10.0 \text{ atm}$



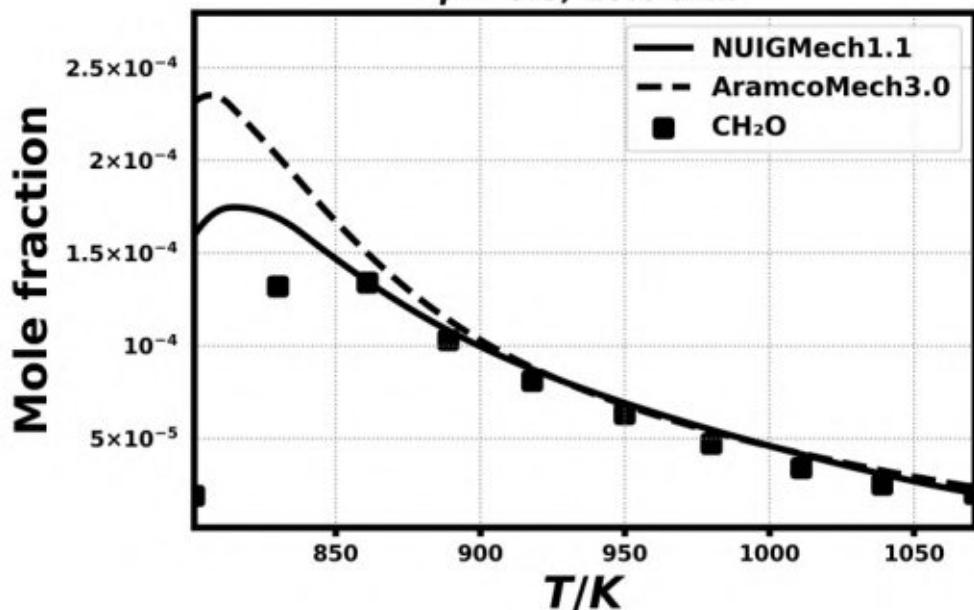
$0.186\% \text{ C}_2\text{H}_5\text{OH}$
 $0.909\% \text{ O}_2, 98.905\% \text{ N}_2$
 $\phi = 0.6, 10.0 \text{ atm}$



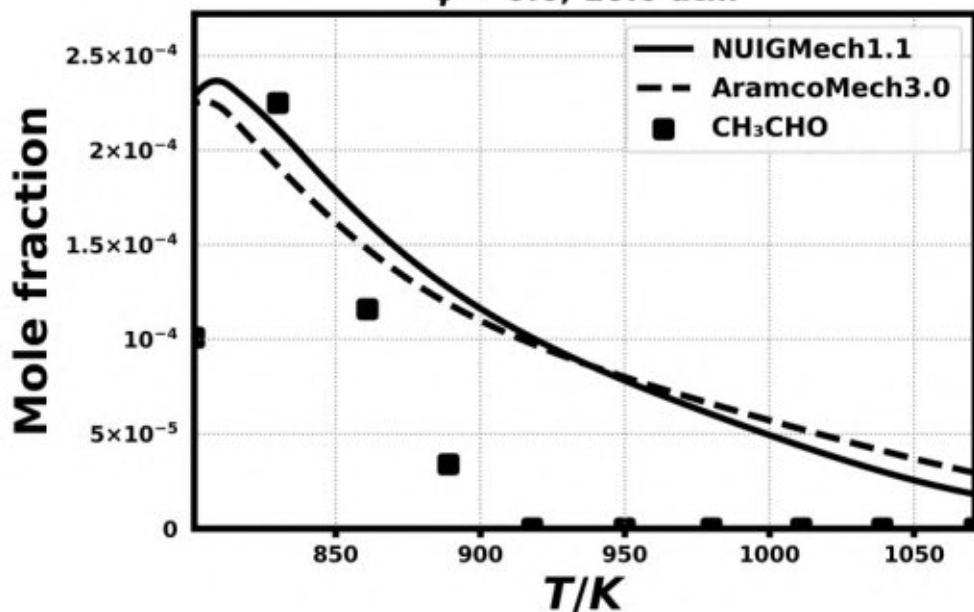
$0.186\% \text{ C}_2\text{H}_5\text{OH}$
 $0.909\% \text{ O}_2, 98.905\% \text{ N}_2$
 $\phi = 0.6, 10.0 \text{ atm}$



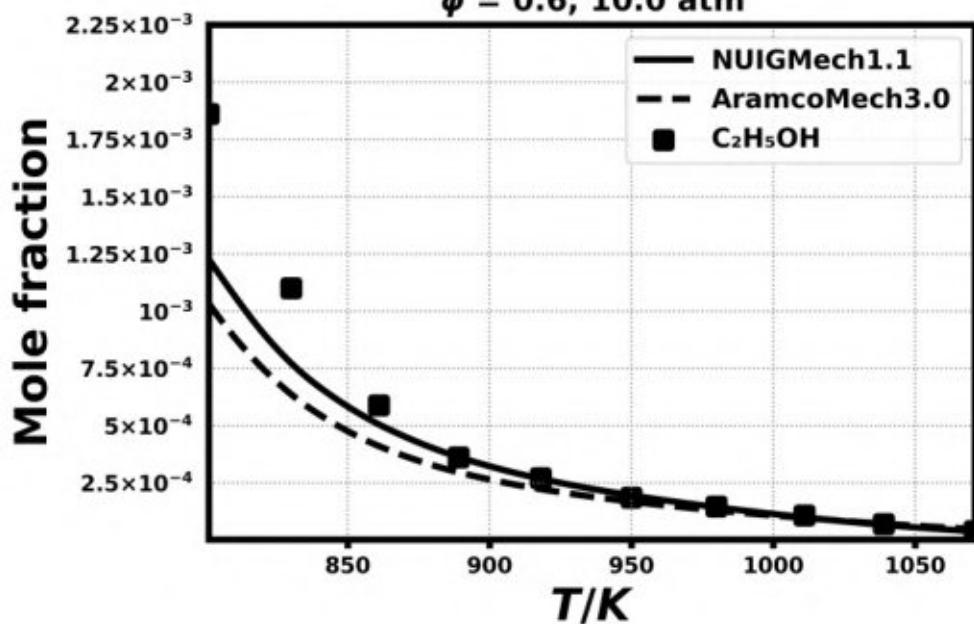
$0.186\% \text{ C}_2\text{H}_5\text{OH}$
 $0.909\% \text{ O}_2, 98.905\% \text{ N}_2$
 $\phi = 0.6, 10.0 \text{ atm}$

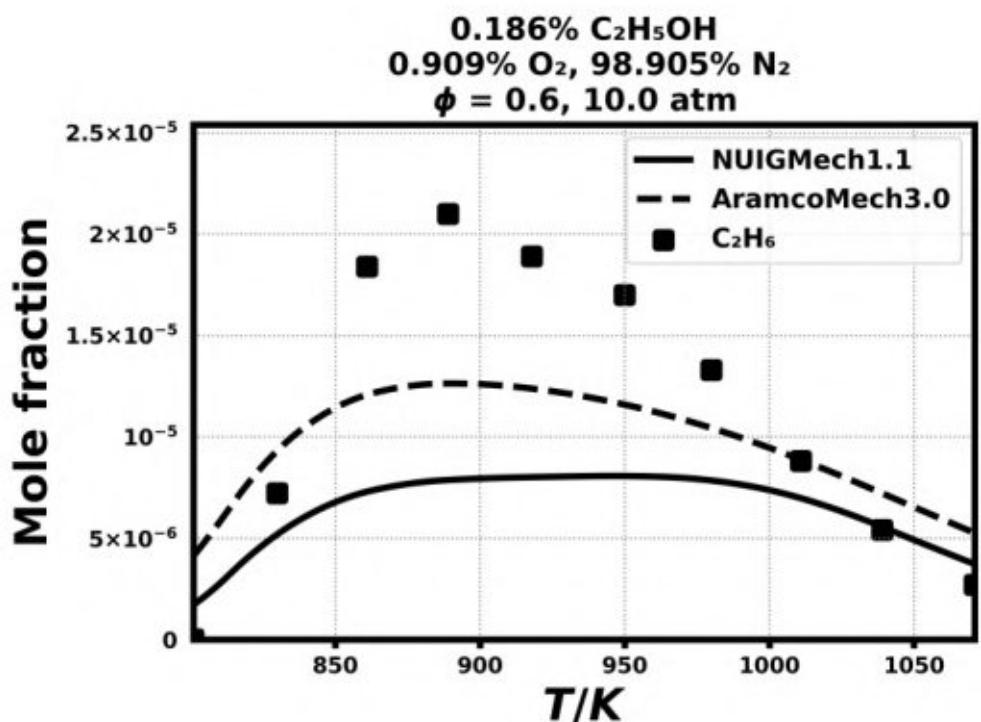
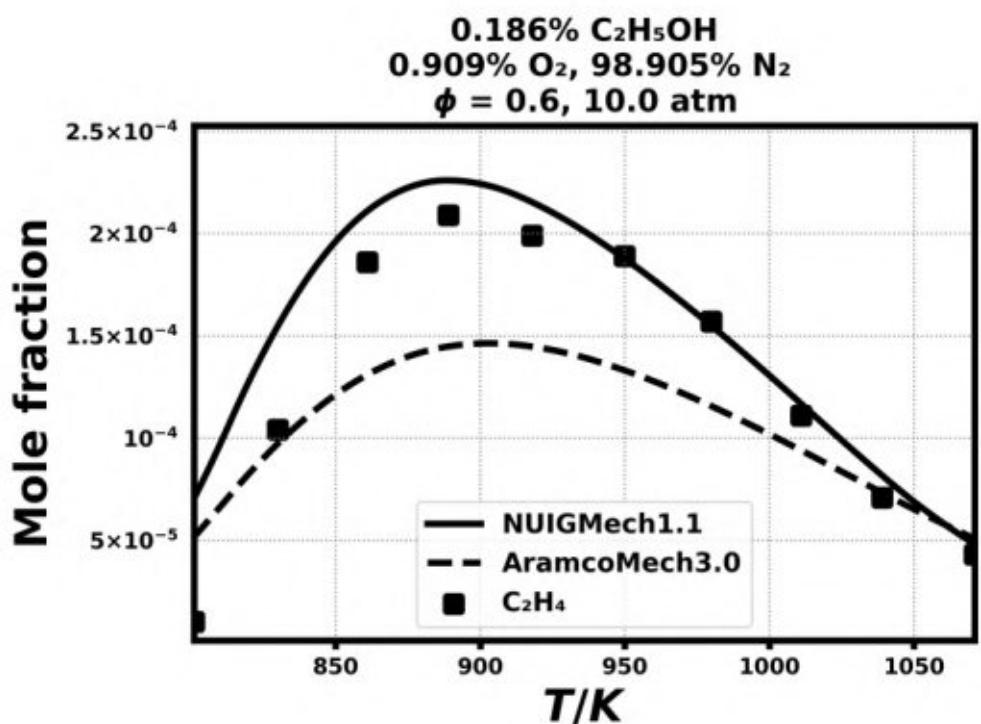


$0.186\% \text{ C}_2\text{H}_5\text{OH}$
 $0.909\% \text{ O}_2, 98.905\% \text{ N}_2$
 $\phi = 0.6, 10.0 \text{ atm}$

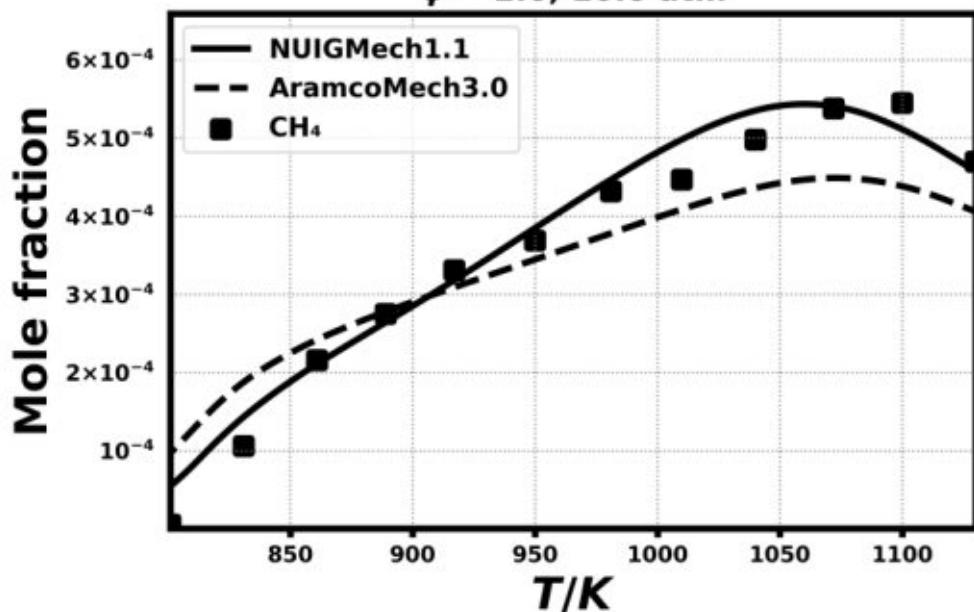


$0.186\% \text{ C}_2\text{H}_5\text{OH}$
 $0.909\% \text{ O}_2, 98.905\% \text{ N}_2$
 $\phi = 0.6, 10.0 \text{ atm}$

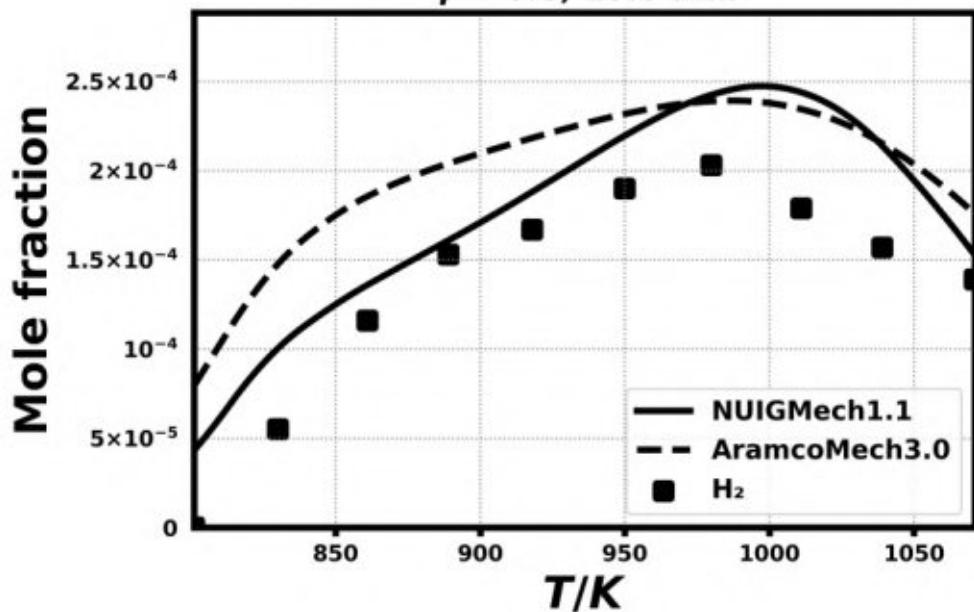




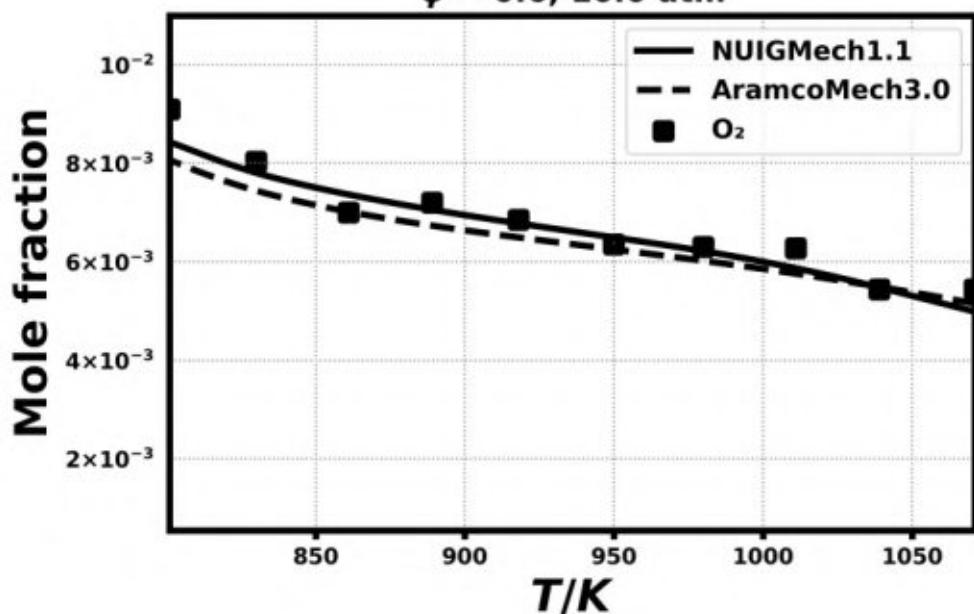
$0.201\% \text{C}_2\text{H}_5\text{OH}$
 $0.325\% \text{O}_2, 99.474\% \text{N}_2$
 $\phi = 2.0, 10.0 \text{ atm}$



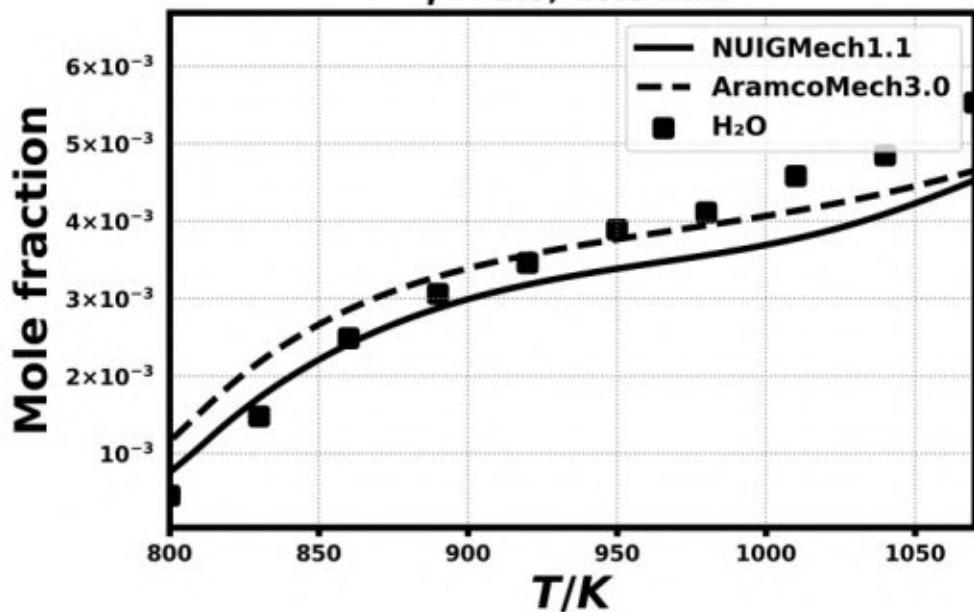
$0.186\% \text{C}_2\text{H}_5\text{OH}$
 $0.909\% \text{O}_2, 98.905\% \text{N}_2$
 $\phi = 0.6, 10.0 \text{ atm}$



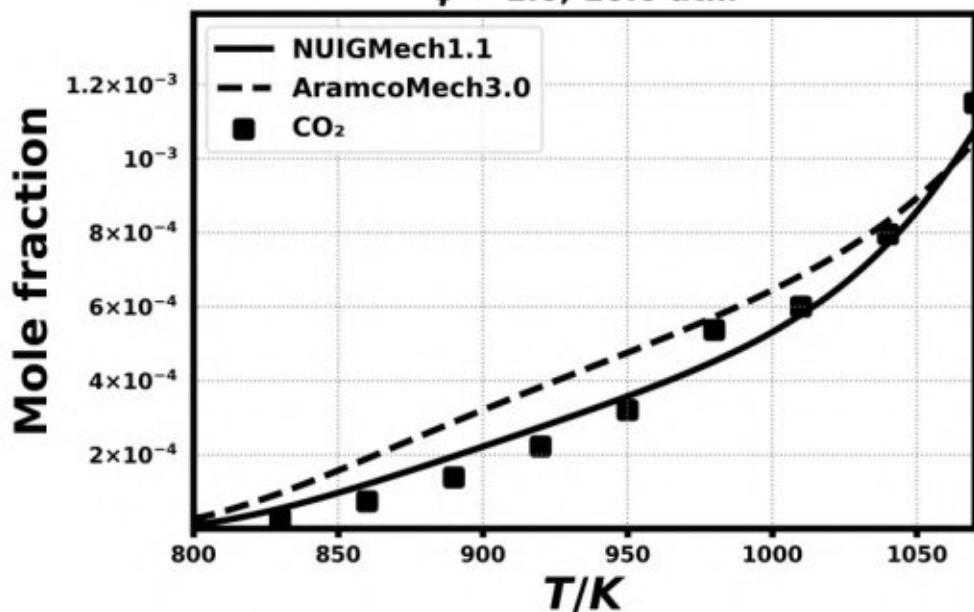
$0.186\% \text{ C}_2\text{H}_5\text{OH}$
 $0.909\% \text{ O}_2, 98.905\% \text{ N}_2$
 $\phi = 0.6, 10.0 \text{ atm}$



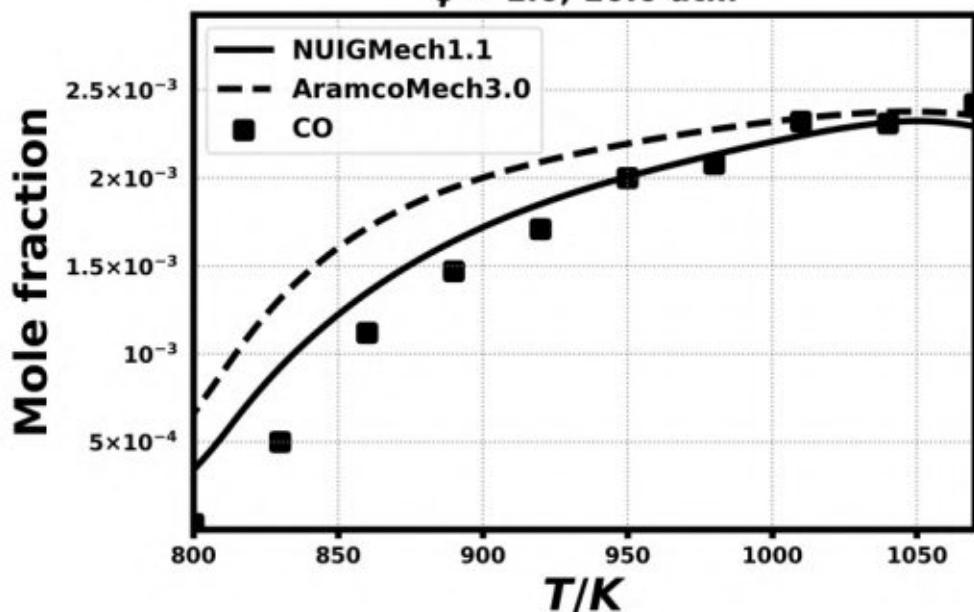
$0.204\% \text{ C}_2\text{H}_5\text{OH}$
 $0.61\% \text{ O}_2, 99.186\% \text{ N}_2$
 $\phi = 1.0, 10.0 \text{ atm}$



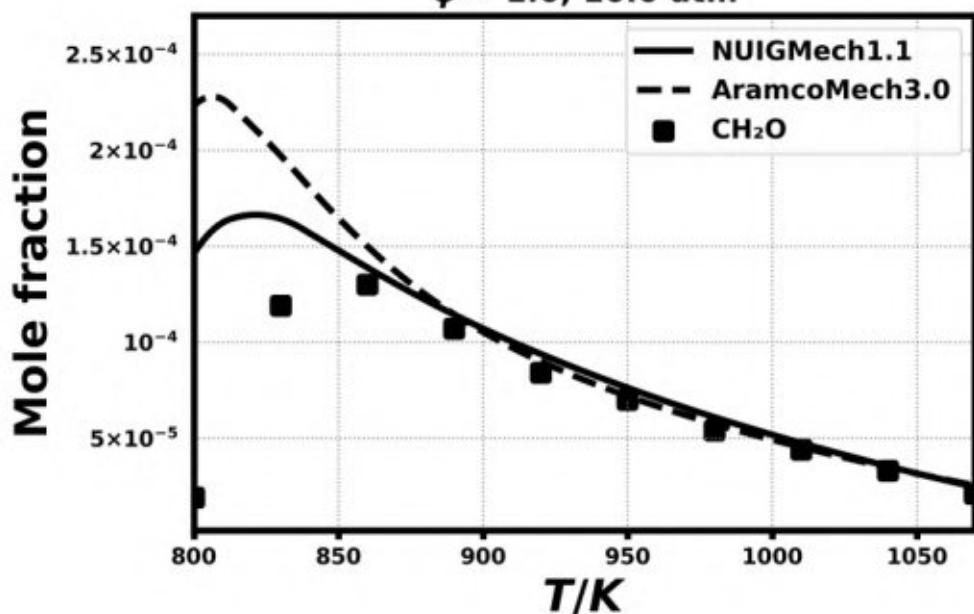
$0.204\% \text{ C}_2\text{H}_5\text{OH}$
 $0.61\% \text{ O}_2, 99.186\% \text{ N}_2$
 $\phi = 1.0, 10.0 \text{ atm}$



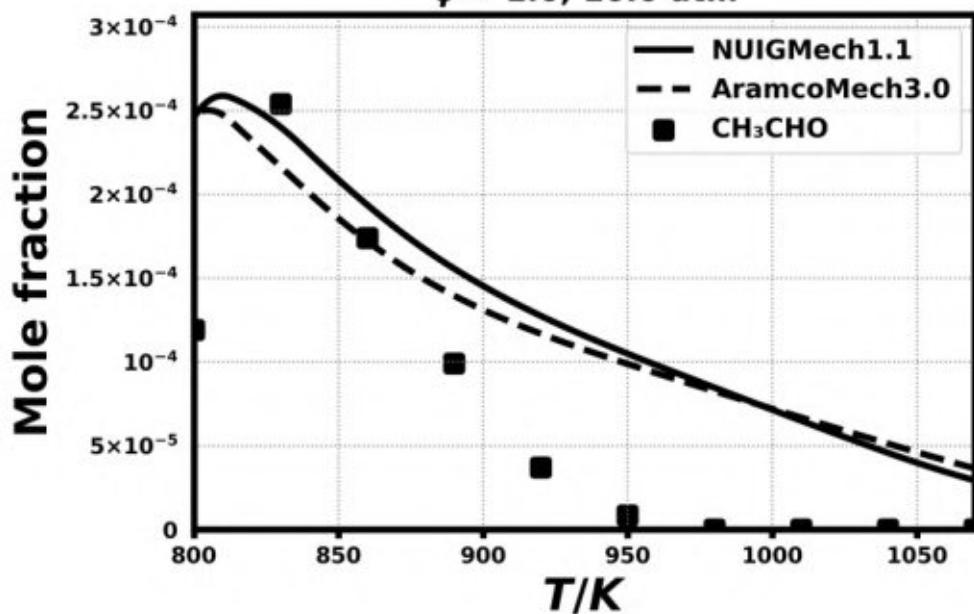
$0.204\% \text{ C}_2\text{H}_5\text{OH}$
 $0.61\% \text{ O}_2, 99.186\% \text{ N}_2$
 $\phi = 1.0, 10.0 \text{ atm}$



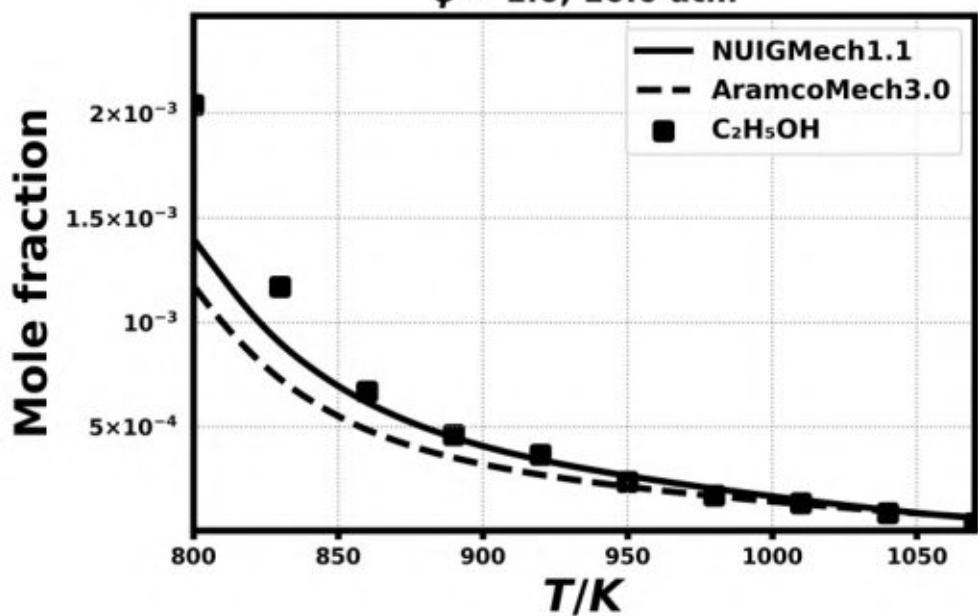
**0.204% C₂H₅OH
0.61% O₂, 99.186% N₂
 $\phi = 1.0, 10.0 \text{ atm}$**



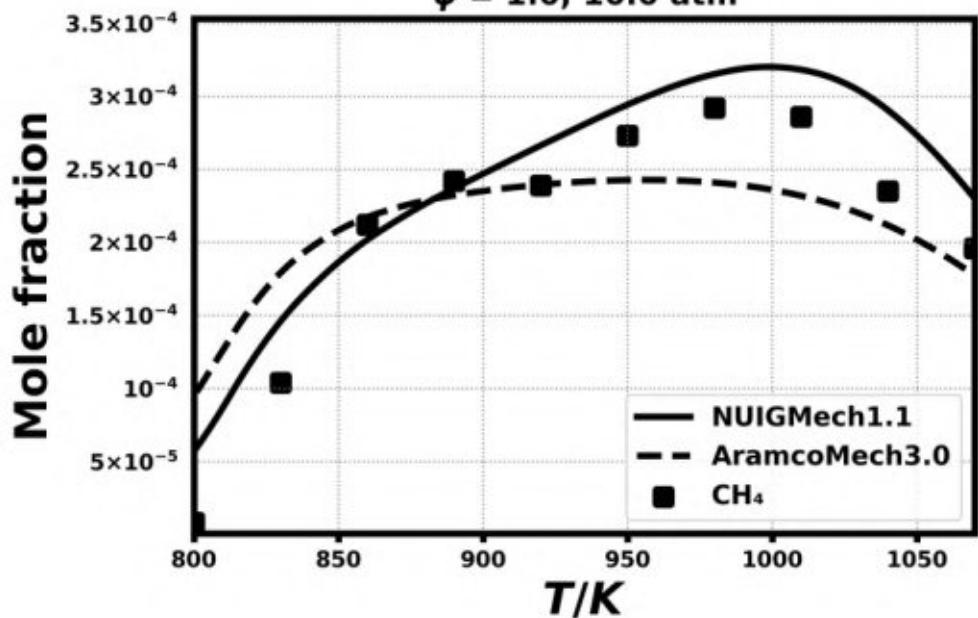
**0.204% C₂H₅OH
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 $\phi = 1.0, 10.0 \text{ atm}$**

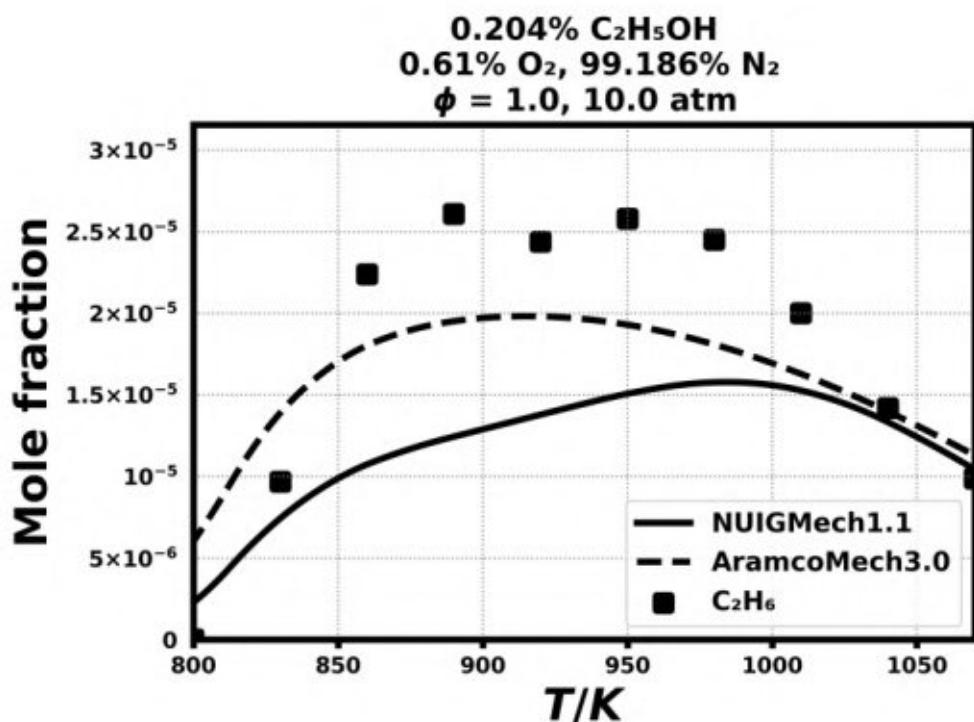
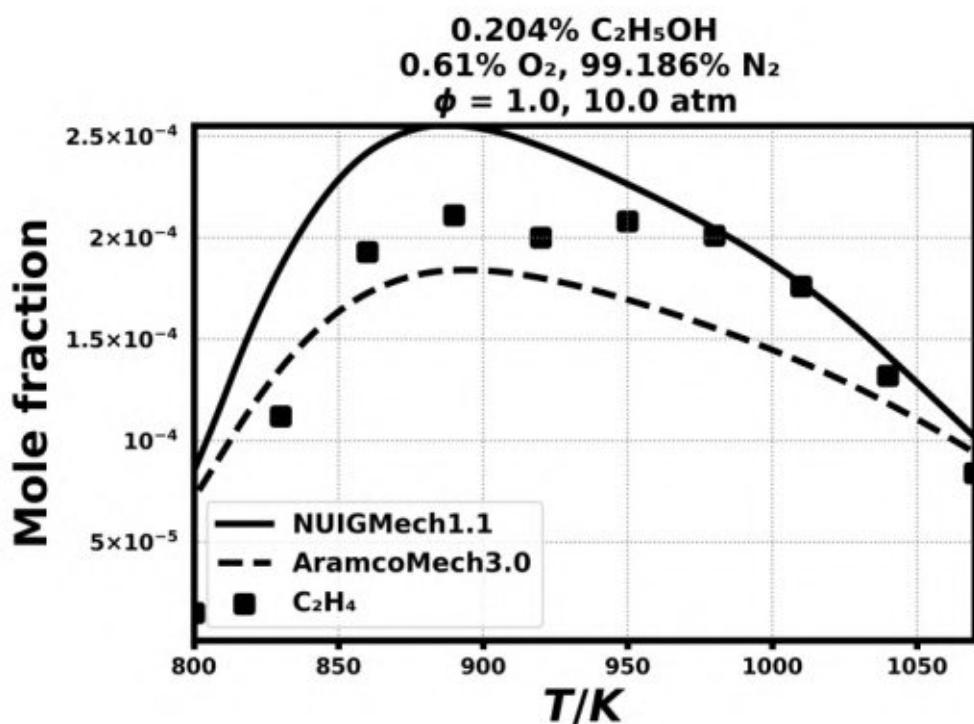


$0.204\% \text{ C}_2\text{H}_5\text{OH}$
 $0.61\% \text{ O}_2, 99.186\% \text{ N}_2$
 $\phi = 1.0, 10.0 \text{ atm}$

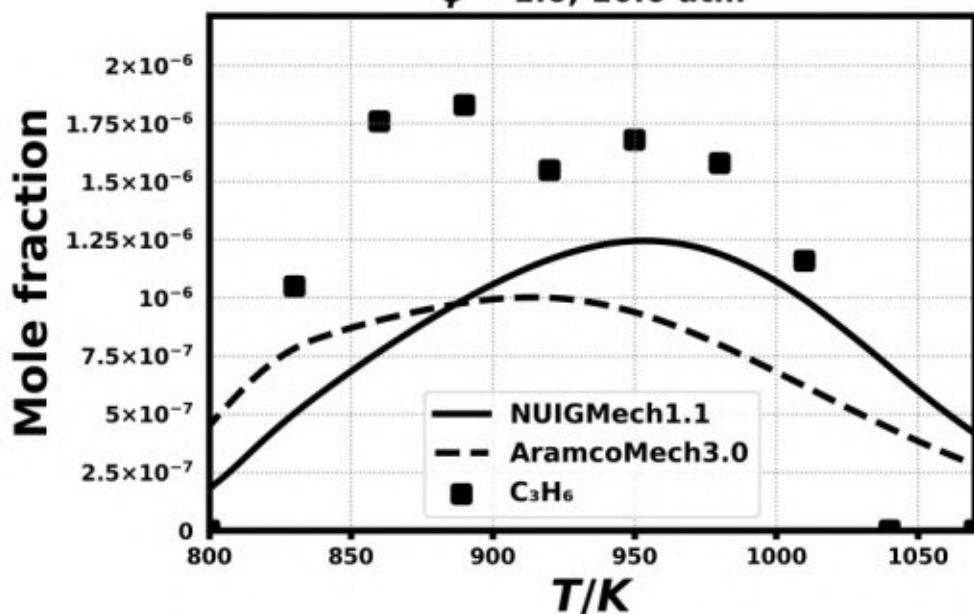


$0.204\% \text{ C}_2\text{H}_5\text{OH}$
 $0.61\% \text{ O}_2, 99.186\% \text{ N}_2$
 $\phi = 1.0, 10.0 \text{ atm}$

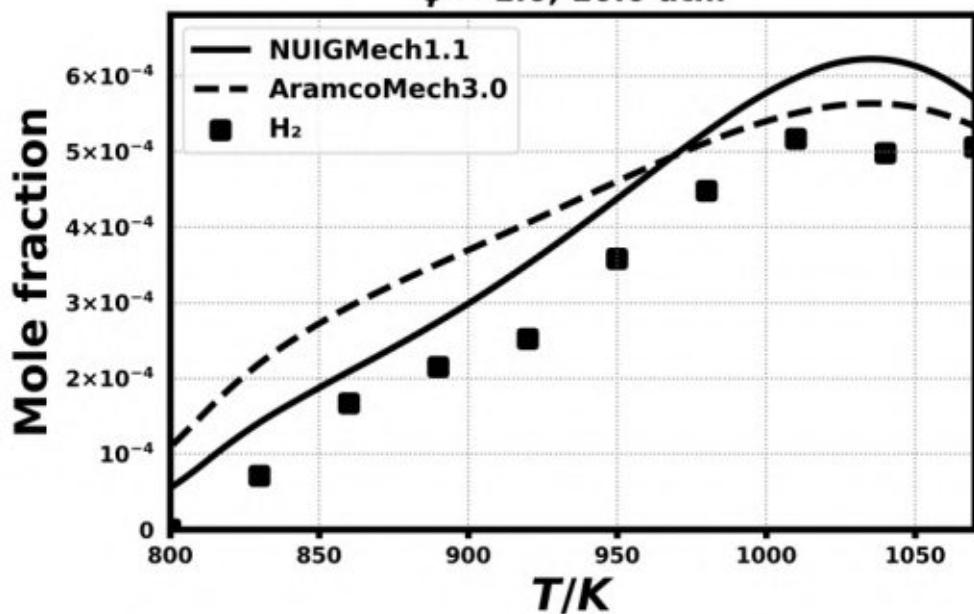




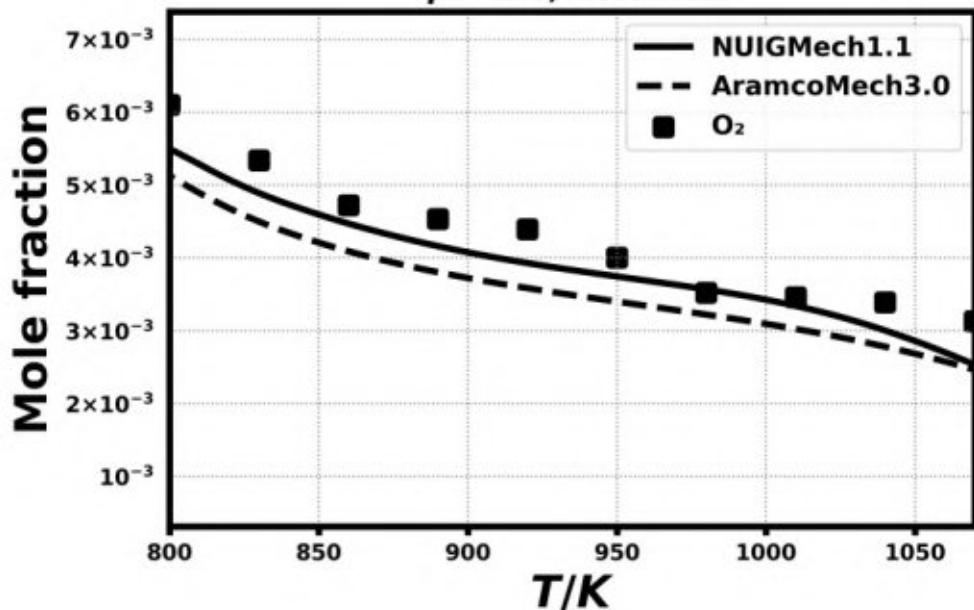
$0.204\% \text{ C}_2\text{H}_5\text{OH}$
 $0.61\% \text{ O}_2, 99.186\% \text{ N}_2$
 $\phi = 1.0, 10.0 \text{ atm}$



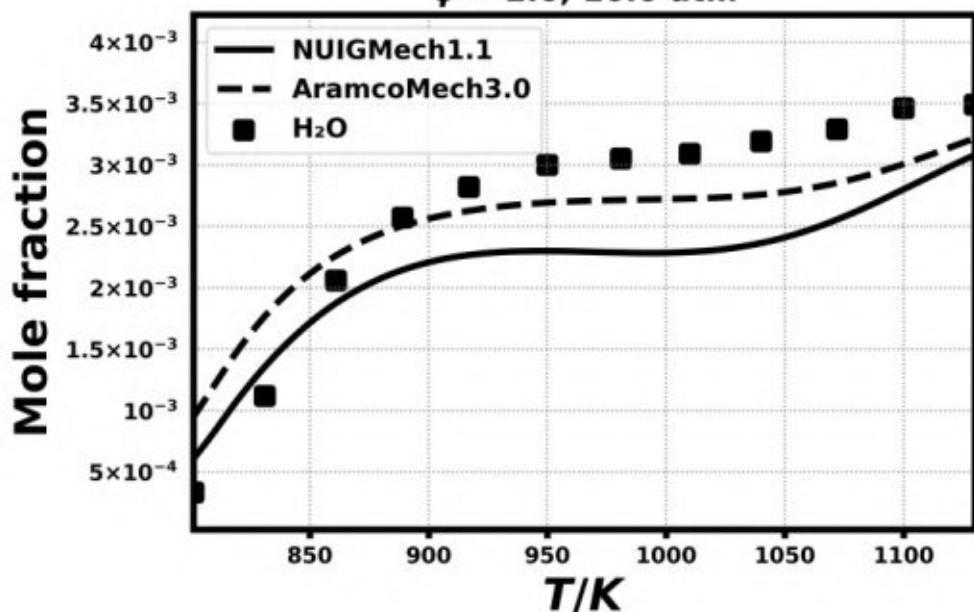
$0.204\% \text{ C}_2\text{H}_5\text{OH}$
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 $\phi = 1.0, 10.0 \text{ atm}$



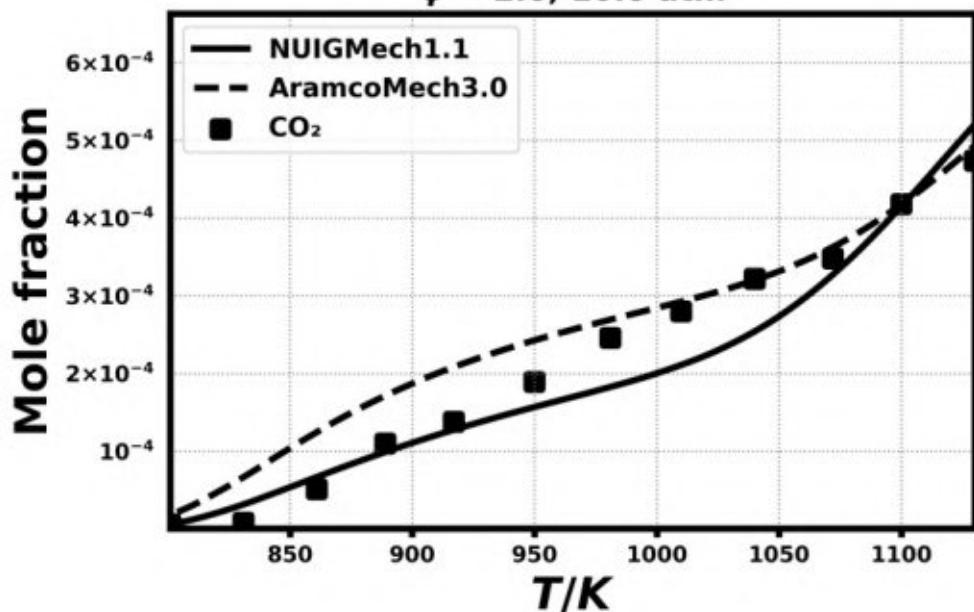
$0.204\% \text{C}_2\text{H}_5\text{OH}$
 $0.61\% \text{O}_2, 99.186\% \text{N}_2$
 $\phi = 1.0, 10.0 \text{ atm}$



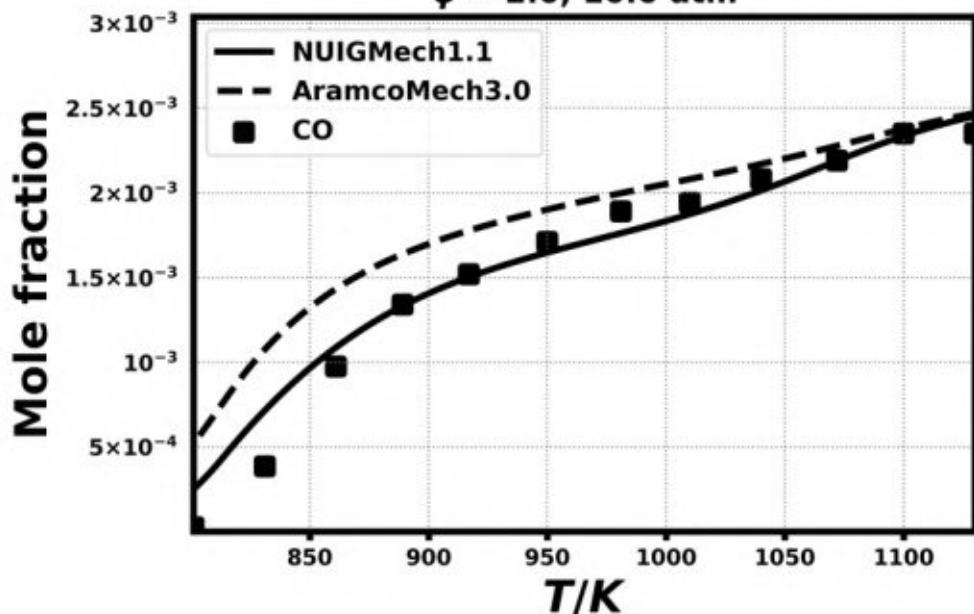
$0.201\% \text{C}_2\text{H}_5\text{OH}$
 $0.325\% \text{O}_2, 99.474\% \text{N}_2$
 $\phi = 2.0, 10.0 \text{ atm}$



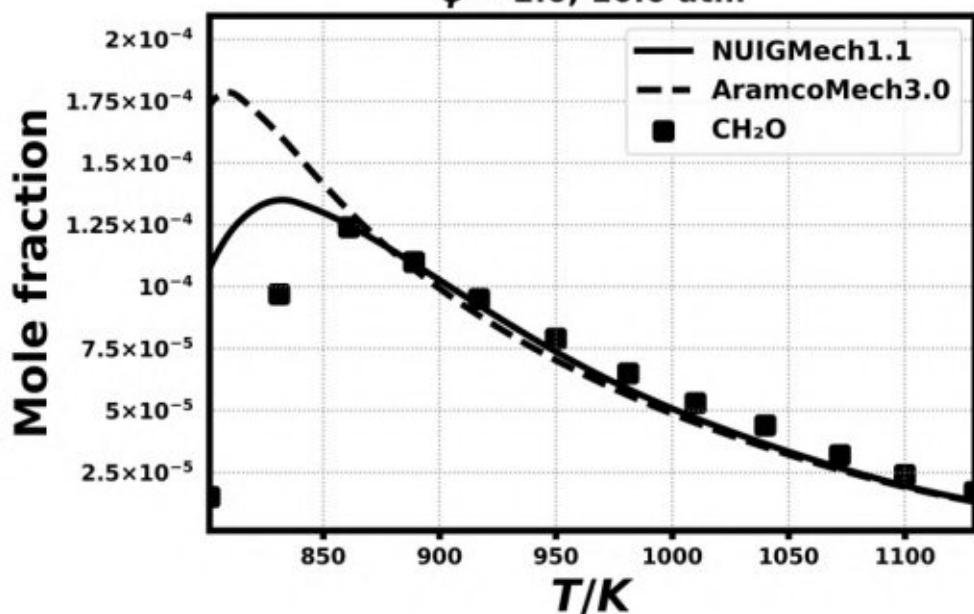
$0.201\% \text{ C}_2\text{H}_5\text{OH}$
 $0.325\% \text{ O}_2, 99.474\% \text{ N}_2$
 $\phi = 2.0, 10.0 \text{ atm}$



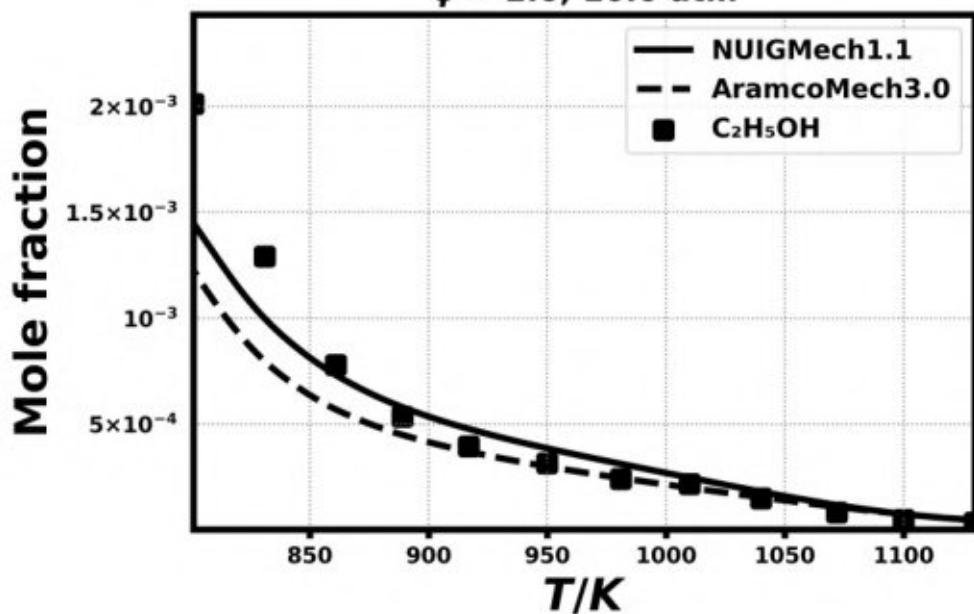
$0.201\% \text{ C}_2\text{H}_5\text{OH}$
 $0.325\% \text{ O}_2, 99.474\% \text{ N}_2$
 $\phi = 2.0, 10.0 \text{ atm}$

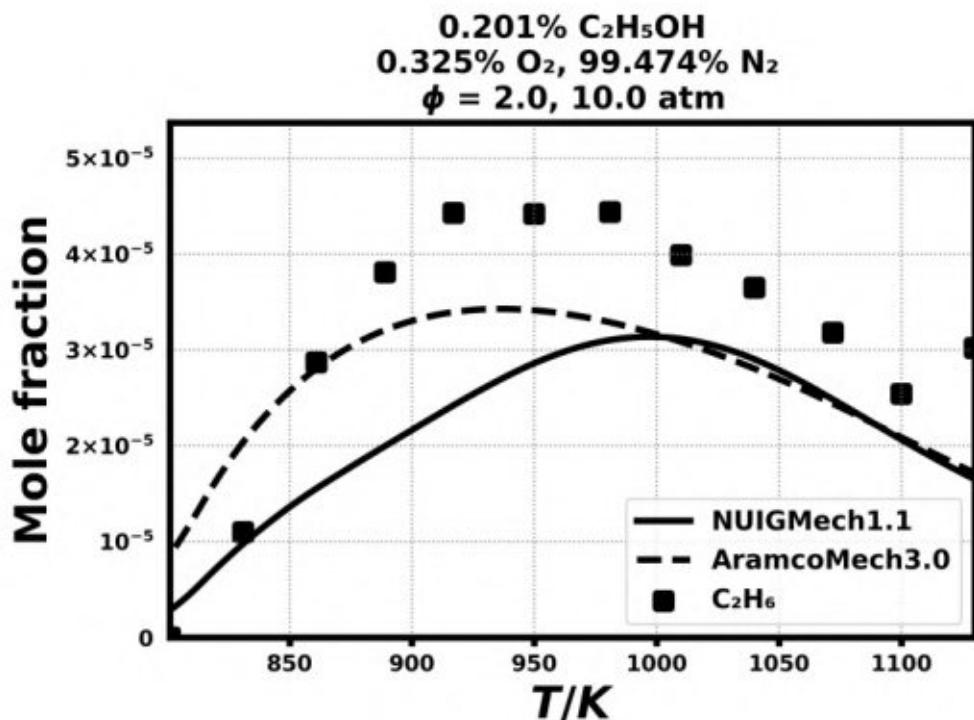
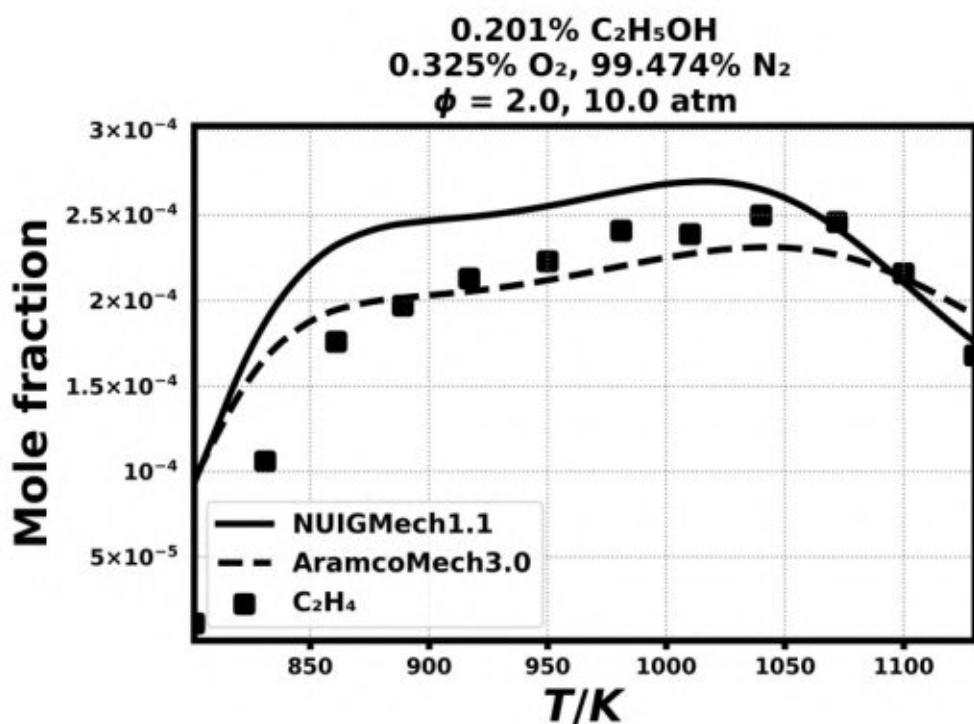


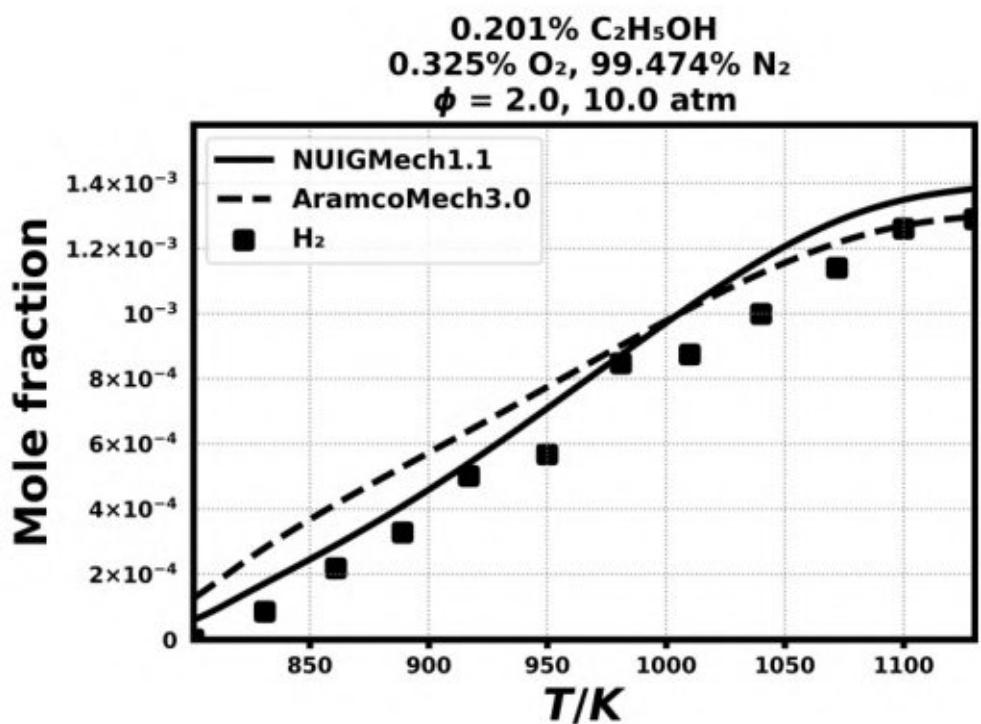
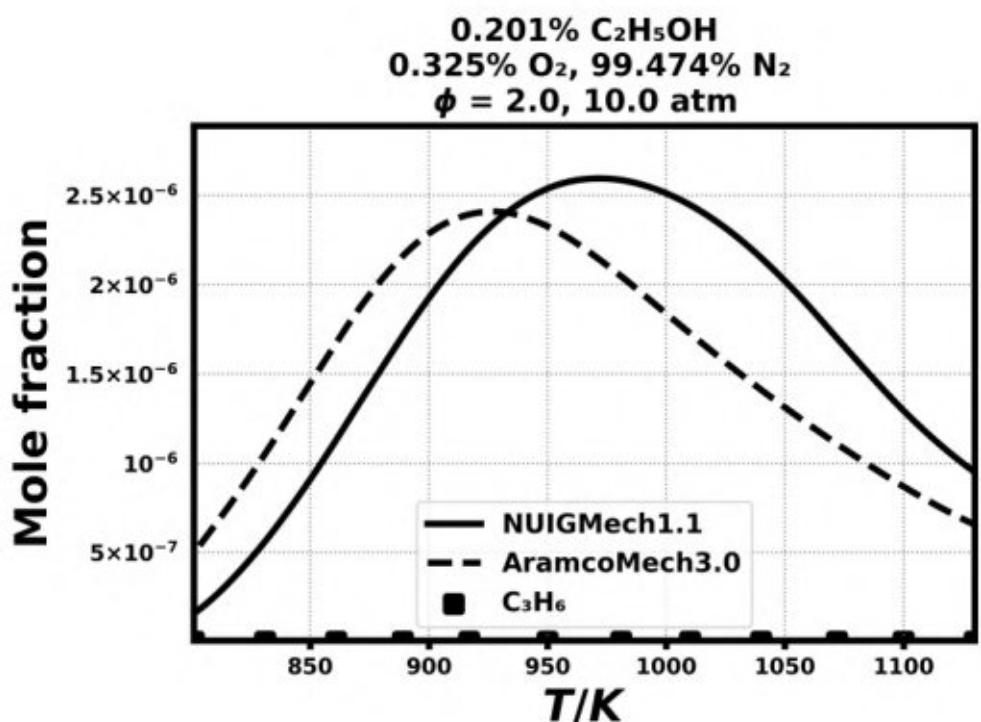
$0.201\% \text{C}_2\text{H}_5\text{OH}$
 $0.325\% \text{O}_2, 99.474\% \text{N}_2$
 $\phi = 2.0, 10.0 \text{ atm}$

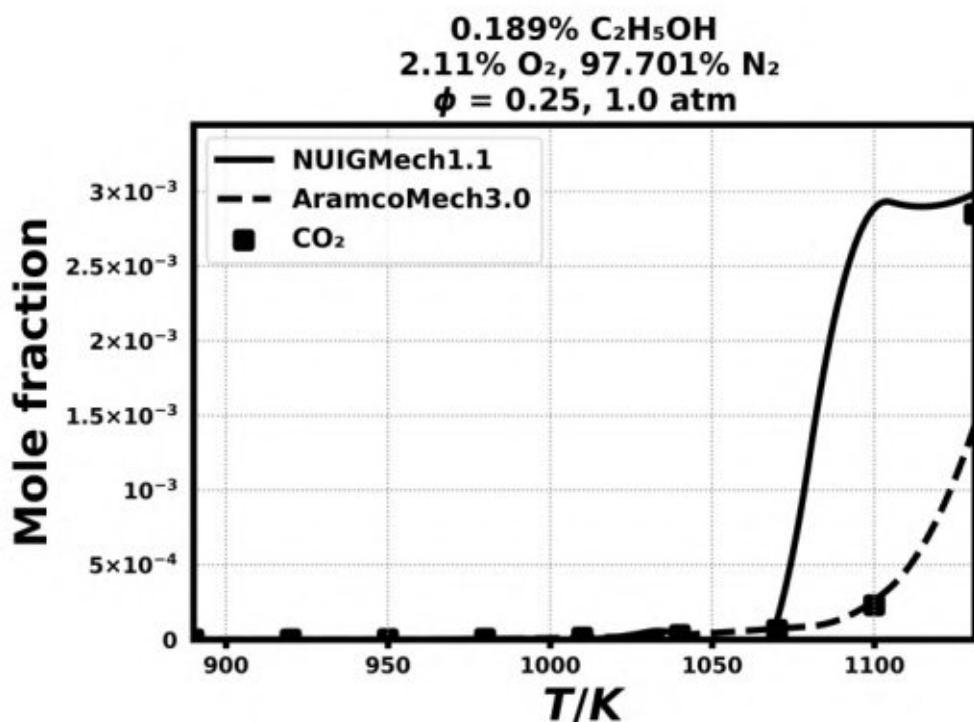
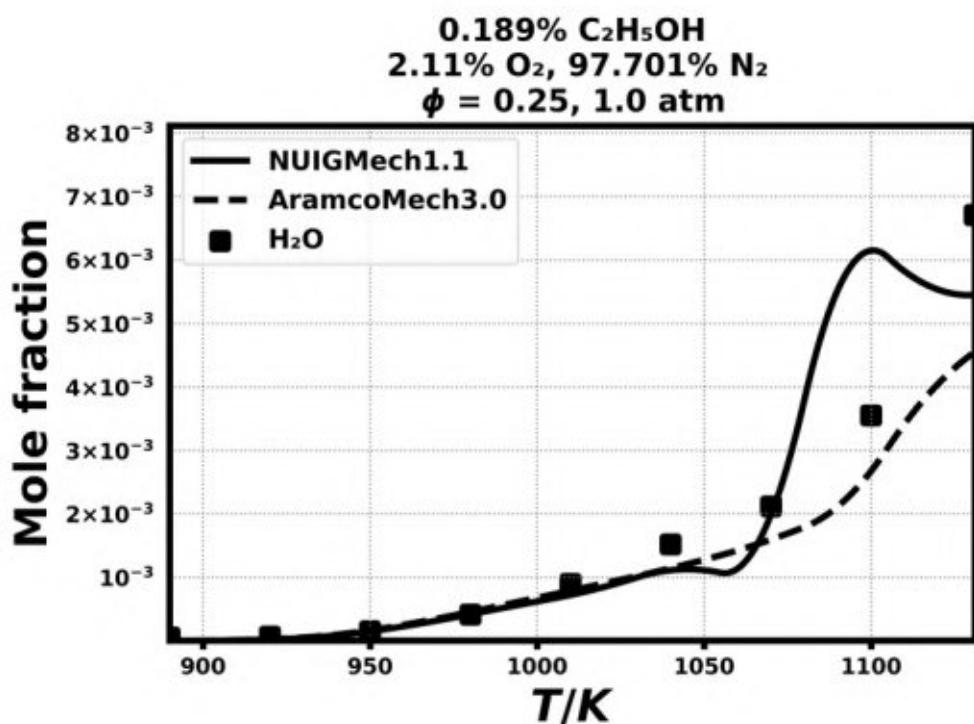


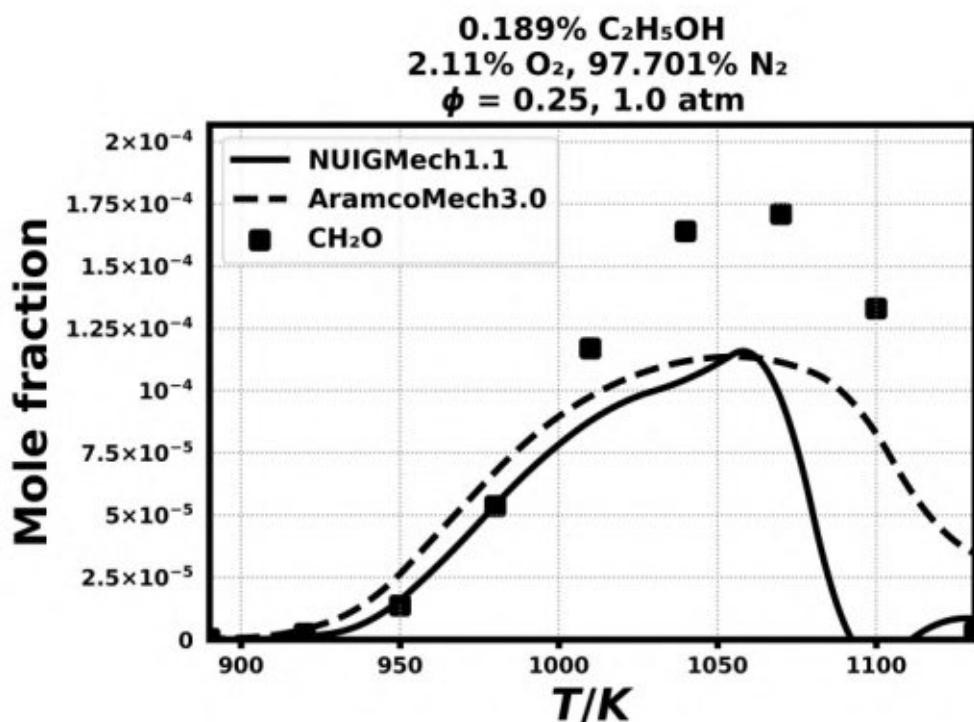
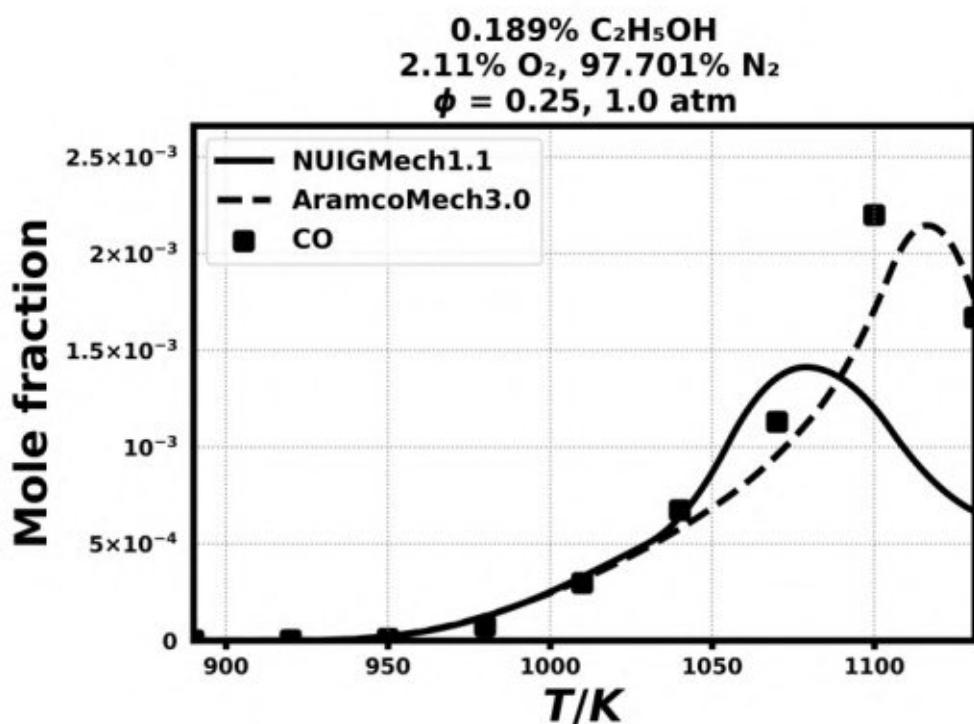
$0.201\% \text{C}_2\text{H}_5\text{OH}$
 $0.325\% \text{O}_2, 99.474\% \text{N}_2$
 $\phi = 2.0, 10.0 \text{ atm}$

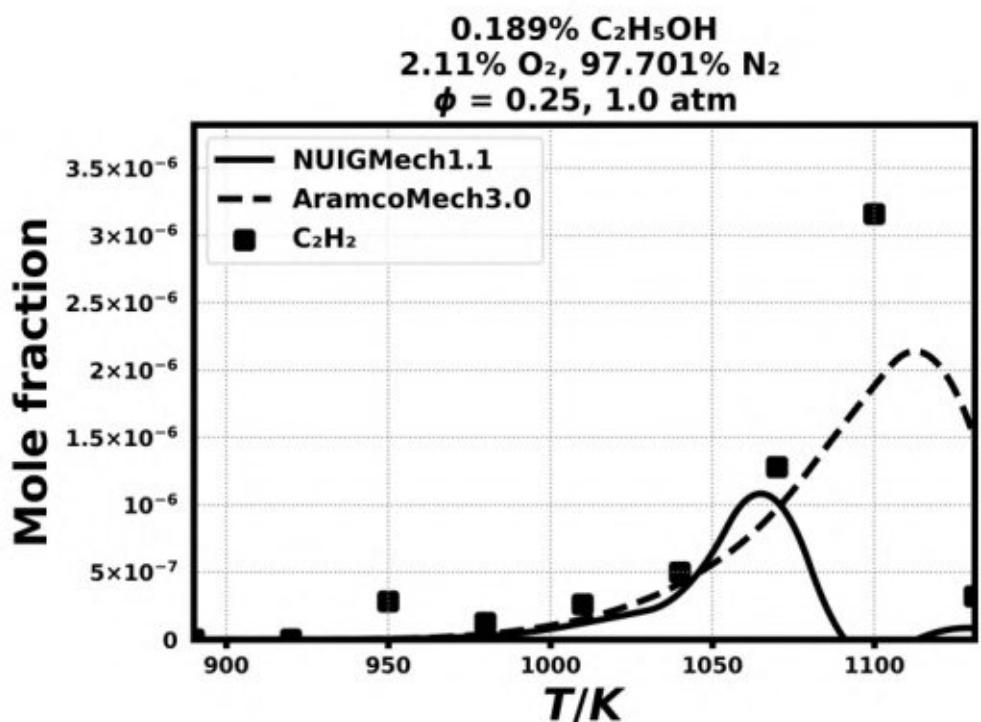
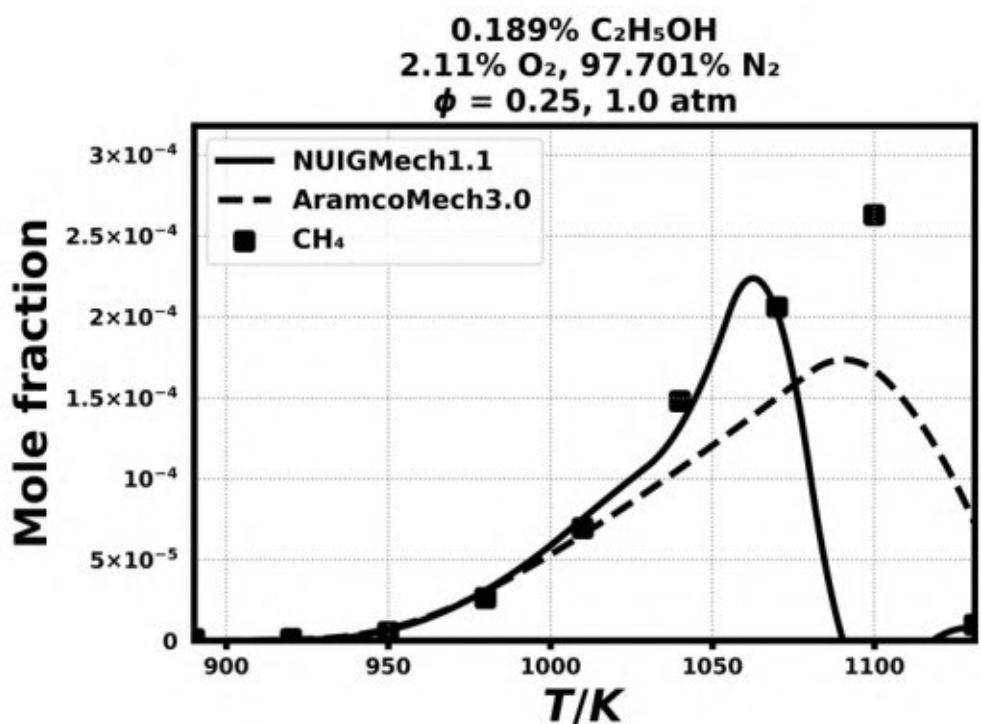




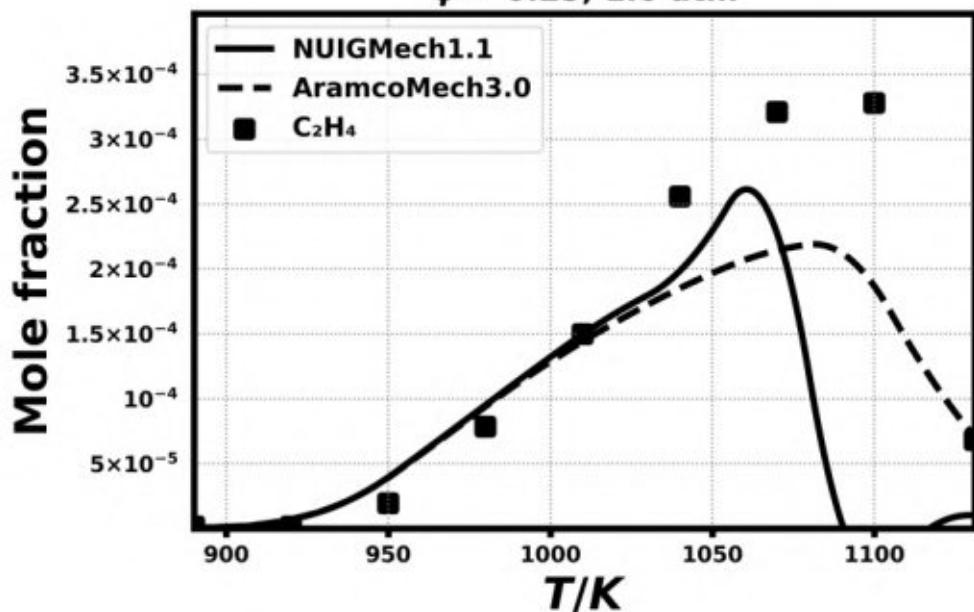




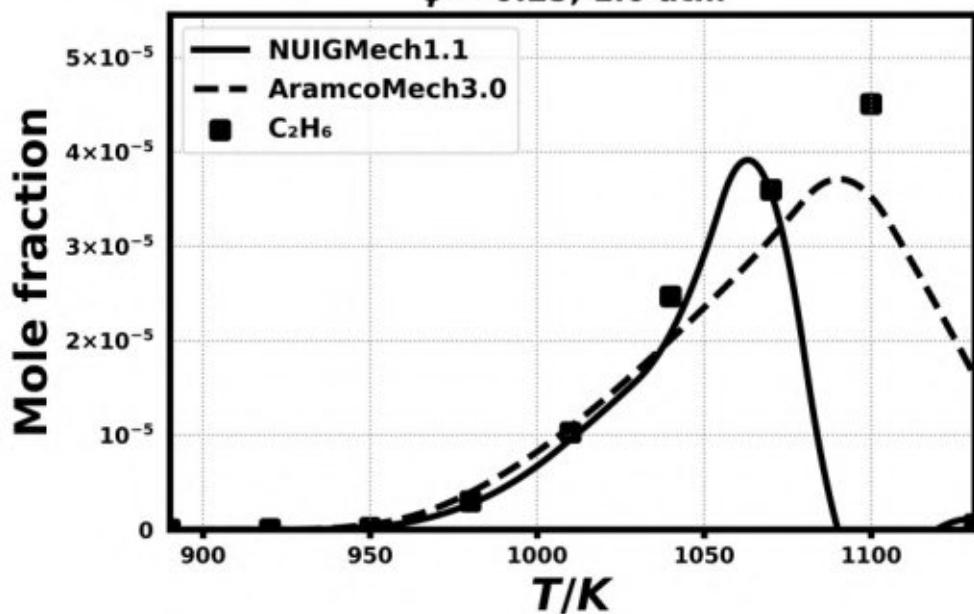




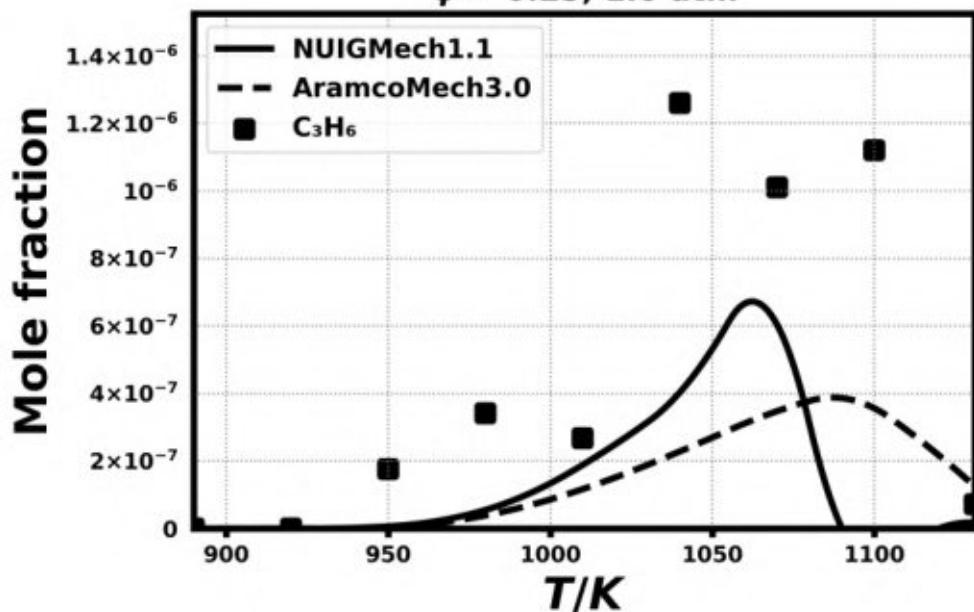
**0.189% C₂H₅OH
2.11% O₂, 97.701% N₂
 $\phi = 0.25, 1.0 \text{ atm}$**



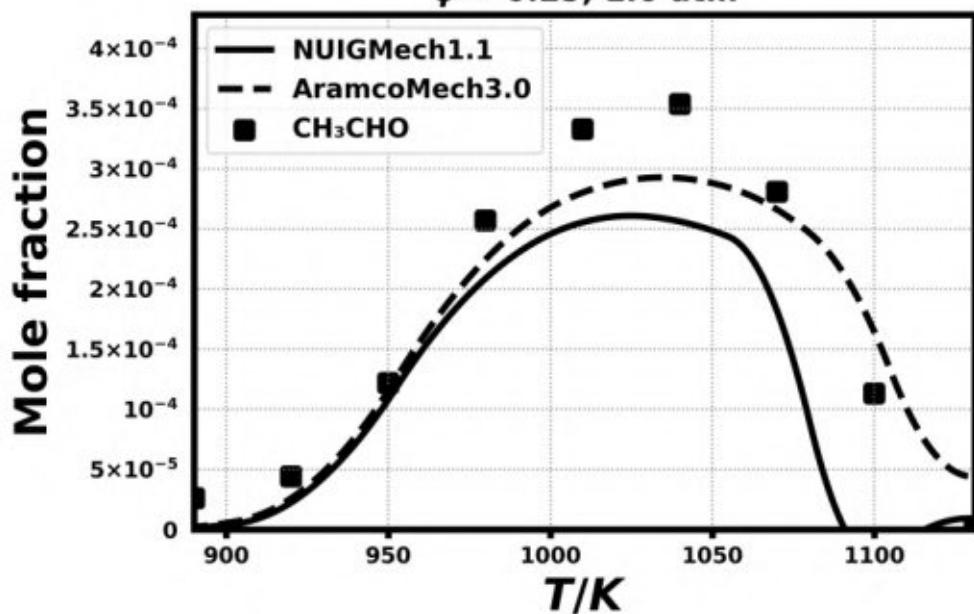
**0.189% C₂H₅OH
2.11% O₂, 97.701% N₂
 $\phi = 0.25, 1.0 \text{ atm}$**



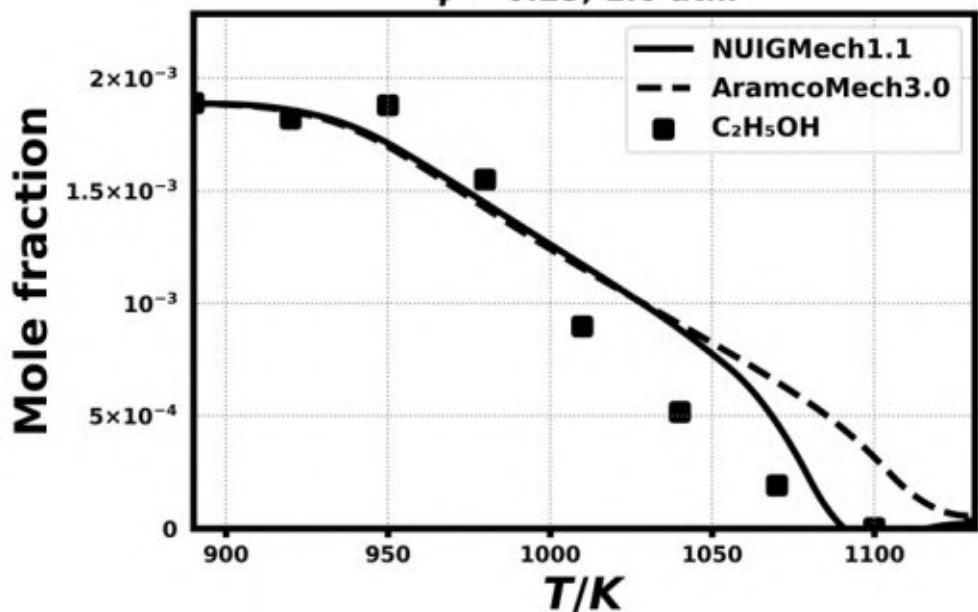
$0.189\% \text{ C}_2\text{H}_5\text{OH}$
 $2.11\% \text{ O}_2, 97.701\% \text{ N}_2$
 $\phi = 0.25, 1.0 \text{ atm}$



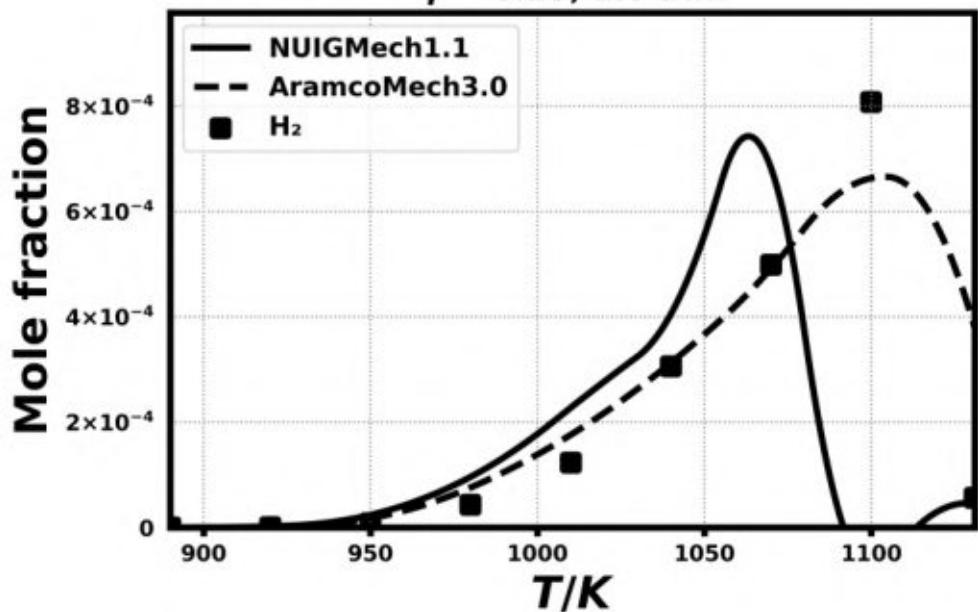
$0.189\% \text{ C}_2\text{H}_5\text{OH}$
 $2.11\% \text{ O}_2, 97.701\% \text{ N}_2$
 $\phi = 0.25, 1.0 \text{ atm}$



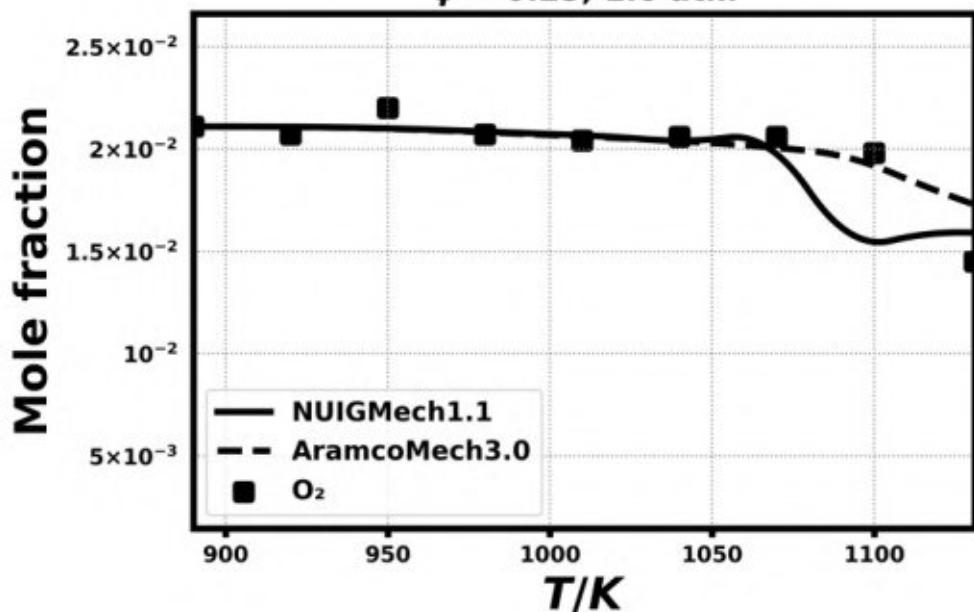
$0.189\% \text{ C}_2\text{H}_5\text{OH}$
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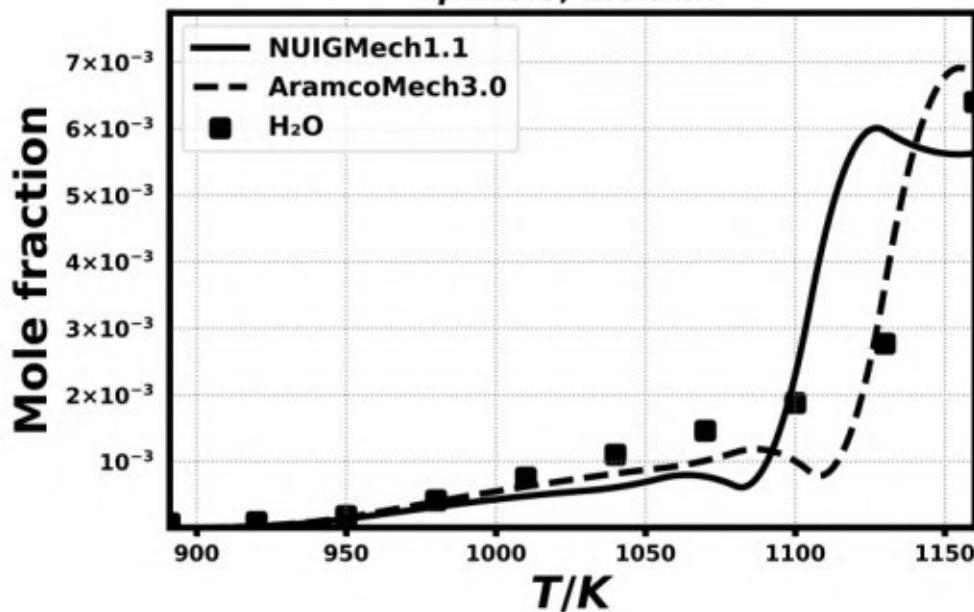
$0.189\% \text{ C}_2\text{H}_5\text{OH}$
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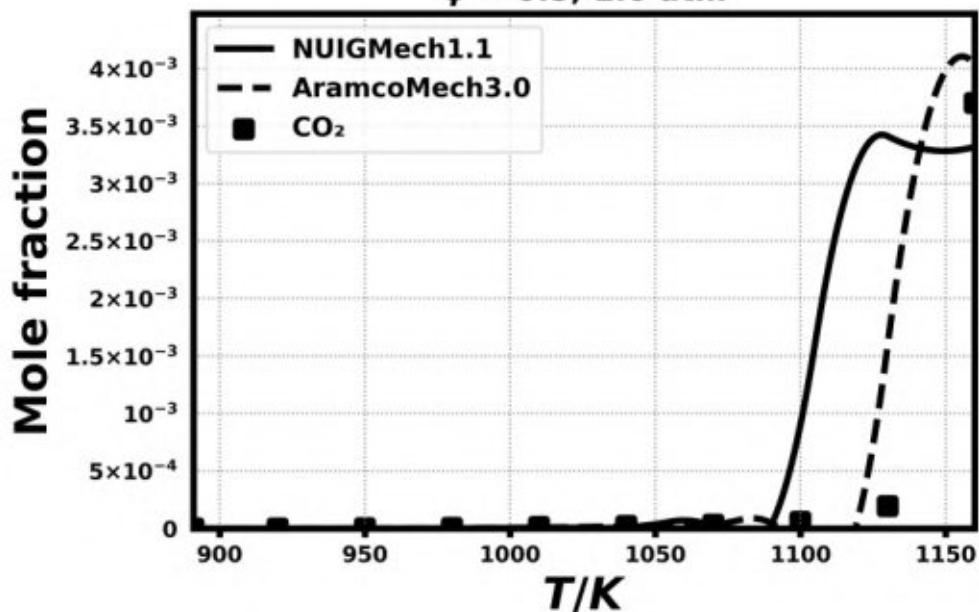
**0.189% C₂H₅OH
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 $\phi = 0.25, 1.0 \text{ atm}$**



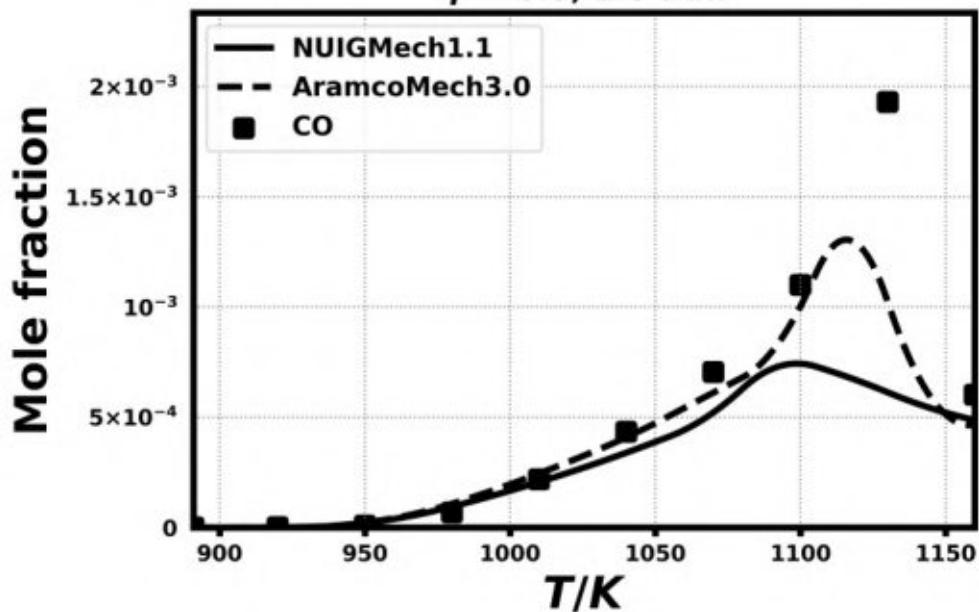
**0.196% C₂H₅OH
1.03% O₂, 98.774% N₂
 $\phi = 0.5, 1.0 \text{ atm}$**



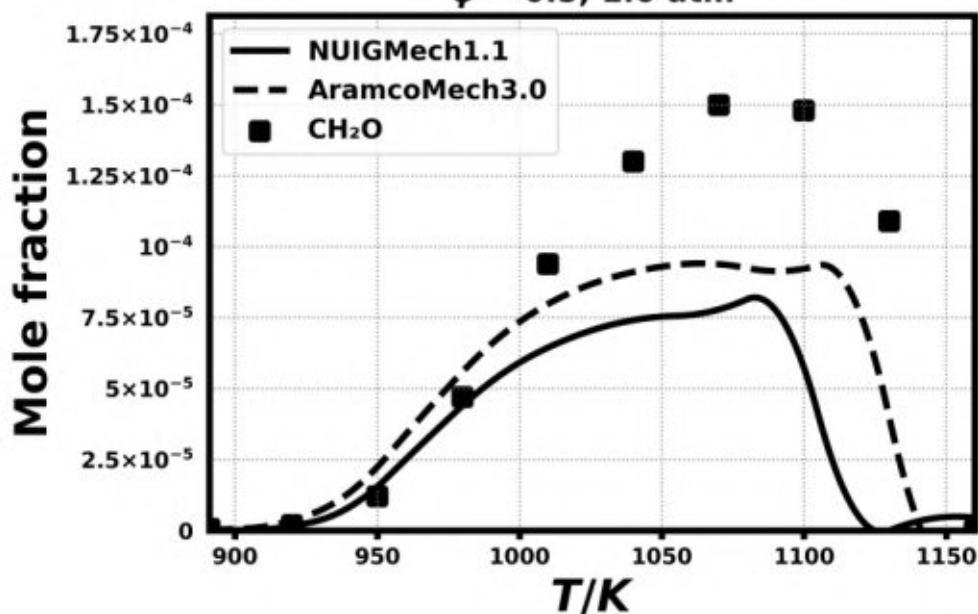
**0.196% C₂H₅OH
1.03% O₂, 98.774% N₂
 $\phi = 0.5, 1.0 \text{ atm}$**



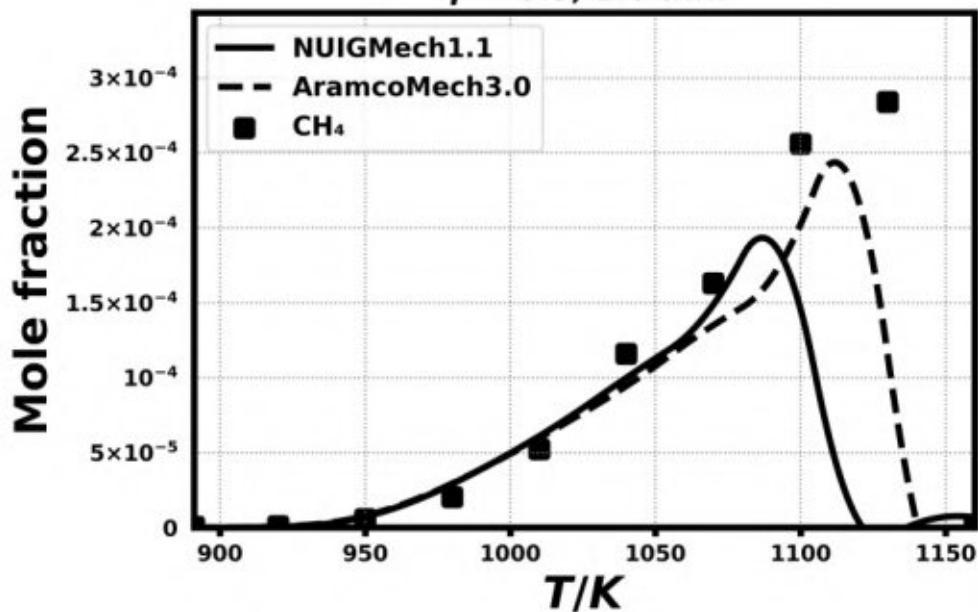
**0.196% C₂H₅OH
1.03% O₂, 98.774% N₂
 $\phi = 0.5, 1.0 \text{ atm}$**

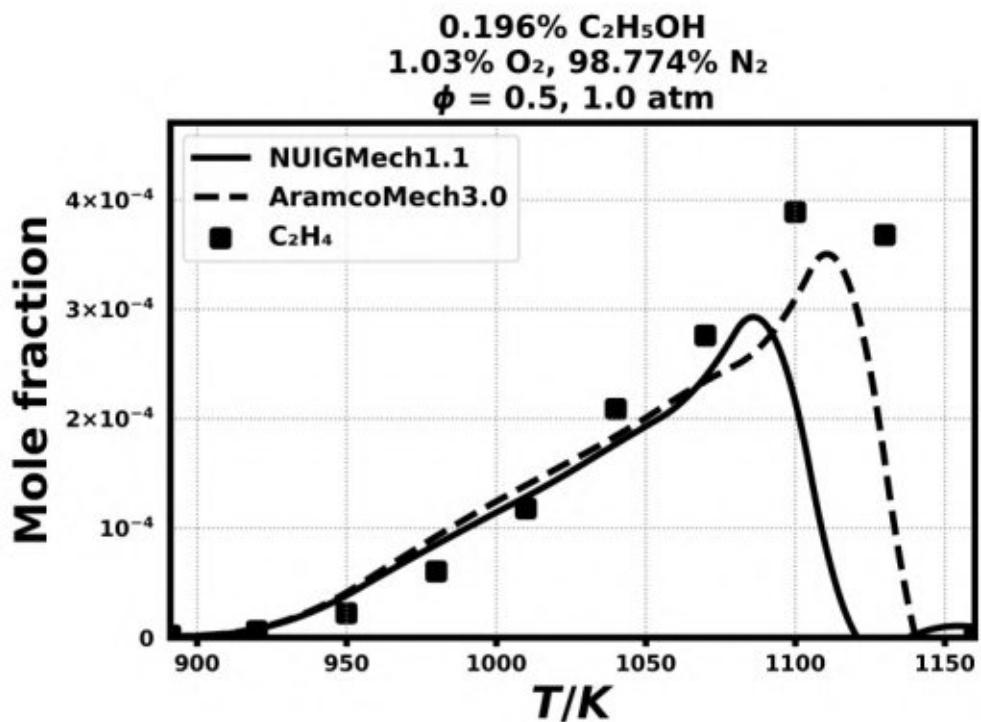
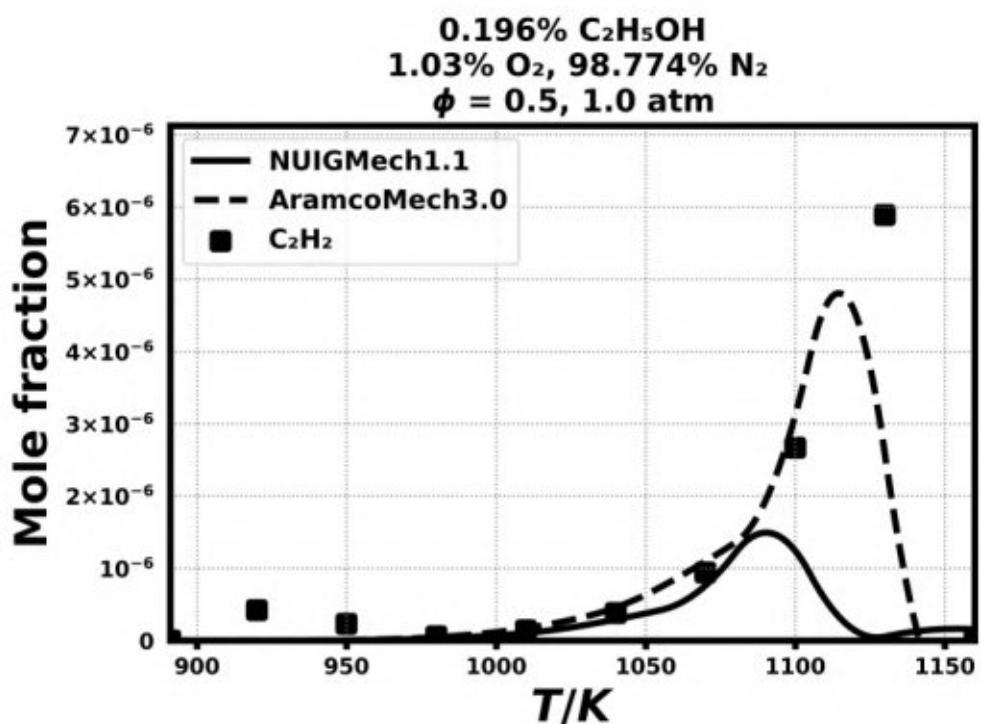


$0.196\% \text{ C}_2\text{H}_5\text{OH}$
 $1.03\% \text{ O}_2, 98.774\% \text{ N}_2$
 $\phi = 0.5, 1.0 \text{ atm}$

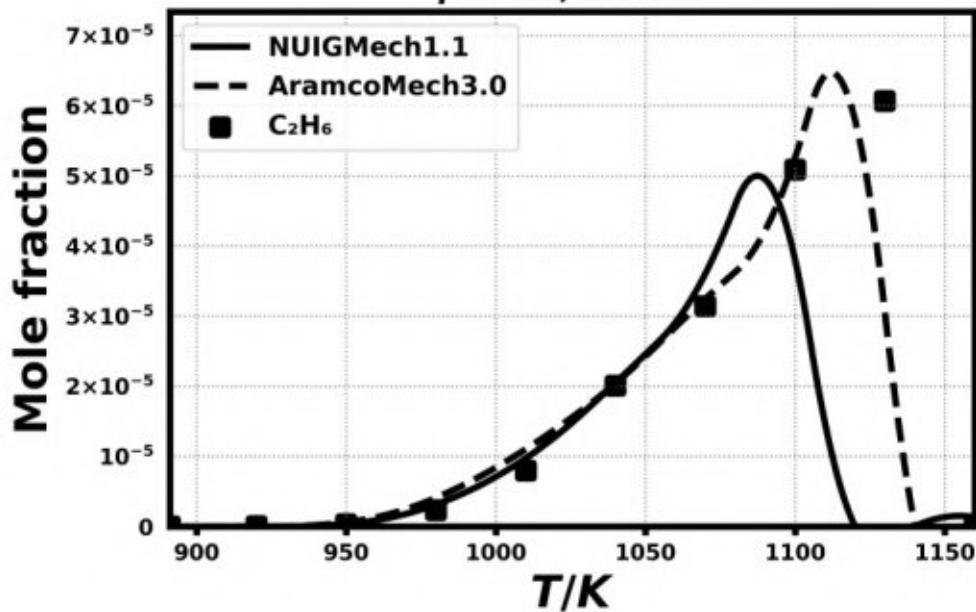


$0.196\% \text{ C}_2\text{H}_5\text{OH}$
 $1.03\% \text{ O}_2, 98.774\% \text{ N}_2$
 $\phi = 0.5, 1.0 \text{ atm}$

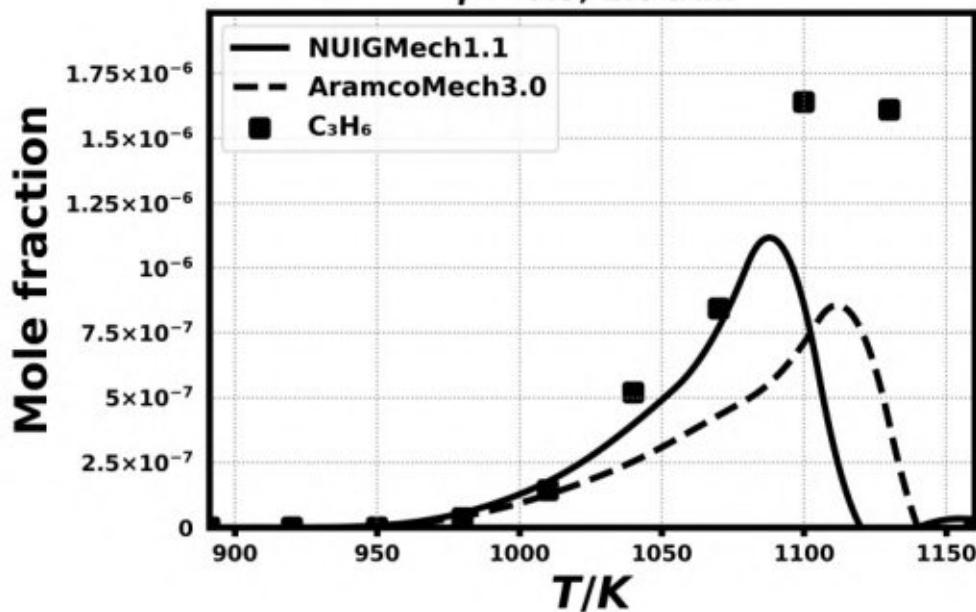




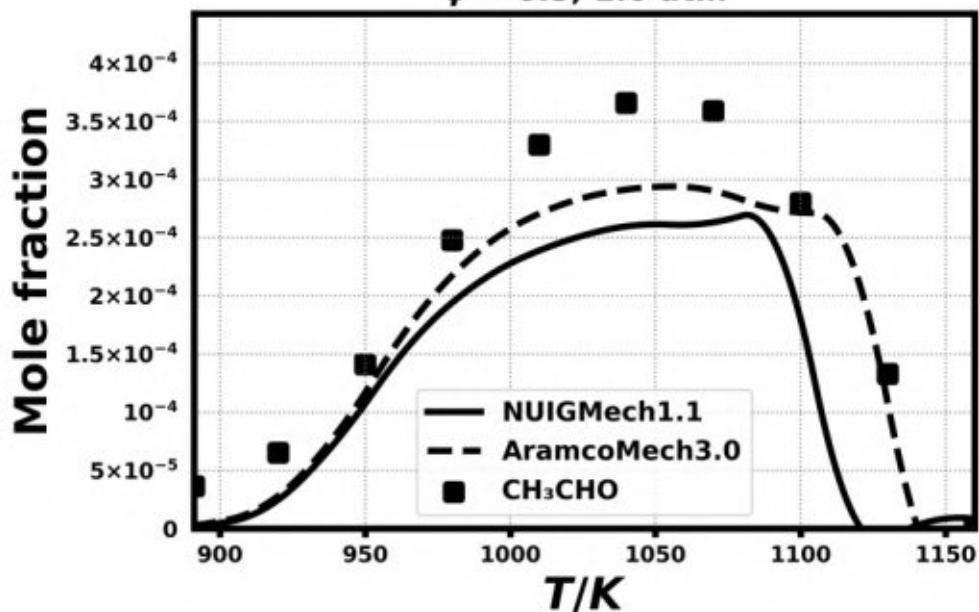
$0.196\% \text{ C}_2\text{H}_5\text{OH}$
 $1.03\% \text{ O}_2, 98.774\% \text{ N}_2$
 $\phi = 0.5, 1.0 \text{ atm}$



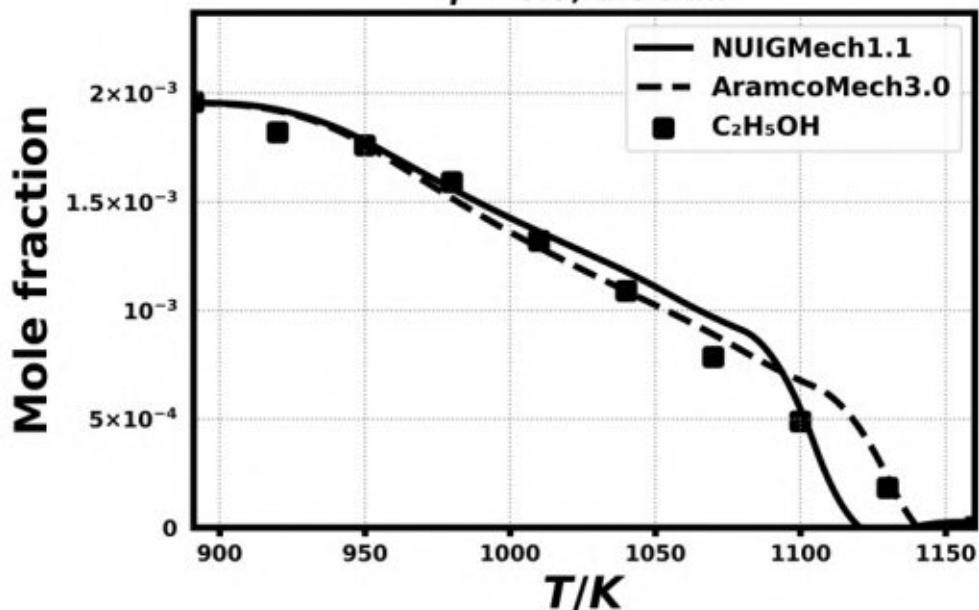
$0.196\% \text{ C}_2\text{H}_5\text{OH}$
 $1.03\% \text{ O}_2, 98.774\% \text{ N}_2$
 $\phi = 0.5, 1.0 \text{ atm}$



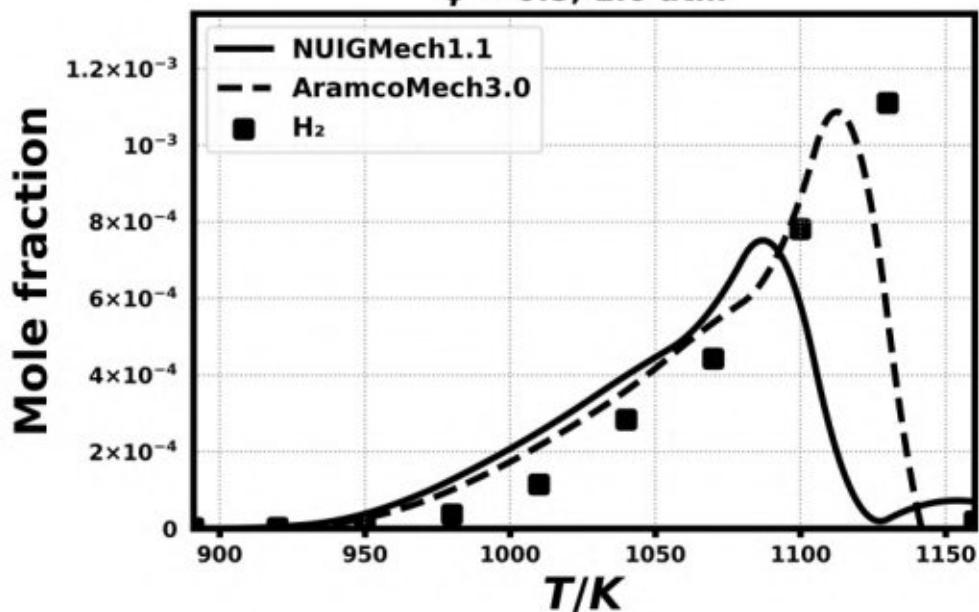
$0.196\% \text{ C}_2\text{H}_5\text{OH}$
 $1.03\% \text{ O}_2, 98.774\% \text{ N}_2$
 $\phi = 0.5, 1.0 \text{ atm}$



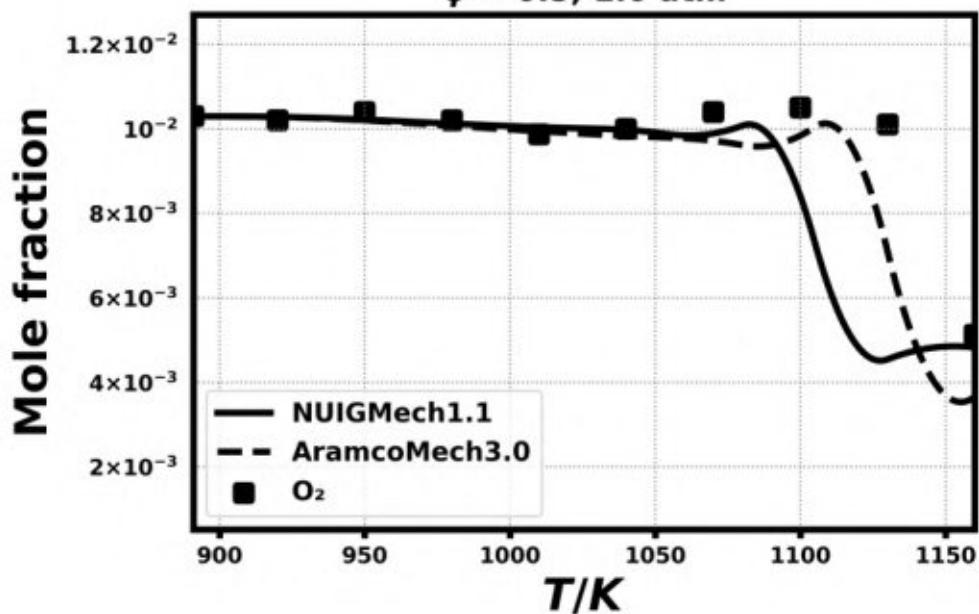
$0.196\% \text{ C}_2\text{H}_5\text{OH}$
 $1.03\% \text{ O}_2, 98.774\% \text{ N}_2$
 $\phi = 0.5, 1.0 \text{ atm}$



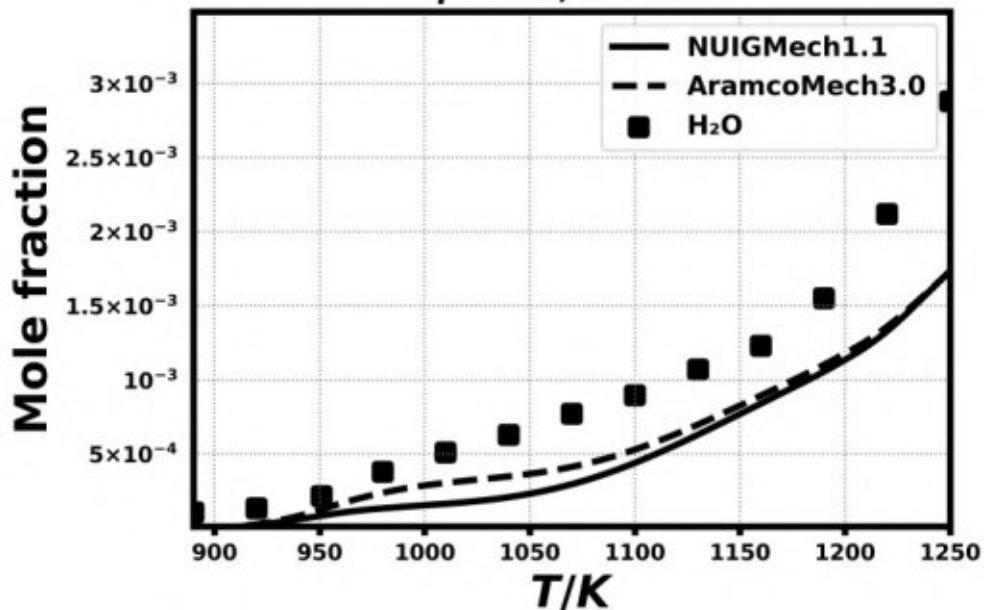
$0.196\% \text{ C}_2\text{H}_5\text{OH}$
 $1.03\% \text{ O}_2, 98.774\% \text{ N}_2$
 $\phi = 0.5, 1.0 \text{ atm}$



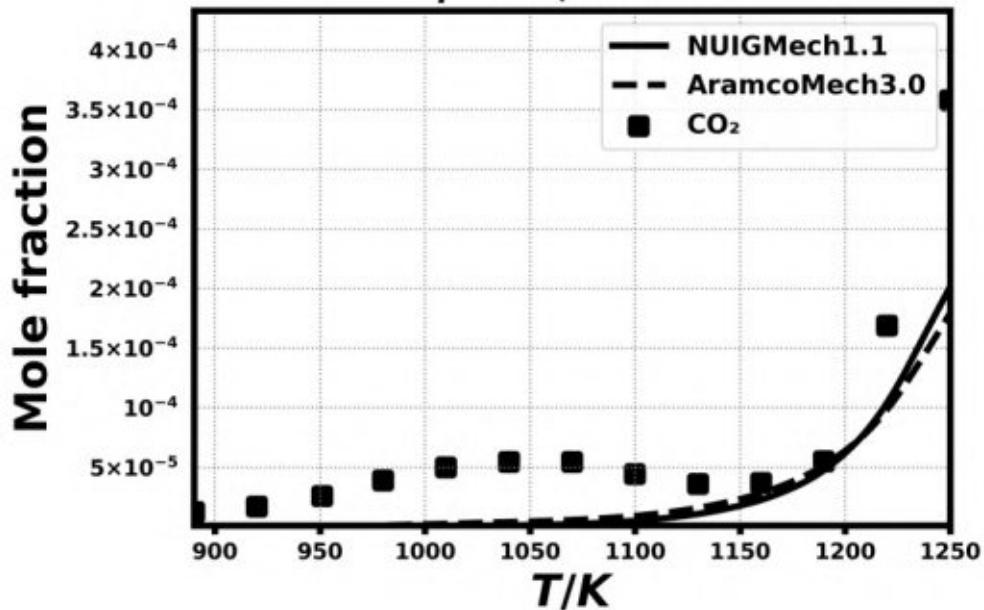
$0.196\% \text{ C}_2\text{H}_5\text{OH}$
 $1.03\% \text{ O}_2, 98.774\% \text{ N}_2$
 $\phi = 0.5, 1.0 \text{ atm}$



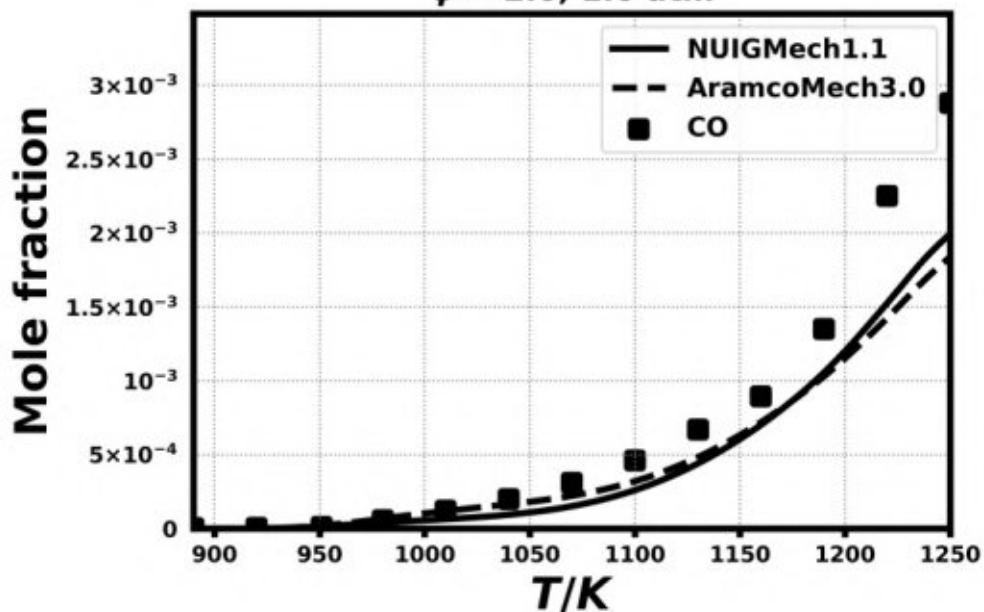
$0.192\% \text{ C}_2\text{H}_5\text{OH}$
 $0.264\% \text{ O}_2, 99.544\% \text{ N}_2$
 $\phi = 2.0, 1.0 \text{ atm}$



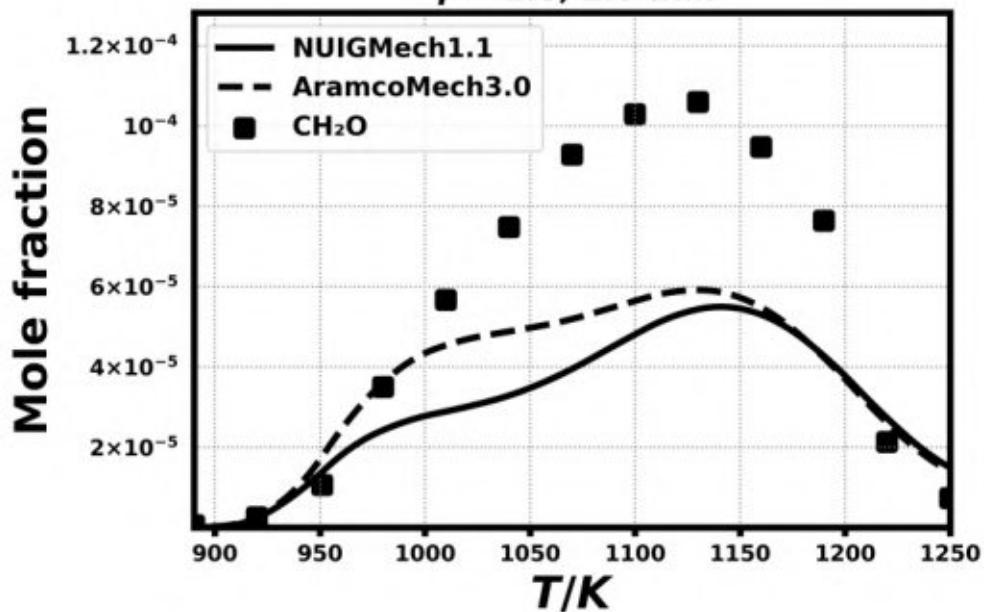
$0.192\% \text{ C}_2\text{H}_5\text{OH}$
 $0.264\% \text{ O}_2, 99.544\% \text{ N}_2$
 $\phi = 2.0, 1.0 \text{ atm}$



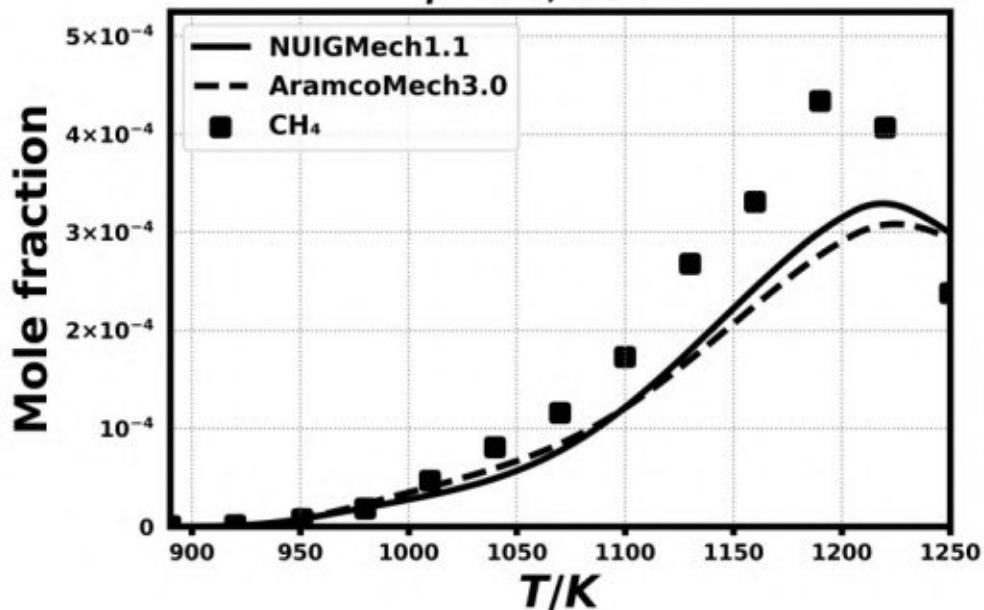
$0.192\% \text{ C}_2\text{H}_5\text{OH}$
 $0.264\% \text{ O}_2, 99.544\% \text{ N}_2$
 $\phi = 2.0, 1.0 \text{ atm}$



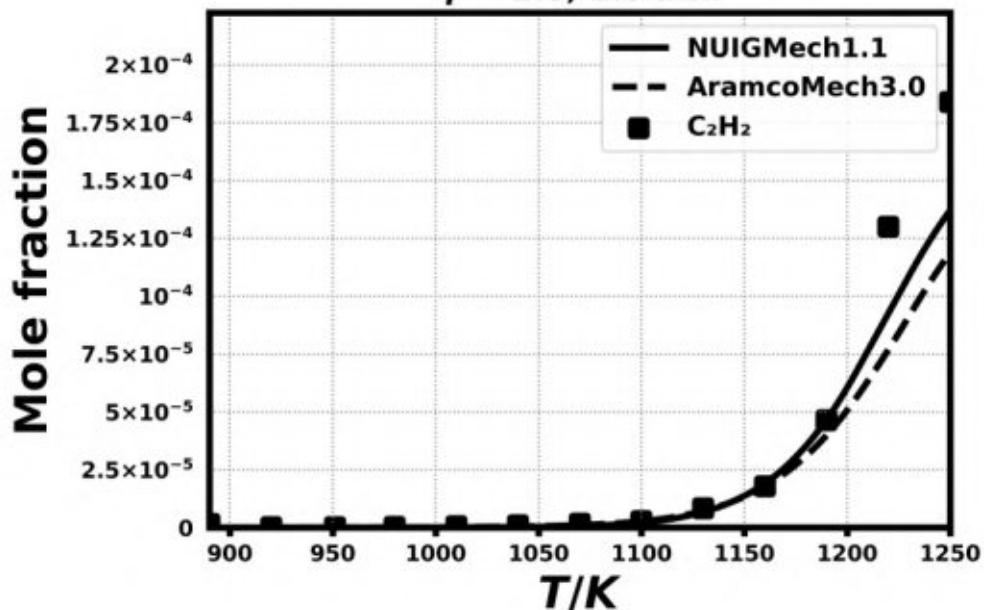
$0.192\% \text{ C}_2\text{H}_5\text{OH}$
 $0.264\% \text{ O}_2, 99.544\% \text{ N}_2$
 $\phi = 2.0, 1.0 \text{ atm}$



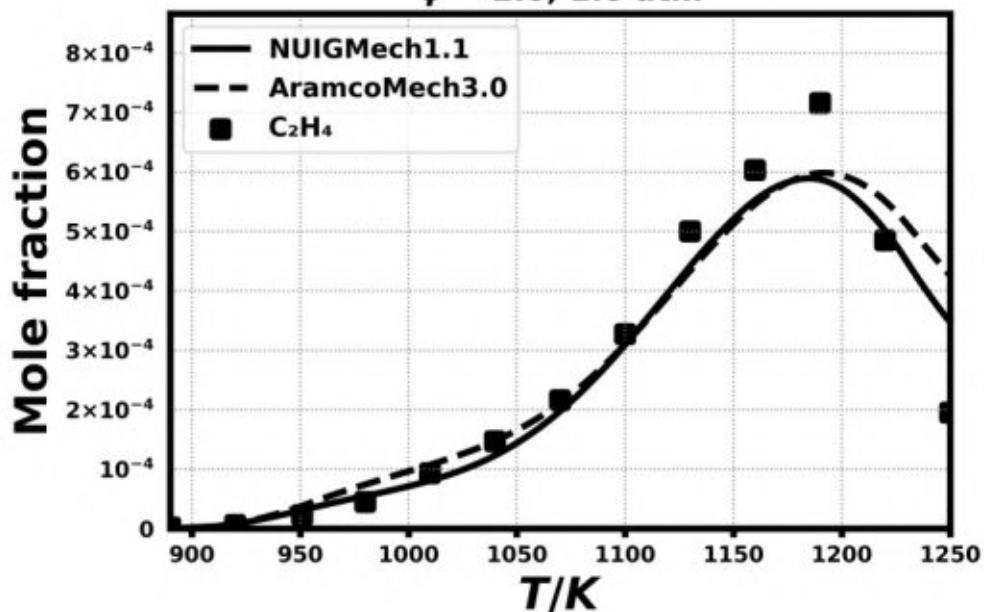
**0.192% C₂H₅OH
0.264% O₂, 99.544% N₂
 $\phi = 2.0, 1.0 \text{ atm}$**



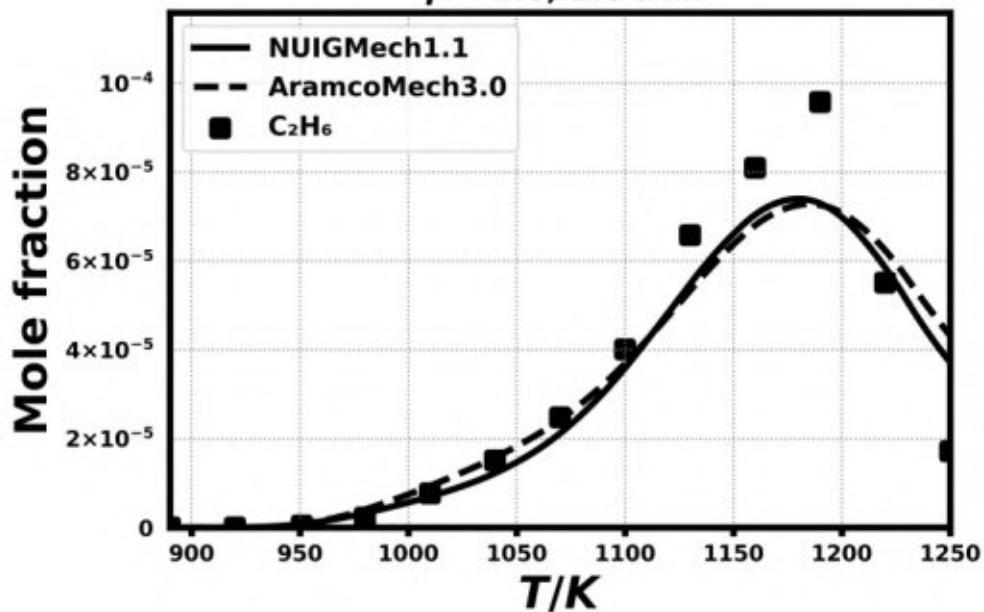
**0.192% C₂H₅OH
0.264% O₂, 99.544% N₂
 $\phi = 2.0, 1.0 \text{ atm}$**



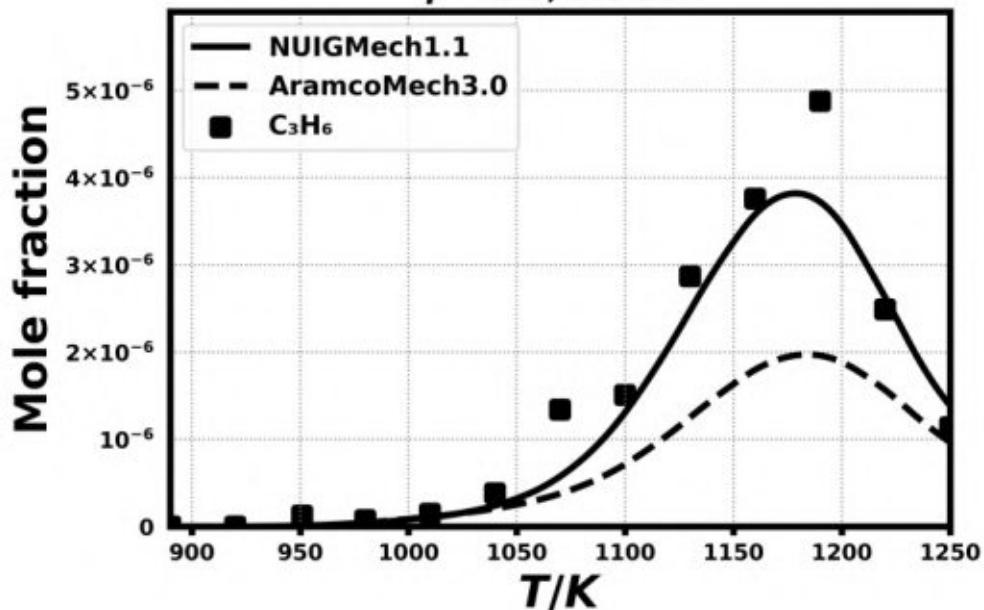
**0.192% C₂H₅OH
0.264% O₂, 99.544% N₂
 $\phi = 2.0, 1.0 \text{ atm}$**



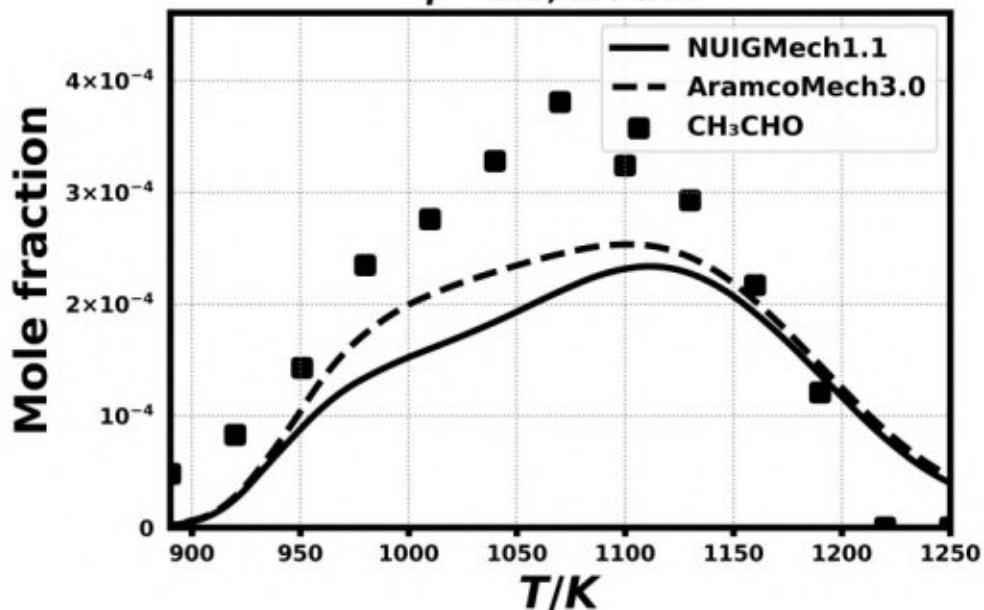
**0.192% C₂H₅OH
0.264% O₂, 99.544% N₂
 $\phi = 2.0, 1.0 \text{ atm}$**



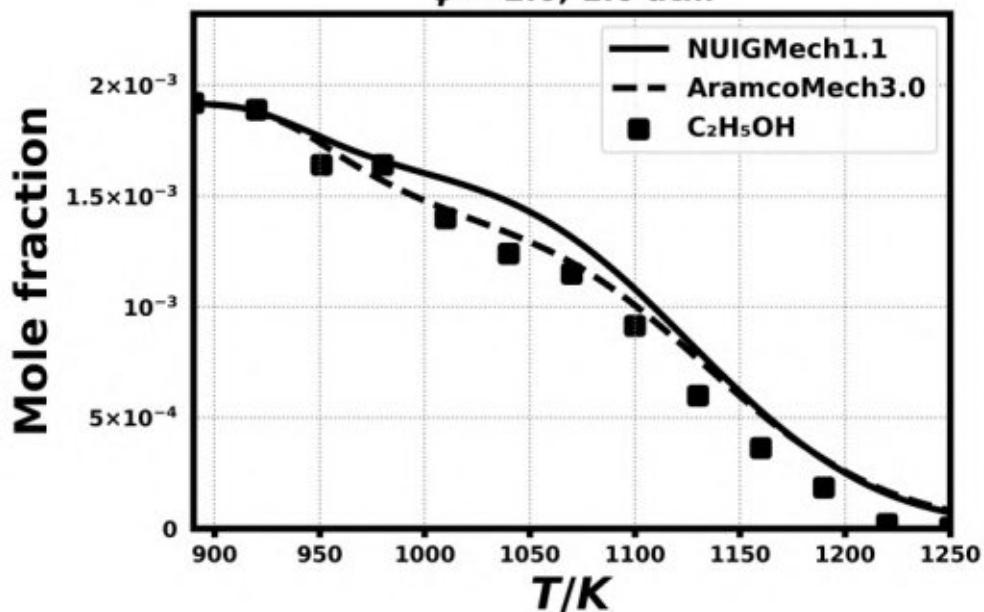
$0.192\% \text{ C}_2\text{H}_5\text{OH}$
 $0.264\% \text{ O}_2, 99.544\% \text{ N}_2$
 $\phi = 2.0, 1.0 \text{ atm}$



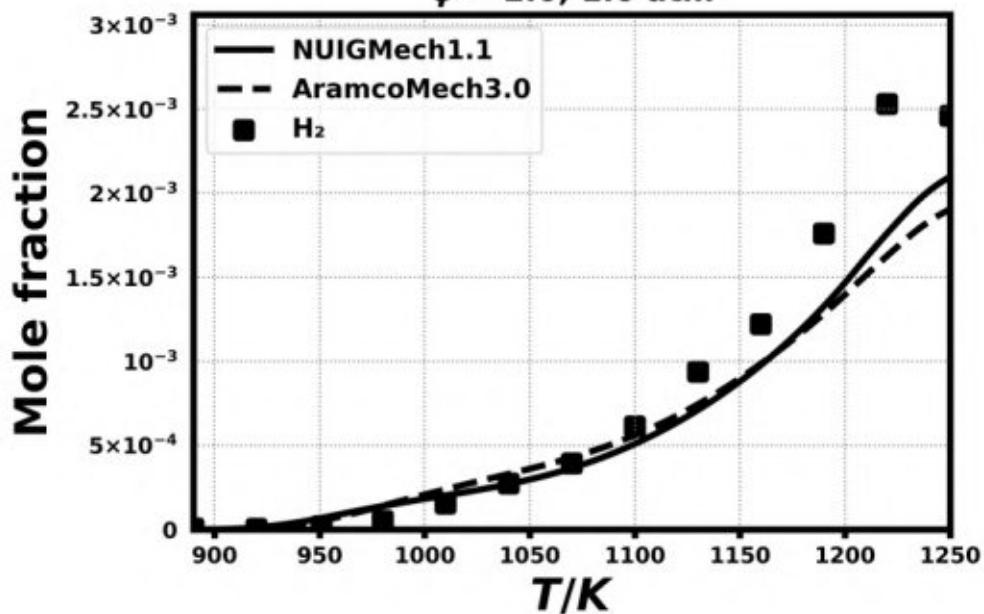
$0.192\% \text{ C}_2\text{H}_5\text{OH}$
 $0.264\% \text{ O}_2, 99.544\% \text{ N}_2$
 $\phi = 2.0, 1.0 \text{ atm}$



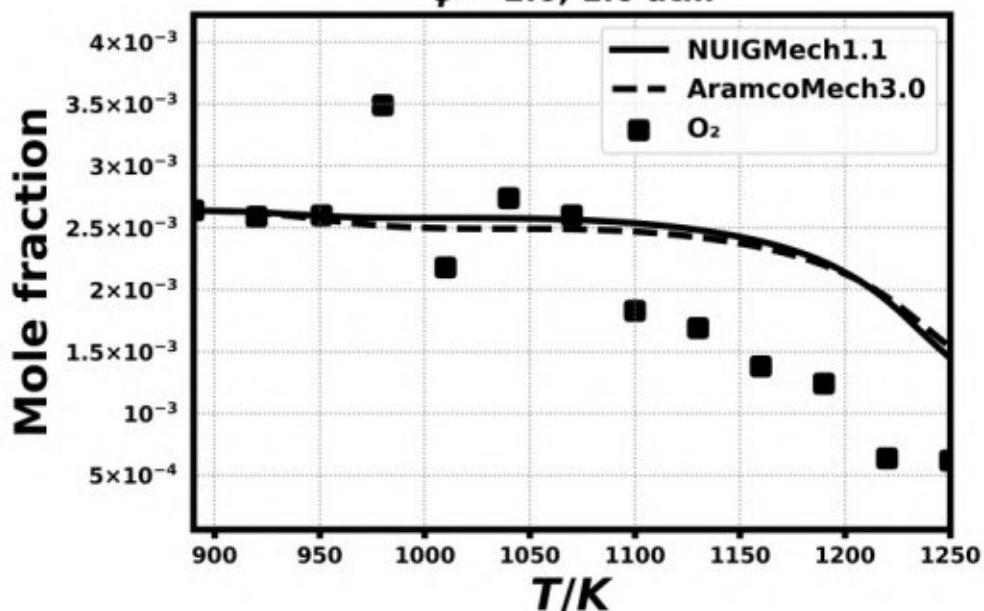
$0.192\% \text{ C}_2\text{H}_5\text{OH}$
 $0.264\% \text{ O}_2, 99.544\% \text{ N}_2$
 $\phi = 2.0, 1.0 \text{ atm}$



$0.192\% \text{ C}_2\text{H}_5\text{OH}$
 $0.264\% \text{ O}_2, 99.544\% \text{ N}_2$
 $\phi = 2.0, 1.0 \text{ atm}$



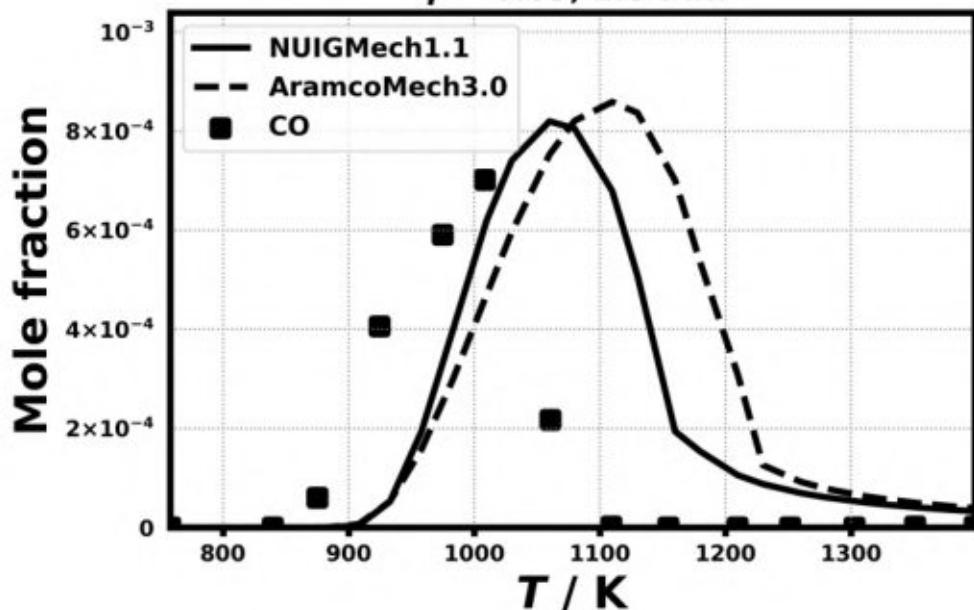
$0.192\% \text{C}_2\text{H}_5\text{OH}$
 $0.264\% \text{O}_2, 99.544\% \text{N}_2$
 $\phi = 2.0, 1.0 \text{ atm}$



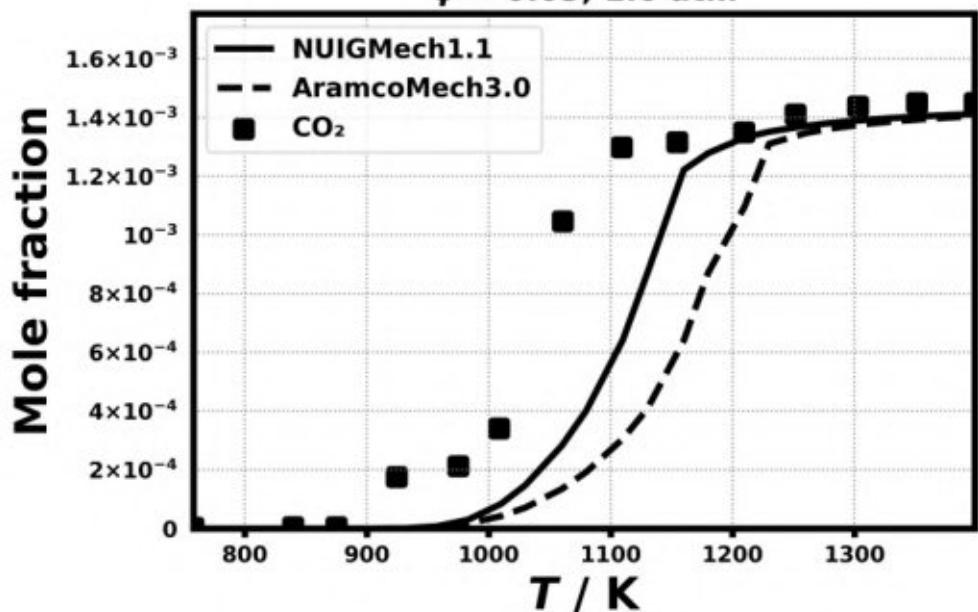
Speciation in Flow reactor

13.9) Alzueta, M. U., & Hernández, J. M., Energy & fuels, 16(1) (2002) 166-171.

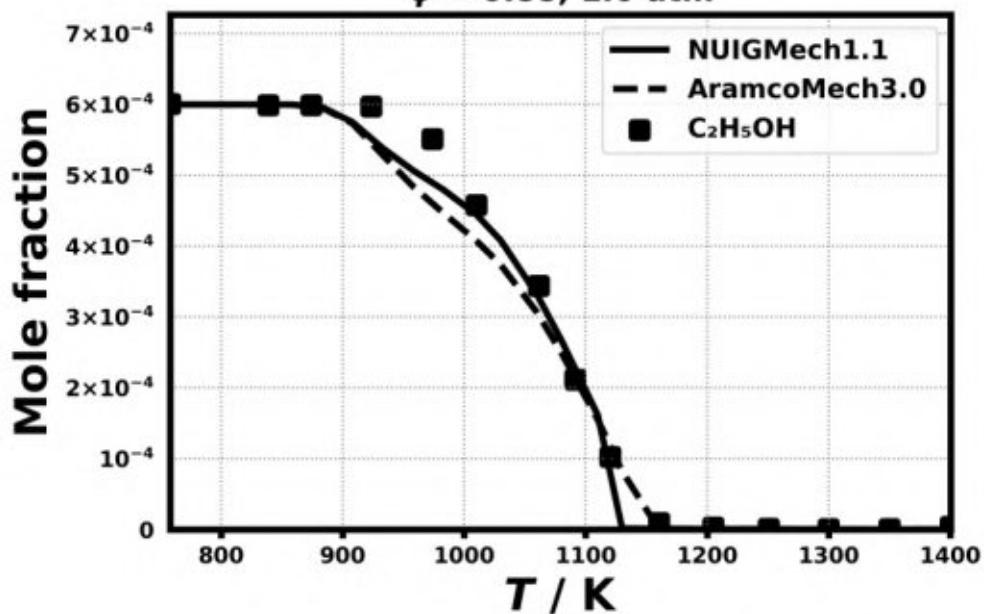
$0.072\% \text{C}_2\text{H}_5\text{OH}$
 $7.63\% \text{O}_2, 91.744\% \text{N}_2$
 $\phi = 0.03, 1.0 \text{ atm}$

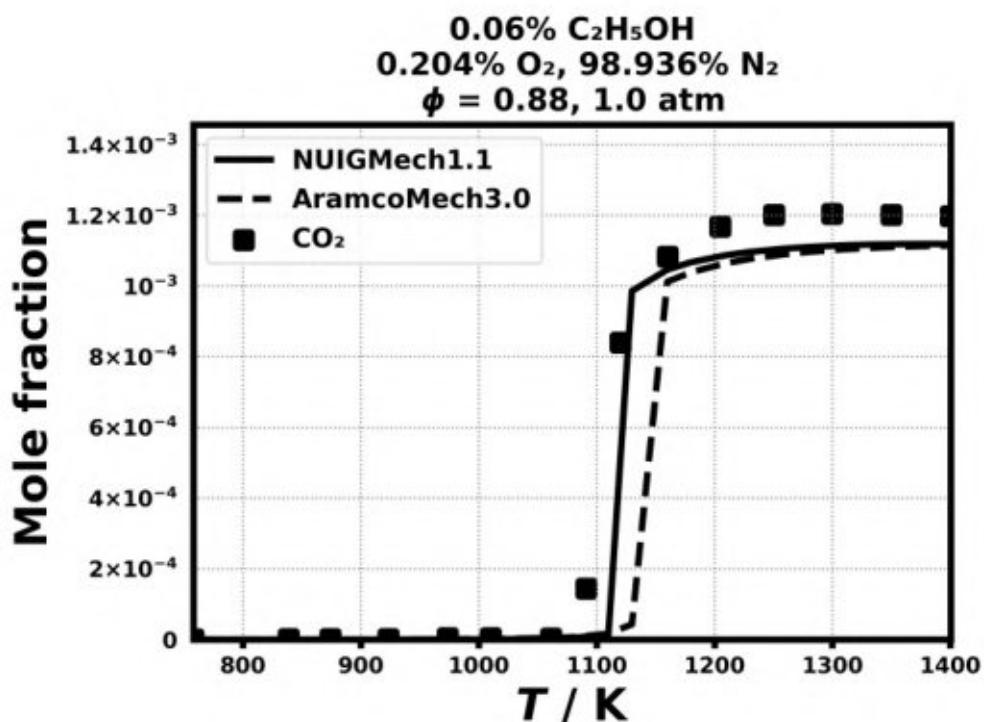
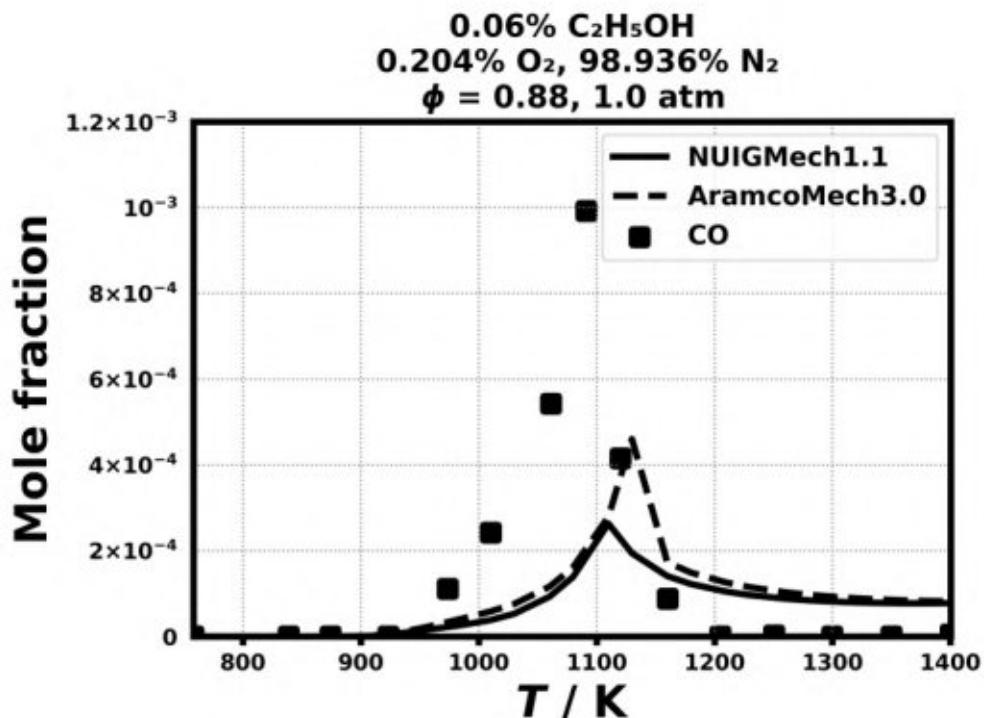


$0.072\% \text{C}_2\text{H}_5\text{OH}$
 $7.63\% \text{O}_2, 91.744\% \text{N}_2$
 $\phi = 0.03, 1.0 \text{ atm}$

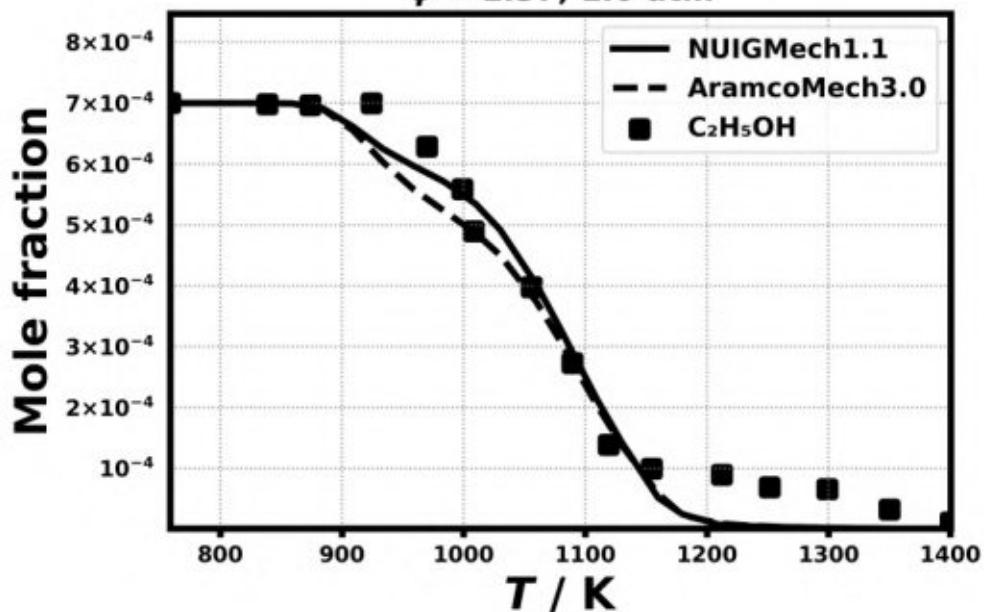


$0.06\% \text{C}_2\text{H}_5\text{OH}$
 $0.204\% \text{O}_2, 98.936\% \text{N}_2$
 $\phi = 0.88, 1.0 \text{ atm}$

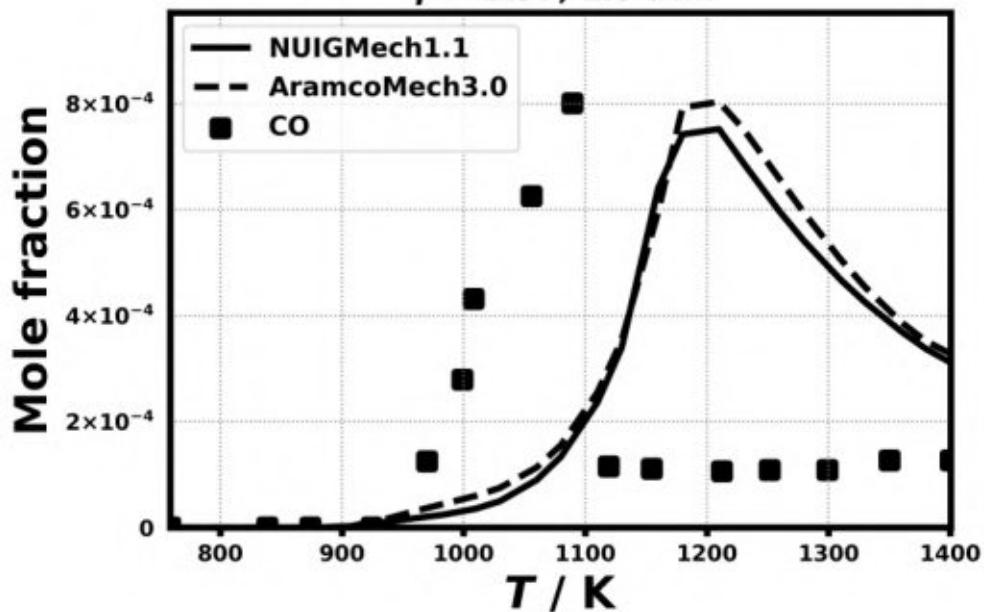




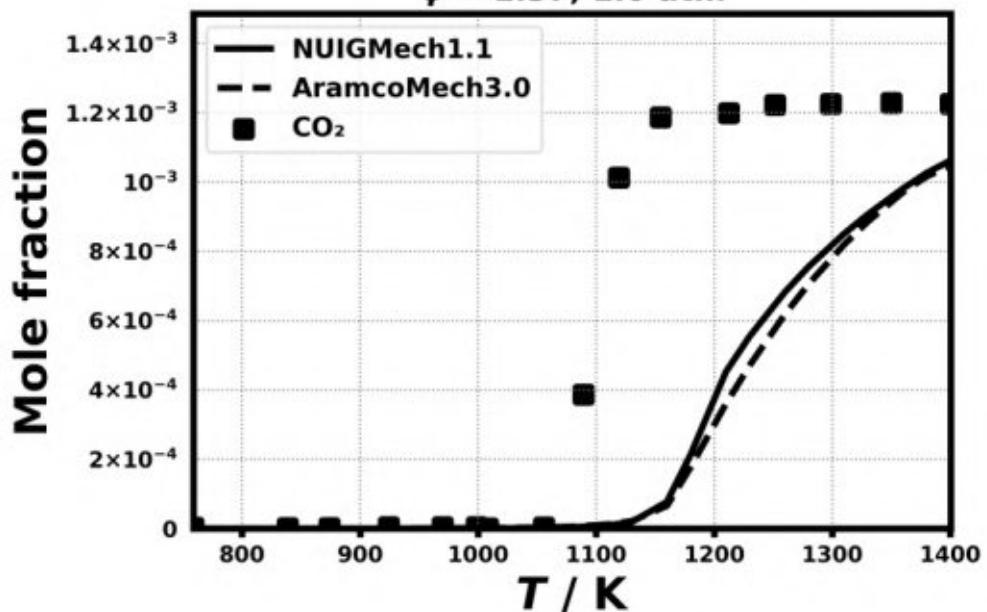
$0.07\% \text{C}_2\text{H}_5\text{OH}$
 $0.153\% \text{O}_2, 98.767\% \text{N}_2$
 $\phi = 1.37, 1.0 \text{ atm}$



$0.07\% \text{C}_2\text{H}_5\text{OH}$
 $0.153\% \text{O}_2, 98.767\% \text{N}_2$
 $\phi = 1.37, 1.0 \text{ atm}$

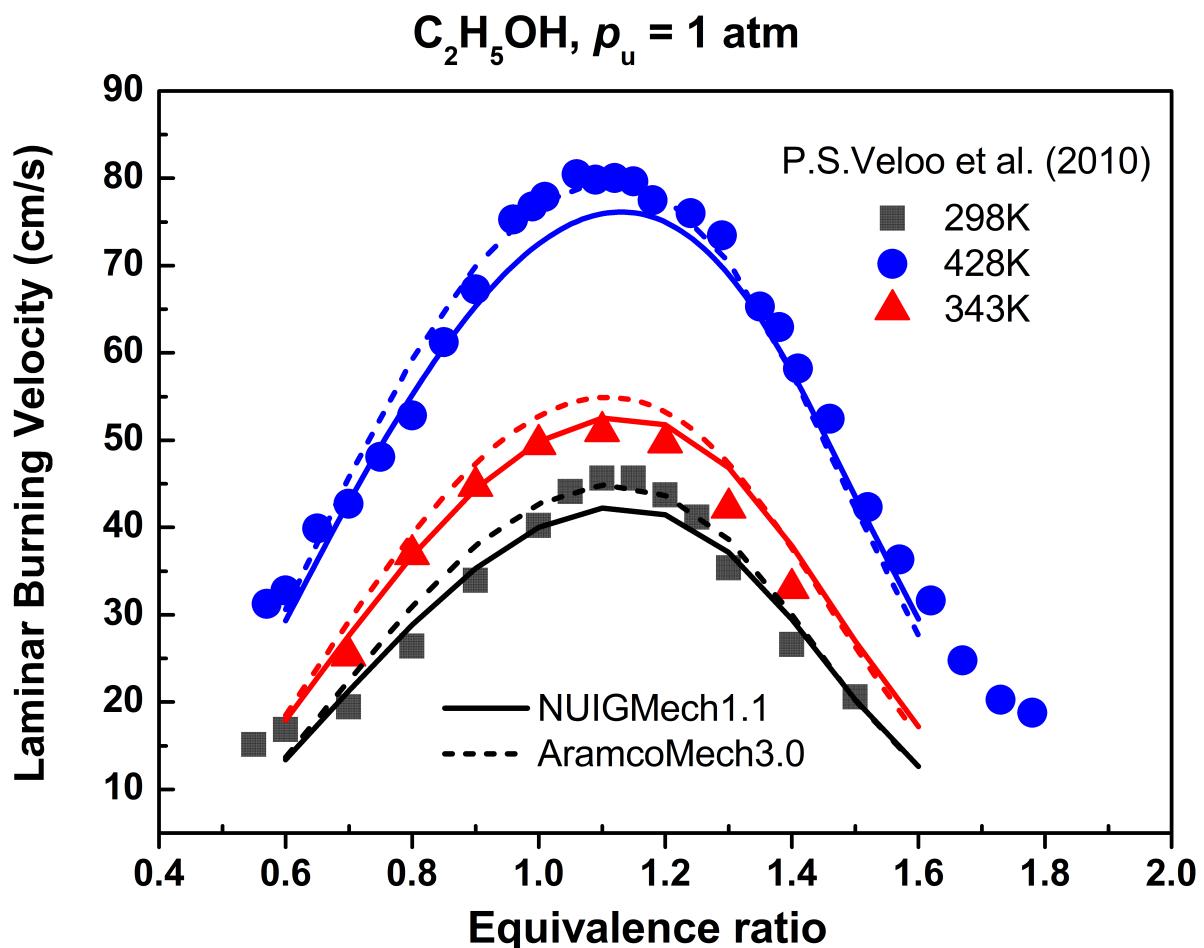


**0.07% C₂H₅OH
0.153% O₂, 98.767% N₂
 $\phi = 1.37$, 1.0 atm**



Laminar flame speed

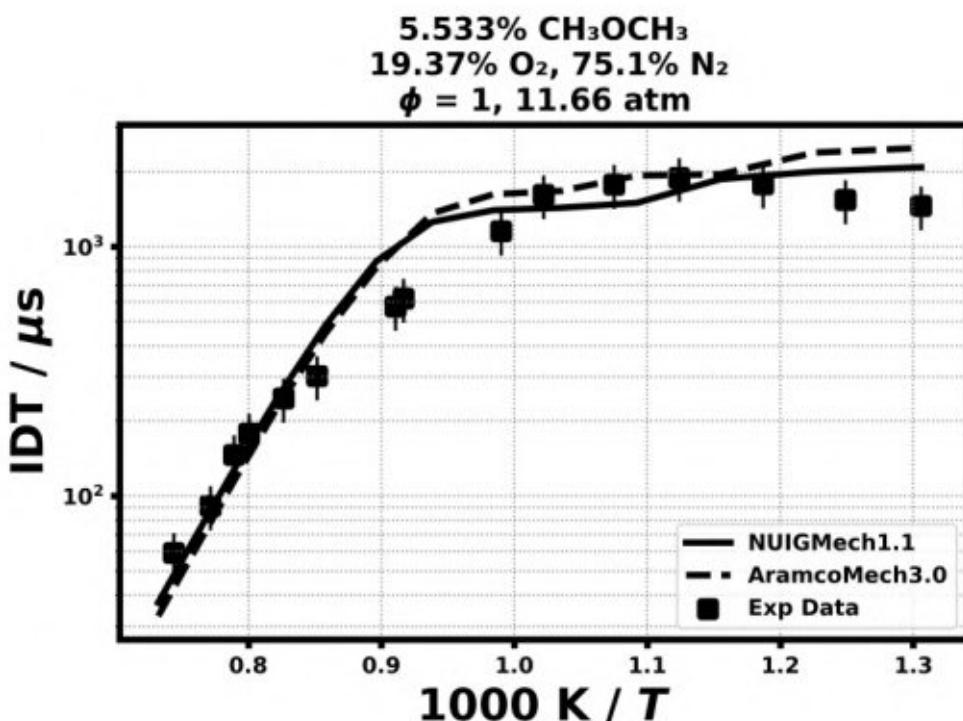
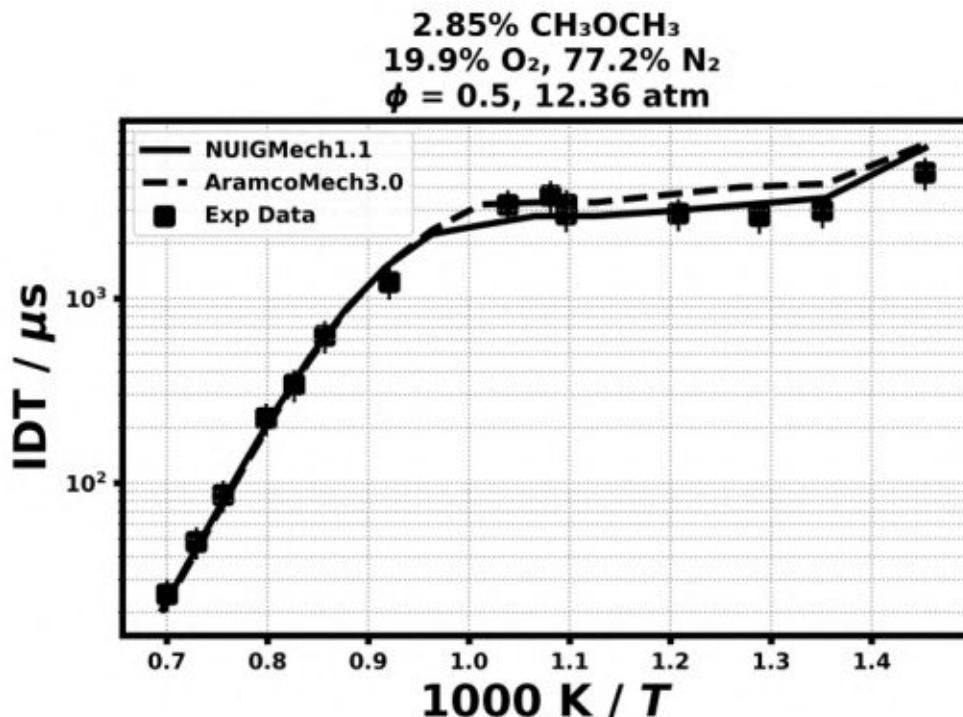
13.10) P. S. Veloo, Y. L. Wang, F. N. Egolfopoulos, C. K. Westbrook, Combustion and Flame 157 (2010) 1989–2004.

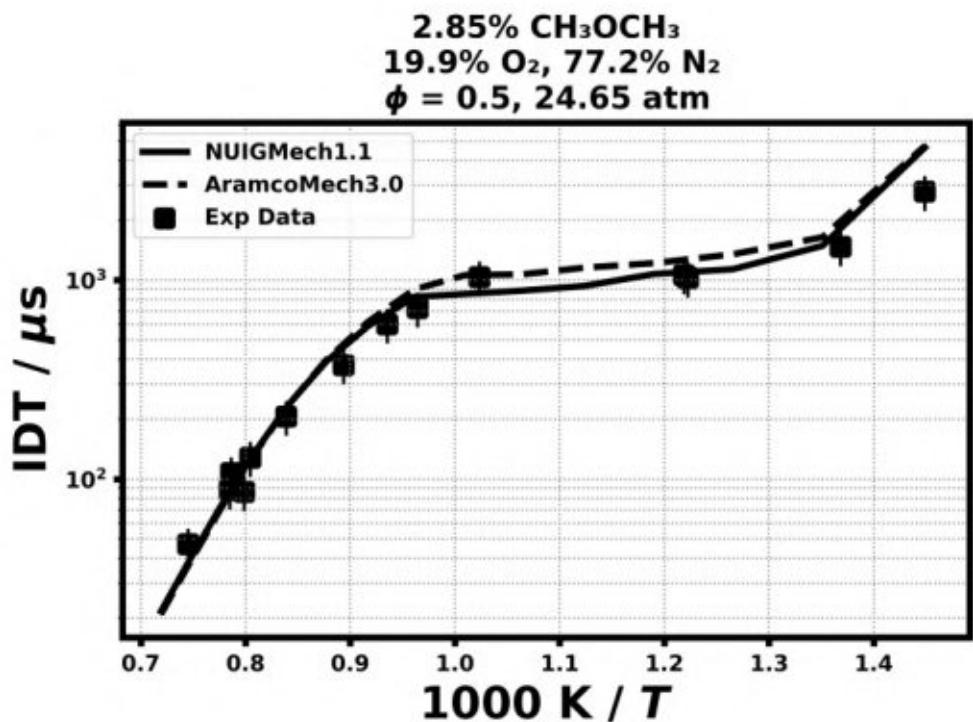
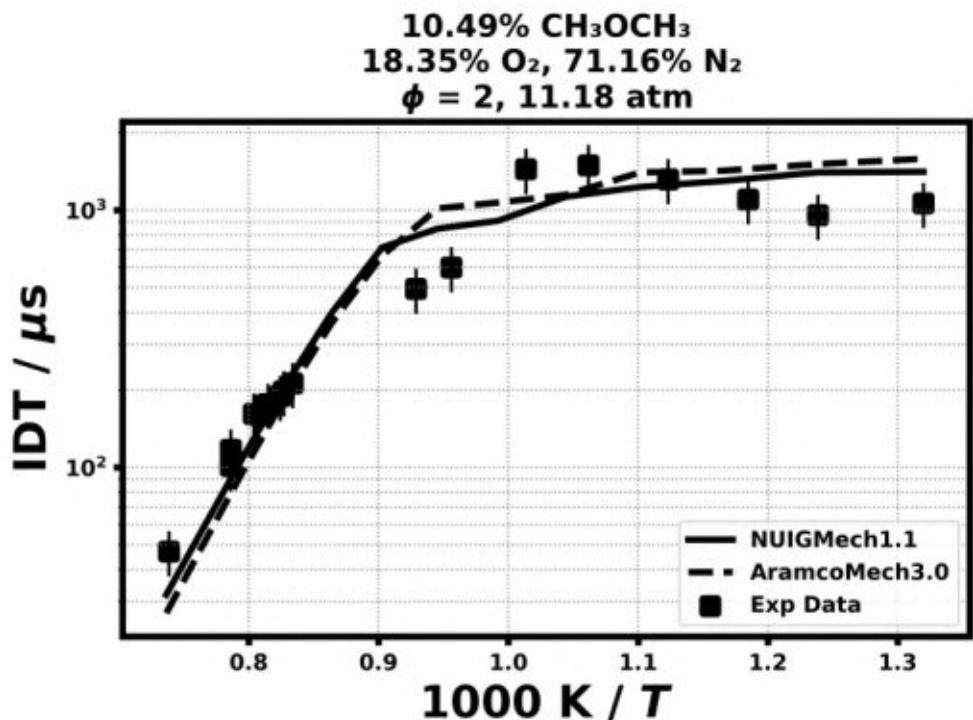


14. Validation for CH_3OCH_3

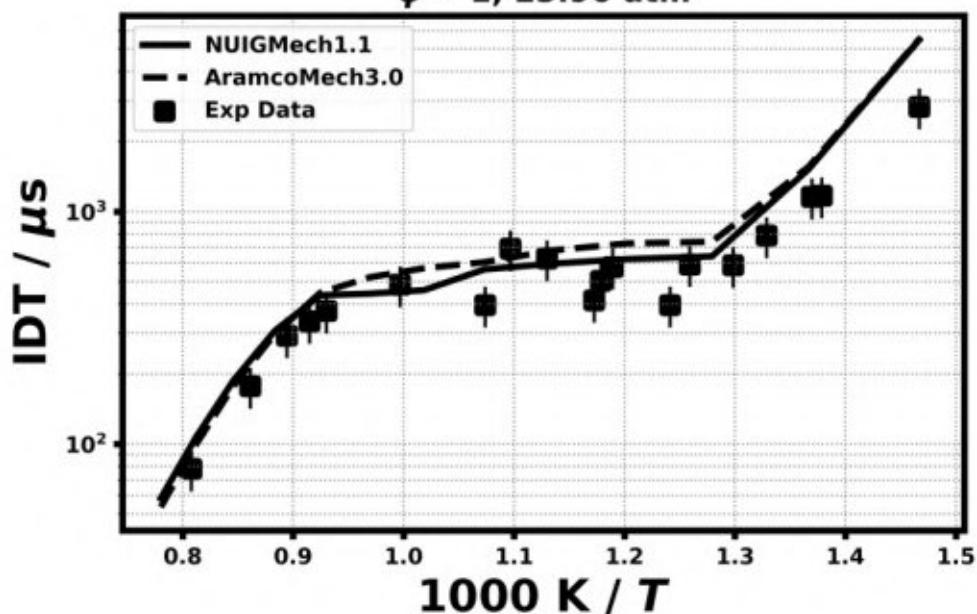
Shock tube ignition delay time

14.1) U. Burke, Combustion and flame 162, (2015) 315-330.

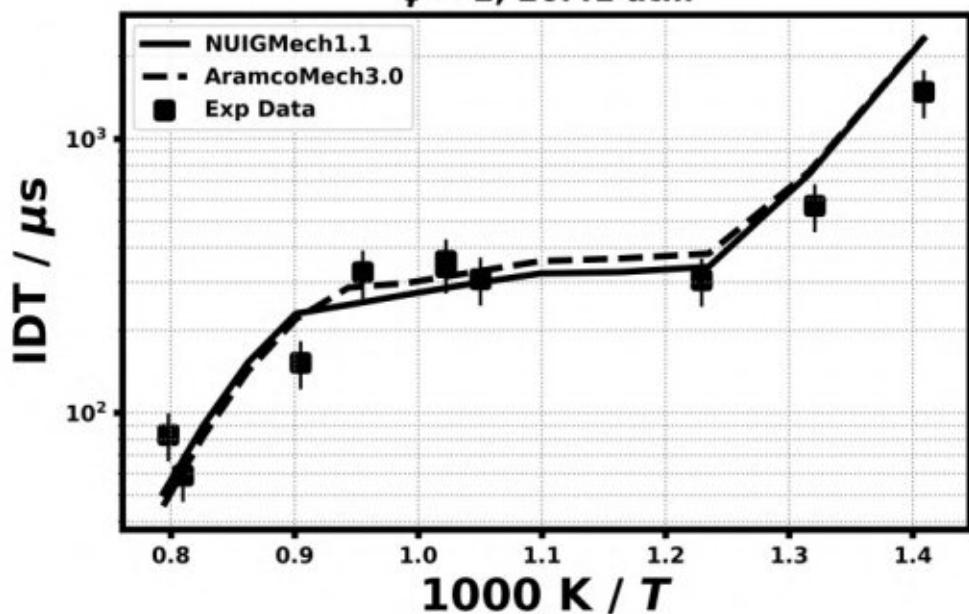


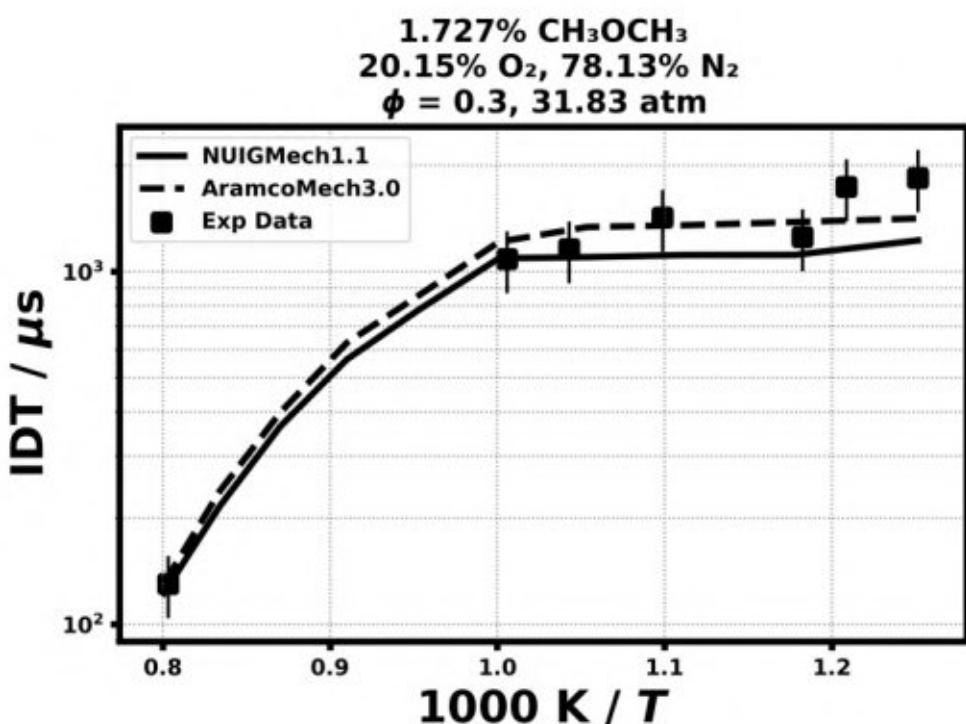
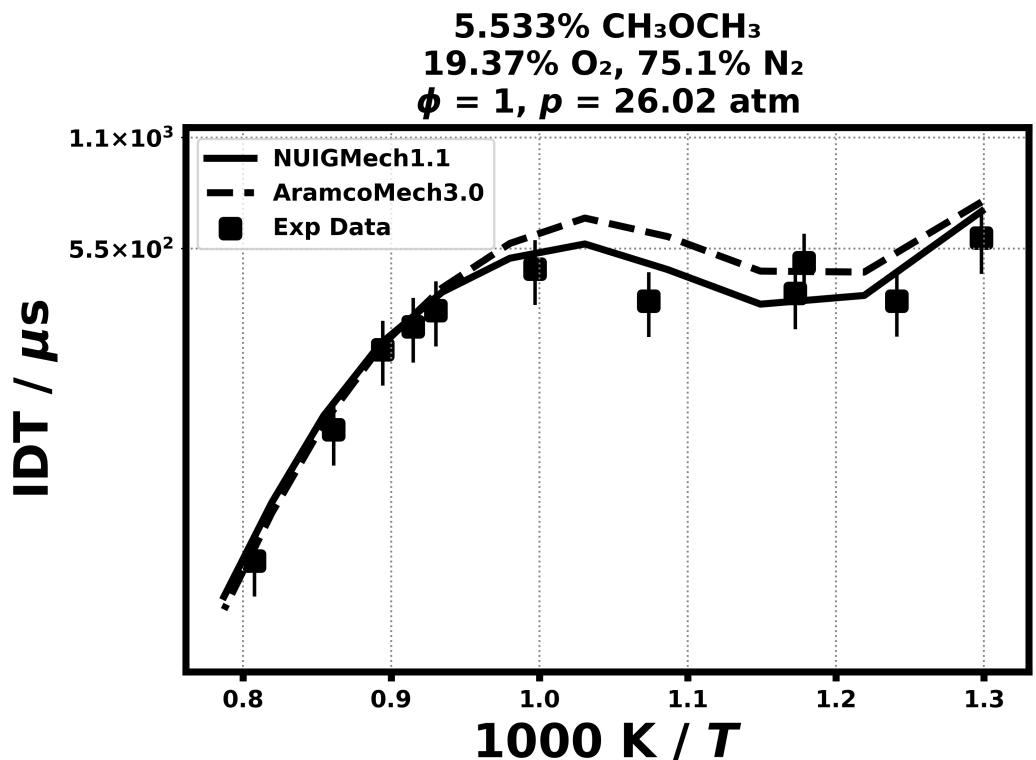


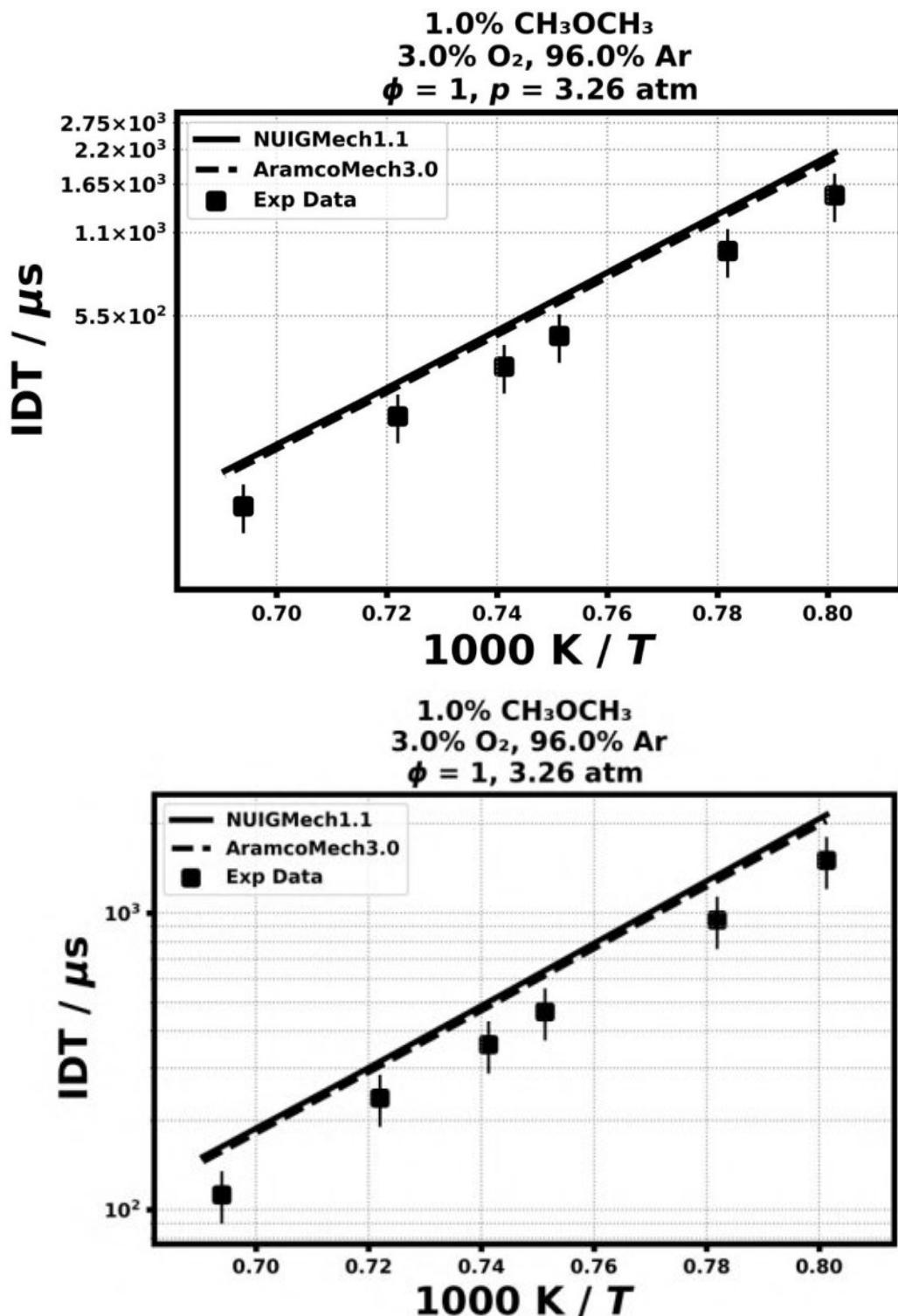
5.533% CH₃OCH₃
19.37% O₂, 75.1% N₂
 $\phi = 1, 23.96 \text{ atm}$

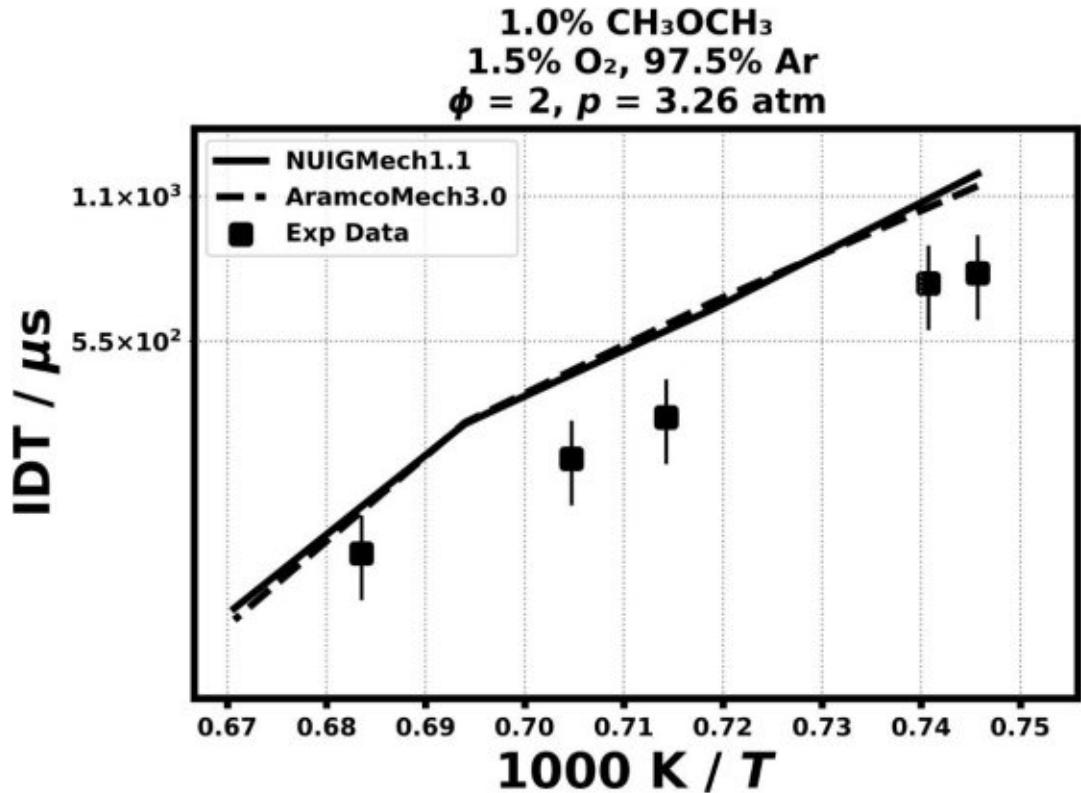


10.49% CH₃OCH₃
18.35% O₂, 71.16% N₂
 $\phi = 2, 26.41 \text{ atm}$

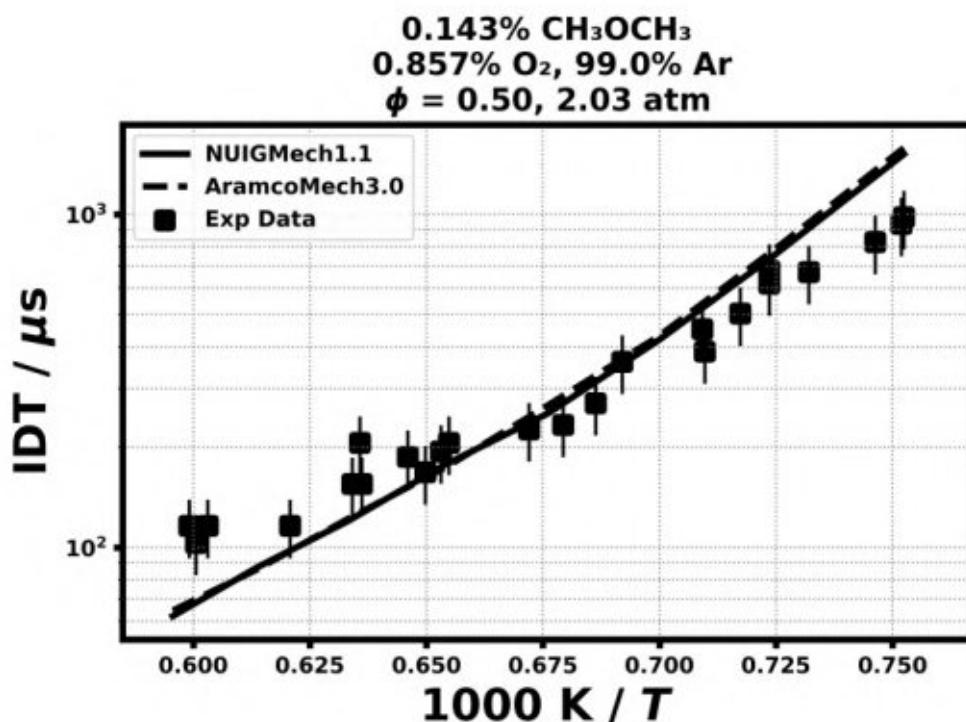




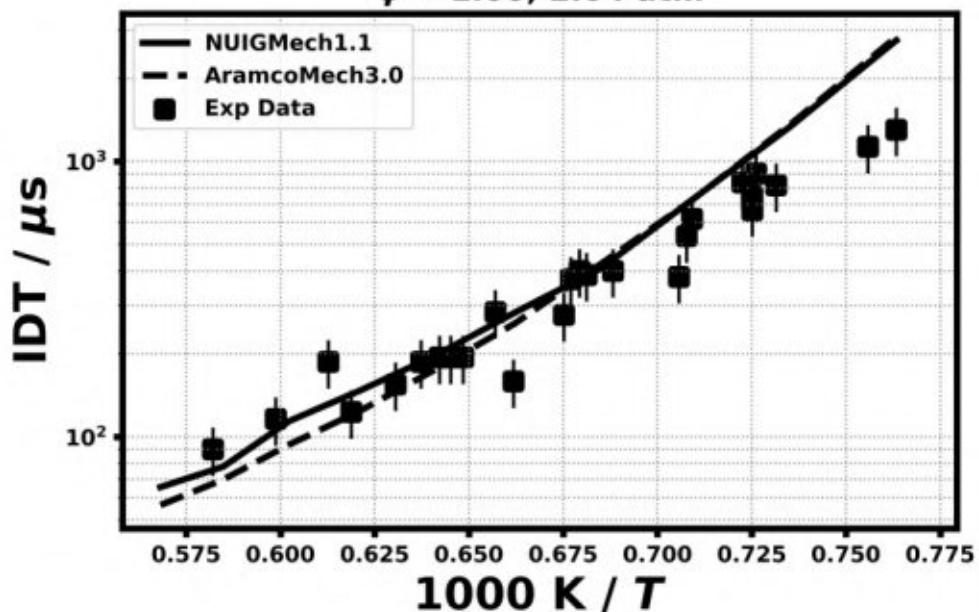




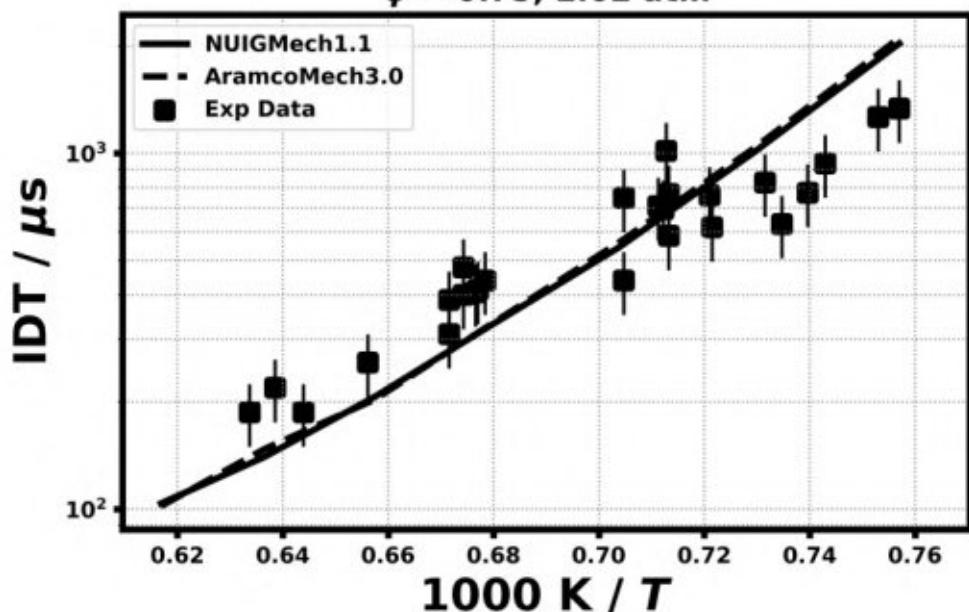
14.3) R. D. Cook, Proceedings of the Combustion Institute 32, (2009) 189-196.



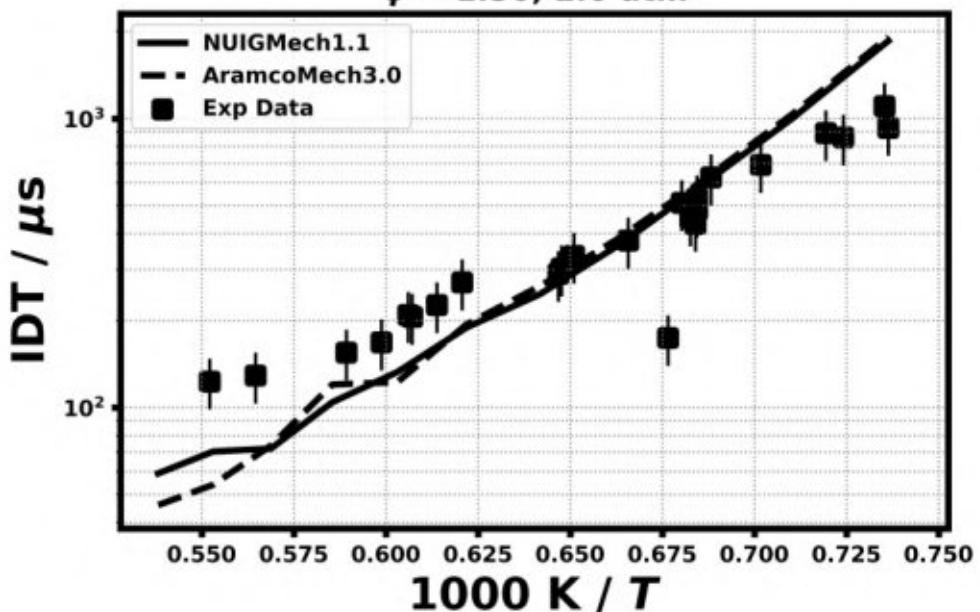
0.25% CH₃OCH₃
0.75% O₂, 99.0% Ar
 $\phi = 1.00, 2.04 \text{ atm}$



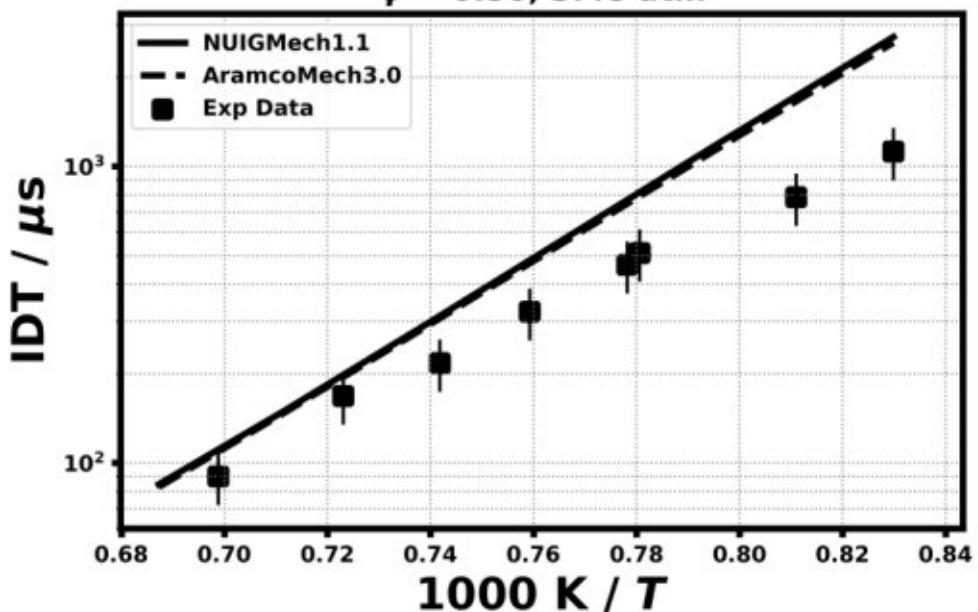
0.2% CH₃OCH₃
0.8% O₂, 99.0% Ar
 $\phi = 0.75, 2.02 \text{ atm}$



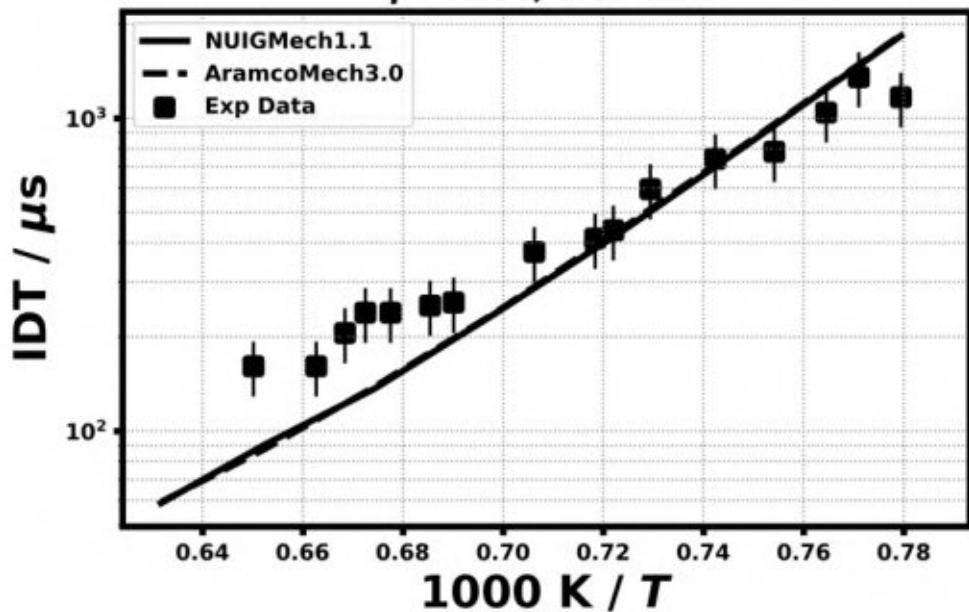
0.333% CH₃OCH₃
0.667% O₂, 99.0% Ar
 $\phi = 1.50, 2.0 \text{ atm}$



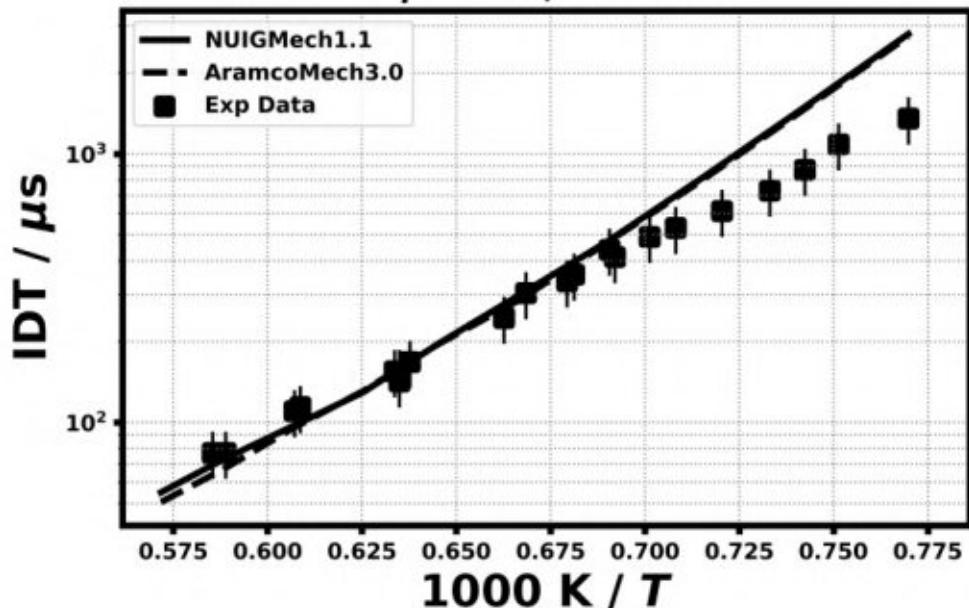
1.0% CH₃OCH₃
6.0% O₂, 93.0% Ar
 $\phi = 0.50, 3.48 \text{ atm}$



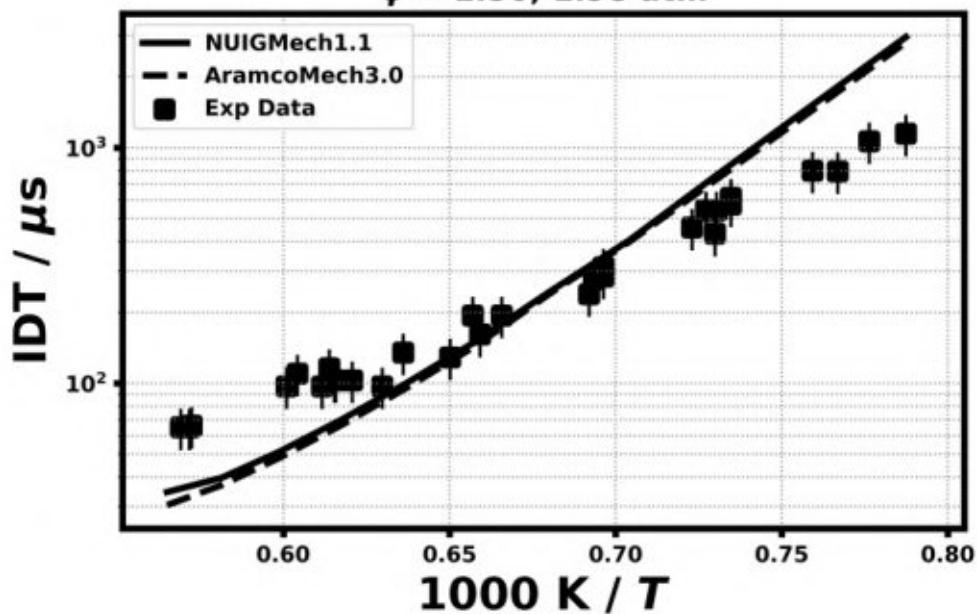
0.5% CH_3OCH_3
3.0% O_2 , 96.5% Ar
 $\phi = 0.50, 2.07 \text{ atm}$



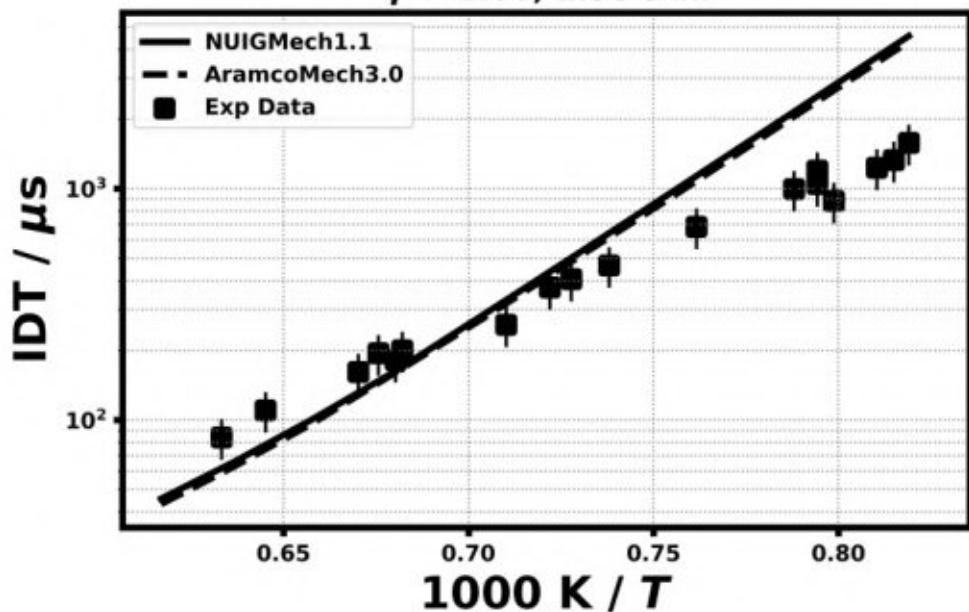
1.0% CH_3OCH_3
1.5% O_2 , 97.5% Ar
 $\phi = 2.00, 2.0 \text{ atm}$



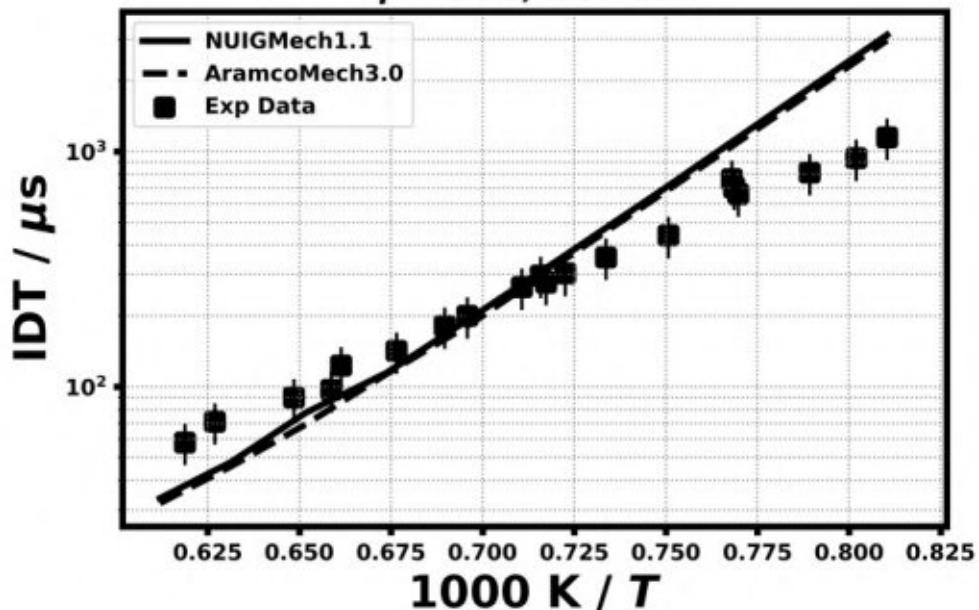
1.0% CH₃OCH₃
2.0% O₂, 97.0% Ar
 $\phi = 1.50, 1.98 \text{ atm}$



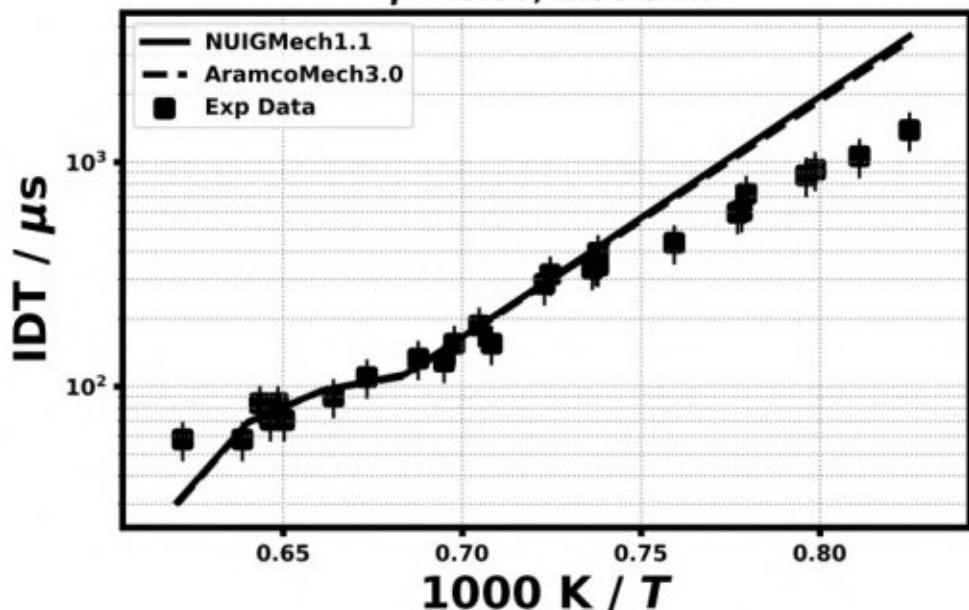
1.0% CH₃OCH₃
3.0% O₂, 96.0% Ar
 $\phi = 1.00, 1.98 \text{ atm}$



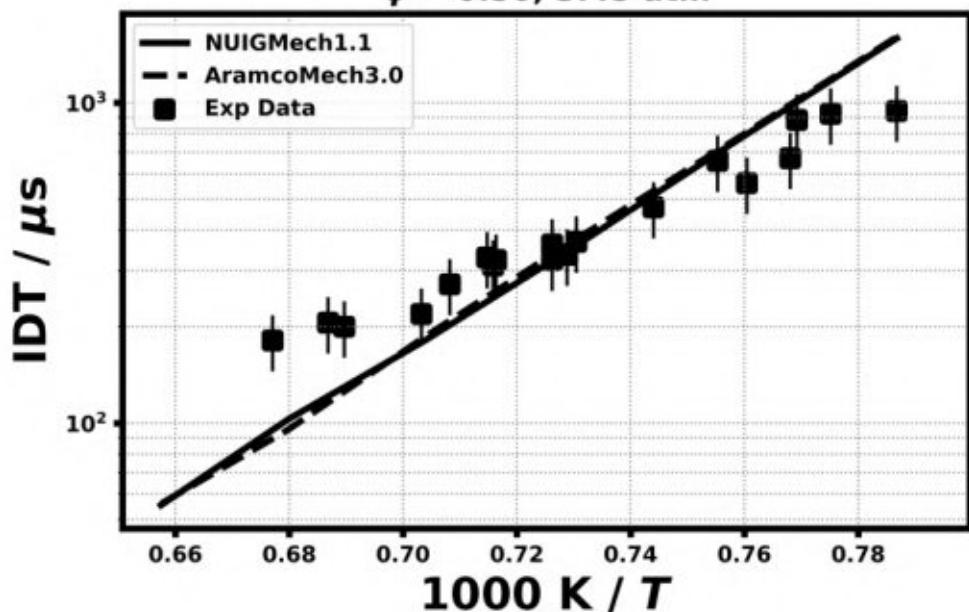
1.0% CH₃OCH₃
4.0% O₂, 95.0% Ar
 $\phi = 0.75, 1.97 \text{ atm}$



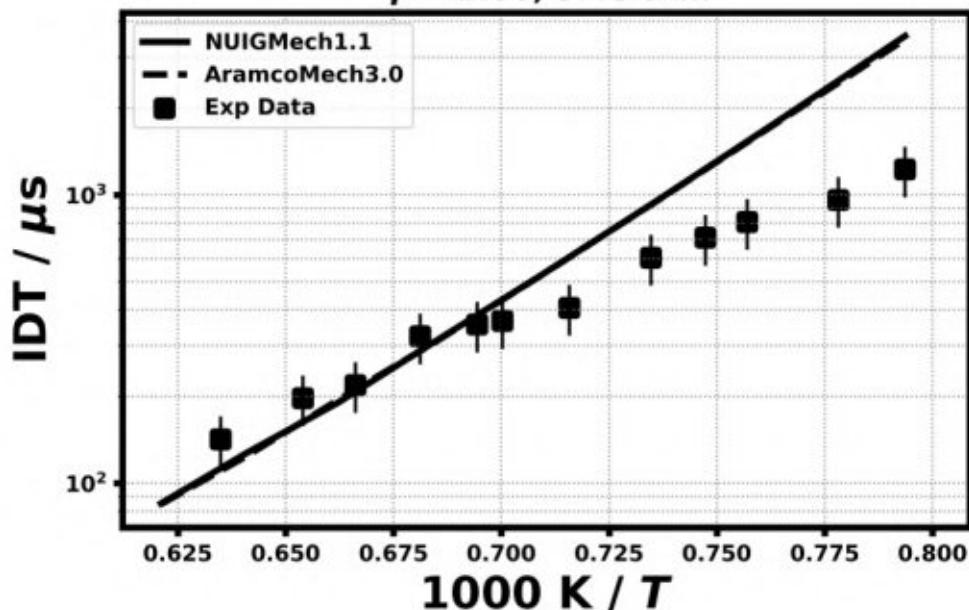
1.0% CH₃OCH₃
6.0% O₂, 93.0% Ar
 $\phi = 0.50, 1.95 \text{ atm}$



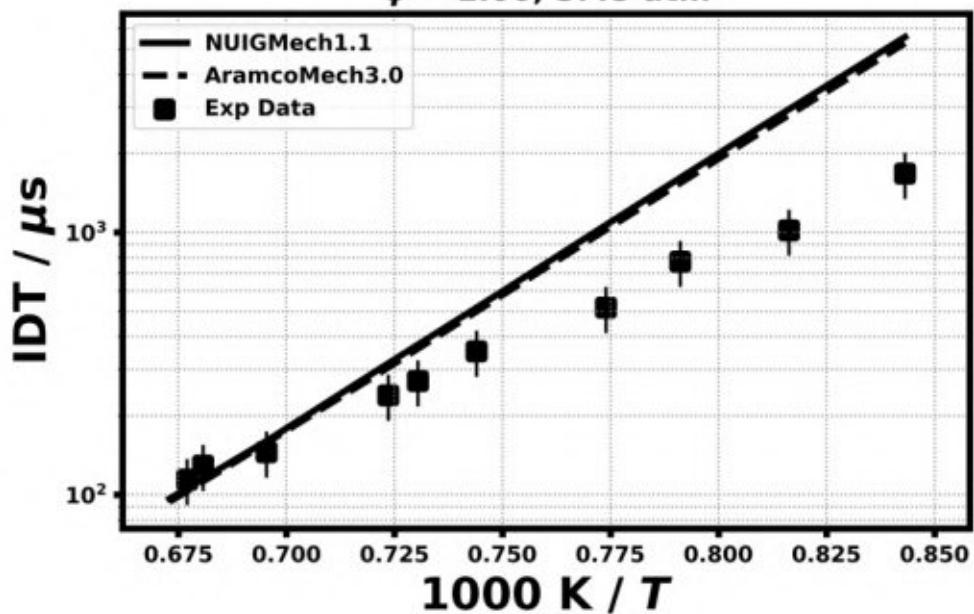
$0.5\% \text{CH}_3\text{OCH}_3$
 $3.0\% \text{O}_2, 96.5\% \text{Ar}$
 $\phi = 0.50, 3.45 \text{ atm}$



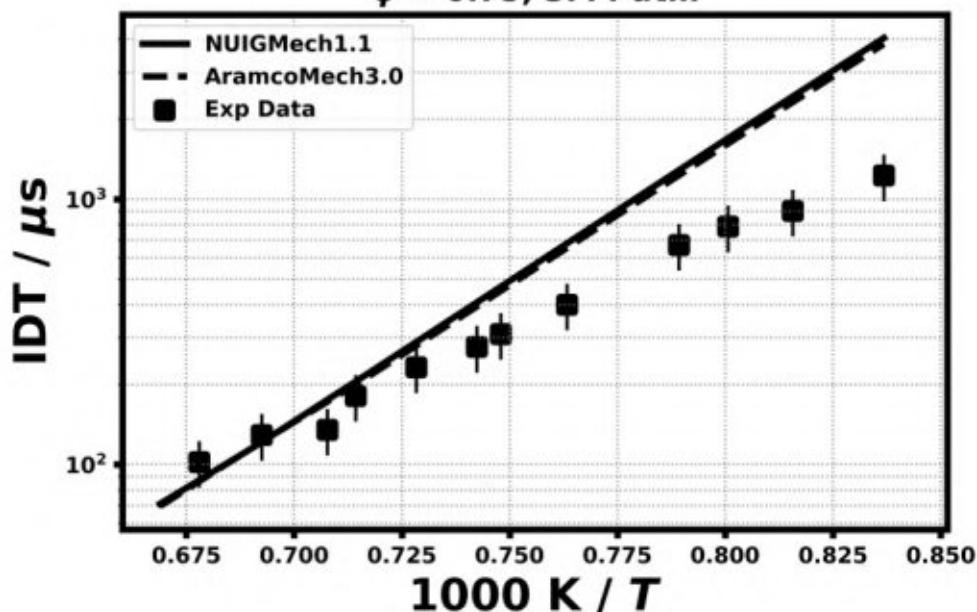
$1.0\% \text{CH}_3\text{OCH}_3$
 $1.5\% \text{O}_2, 97.5\% \text{Ar}$
 $\phi = 2.00, 3.43 \text{ atm}$



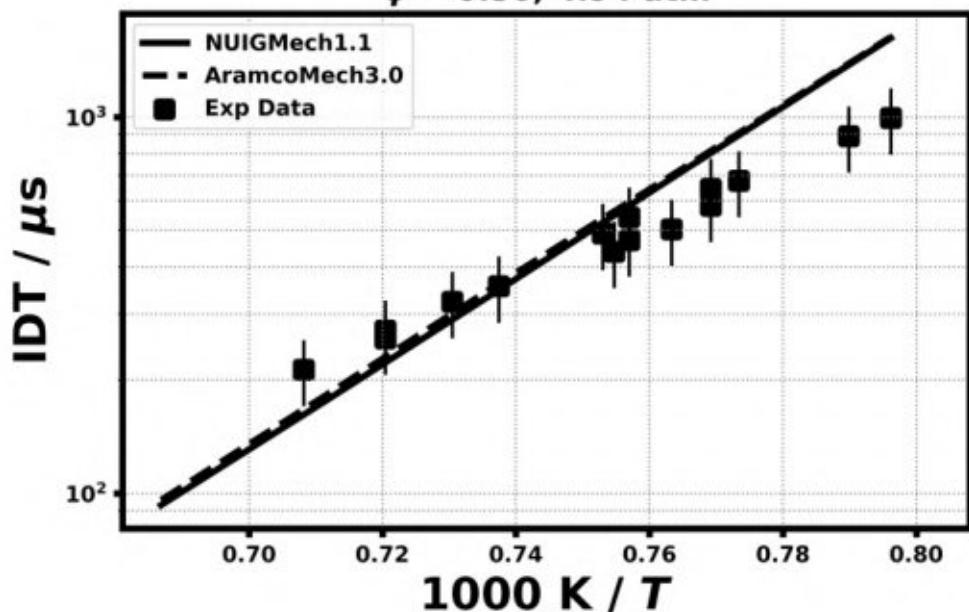
1.0% CH₃OCH₃
3.0% O₂, 96.0% Ar
 $\phi = 1.00, 3.45 \text{ atm}$



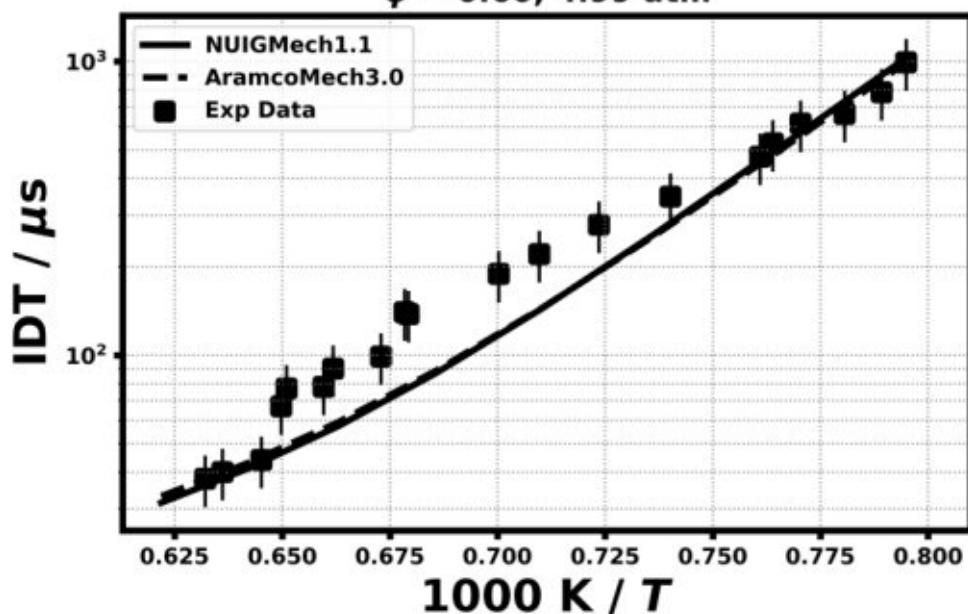
1.0% CH₃OCH₃
4.0% O₂, 95.0% Ar
 $\phi = 0.75, 3.44 \text{ atm}$

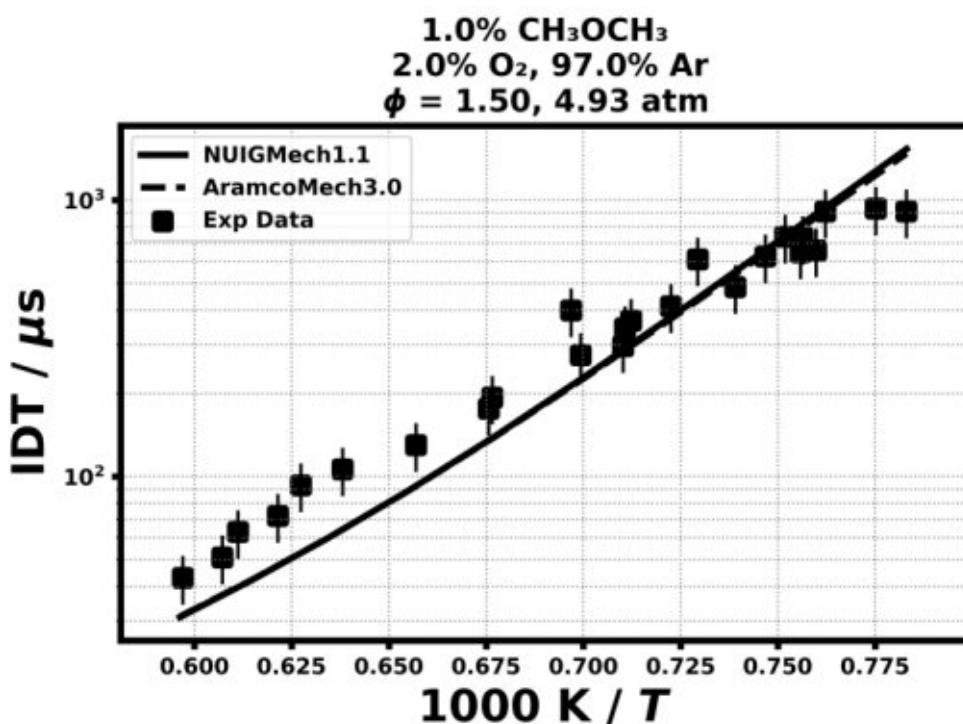
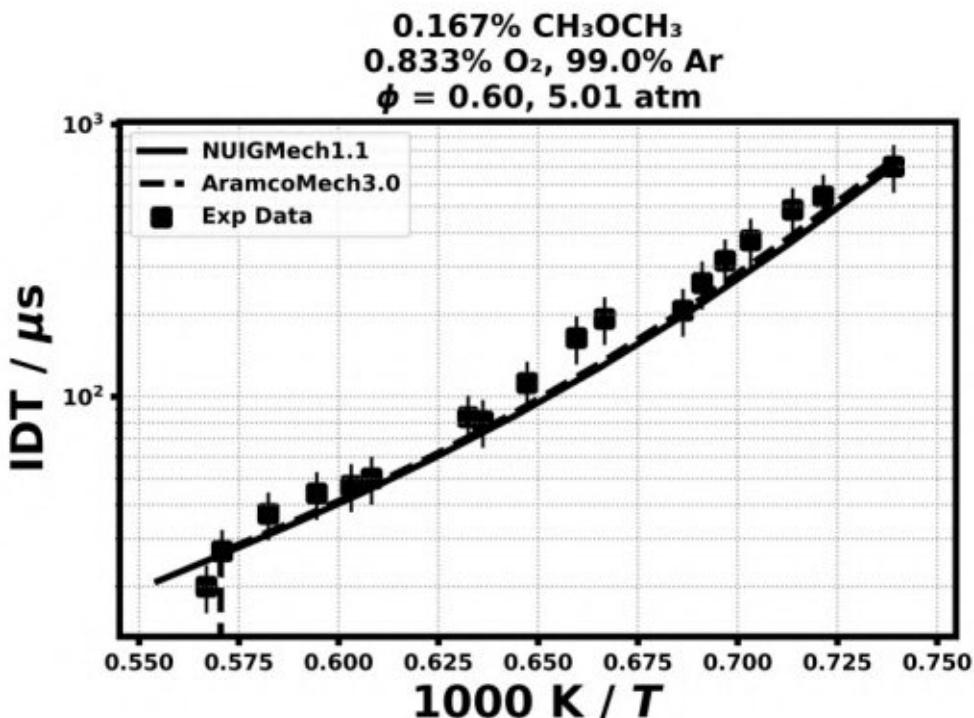


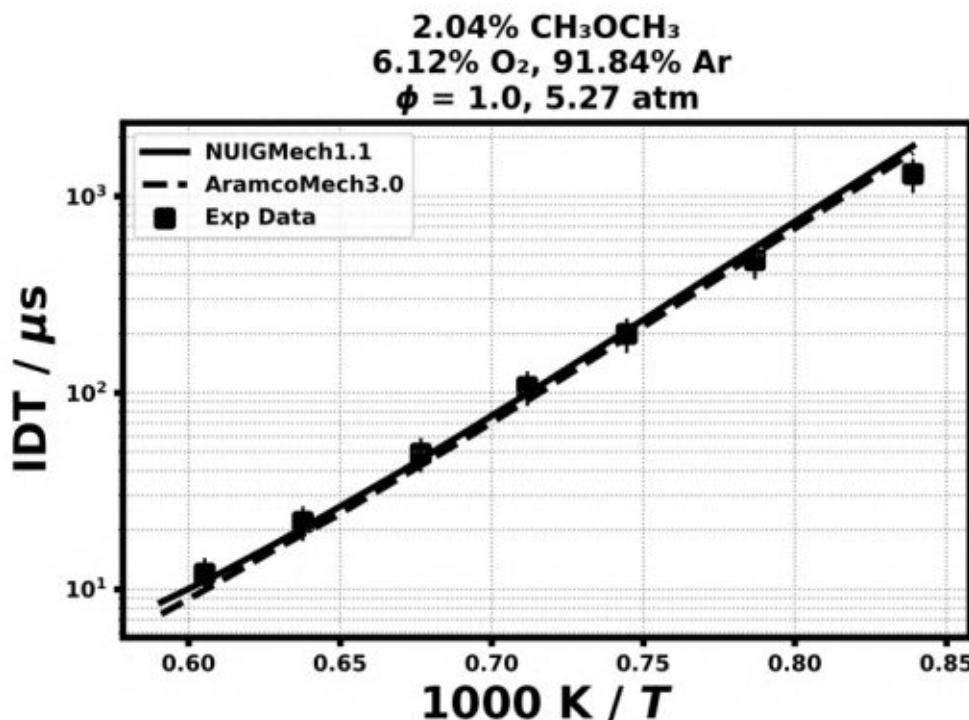
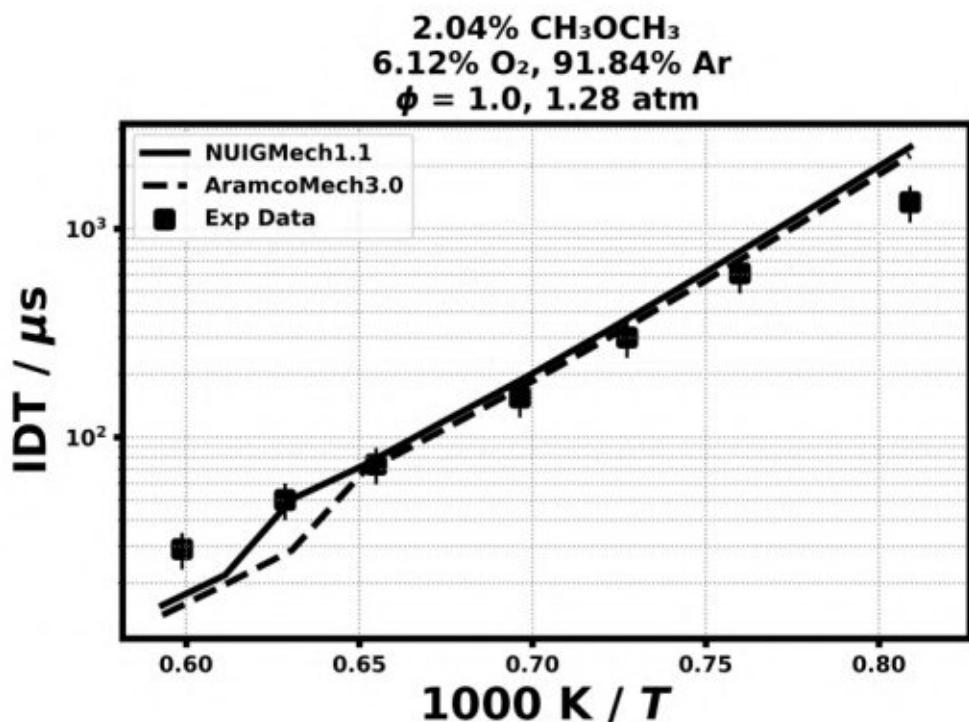
0.5% CH₃OCH₃
3.0% O₂, 96.5% Ar
 $\phi = 0.50, 4.94 \text{ atm}$



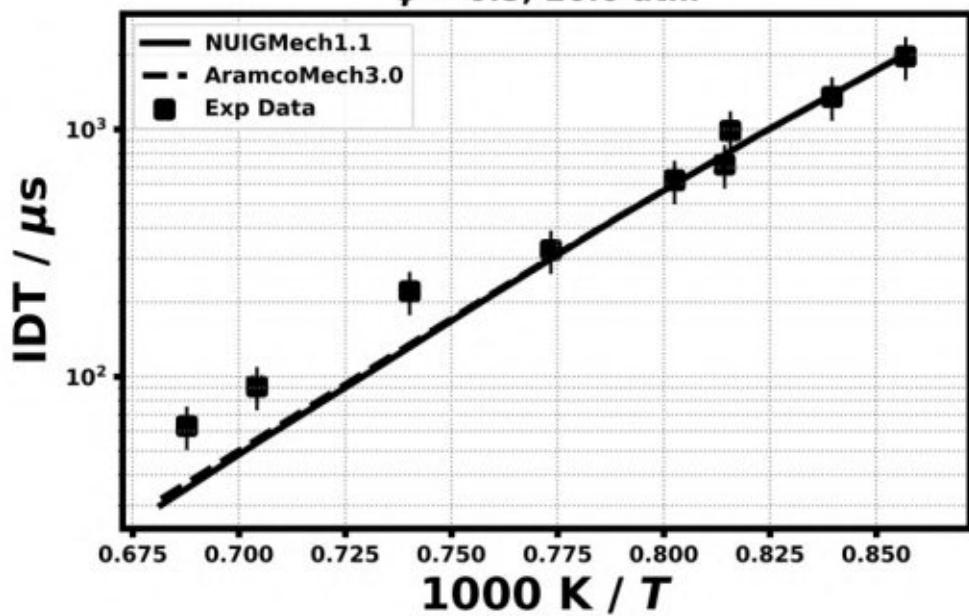
1.0% CH₃OCH₃
5.0% O₂, 94.0% Ar
 $\phi = 0.60, 4.99 \text{ atm}$



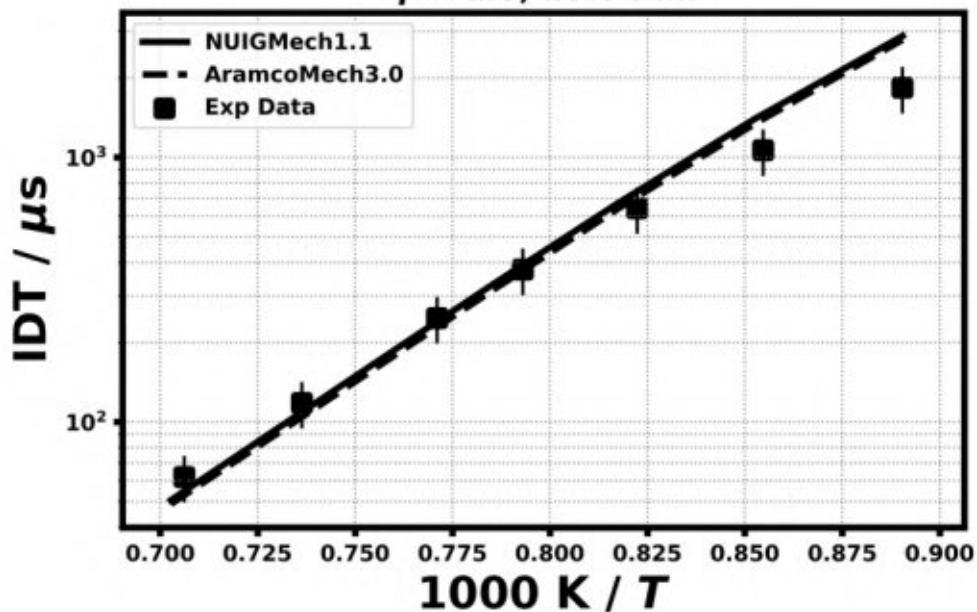




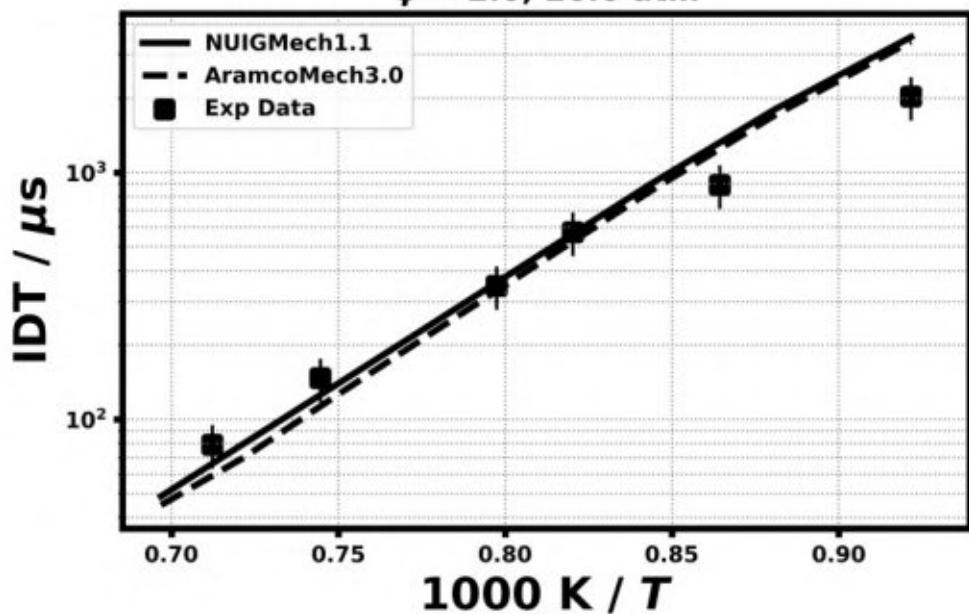
0.68% CH₃OCH₃
4.06% O₂, 95.27% Ar
 $\phi = 0.5, 20.0 \text{ atm}$



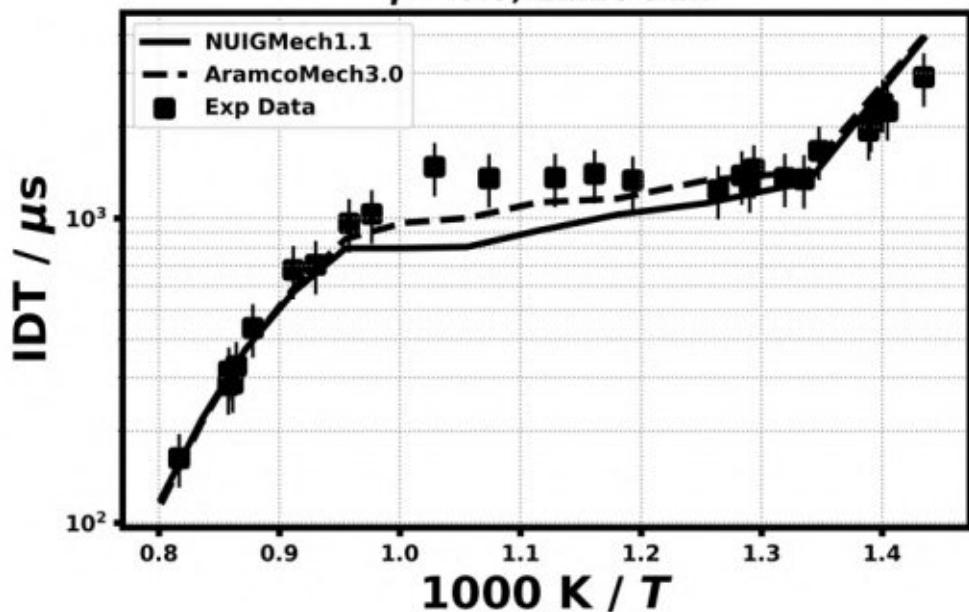
1.31% CH₃OCH₃
3.93% O₂, 94.77% Ar
 $\phi = 1.0, 20.0 \text{ atm}$

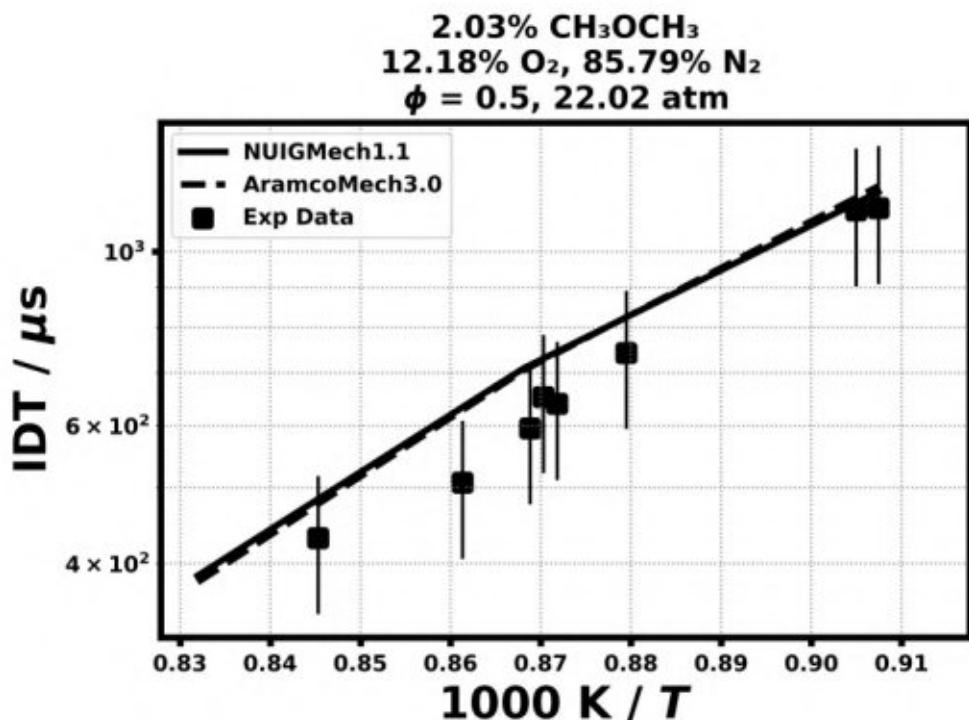
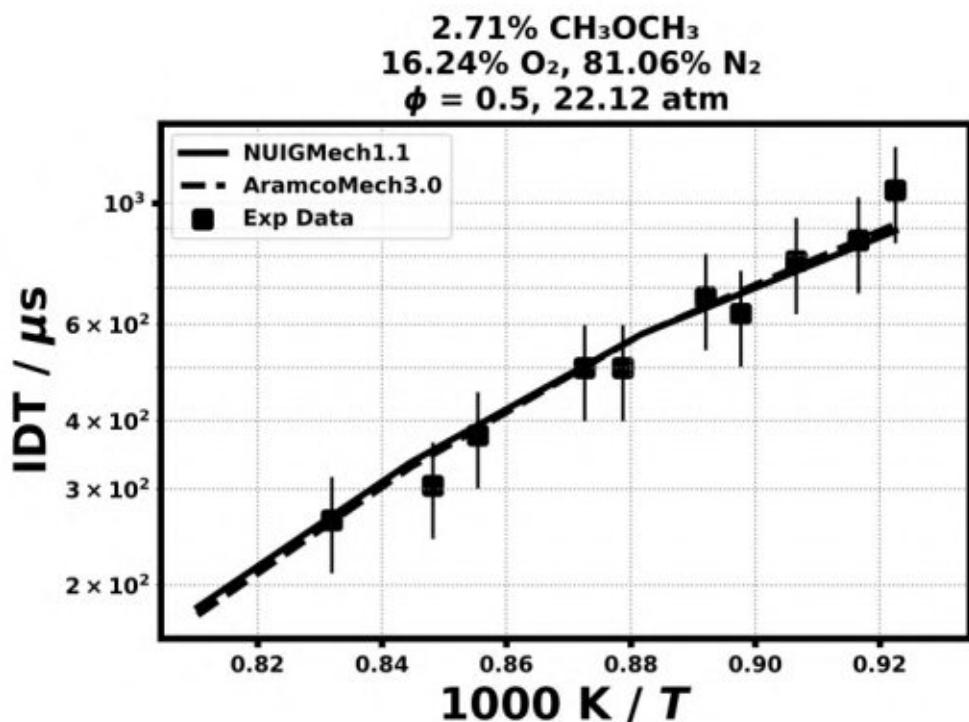


2.46% CH₃OCH₃
3.68% O₂, 93.86% Ar
 $\phi = 2.0, 20.0 \text{ atm}$

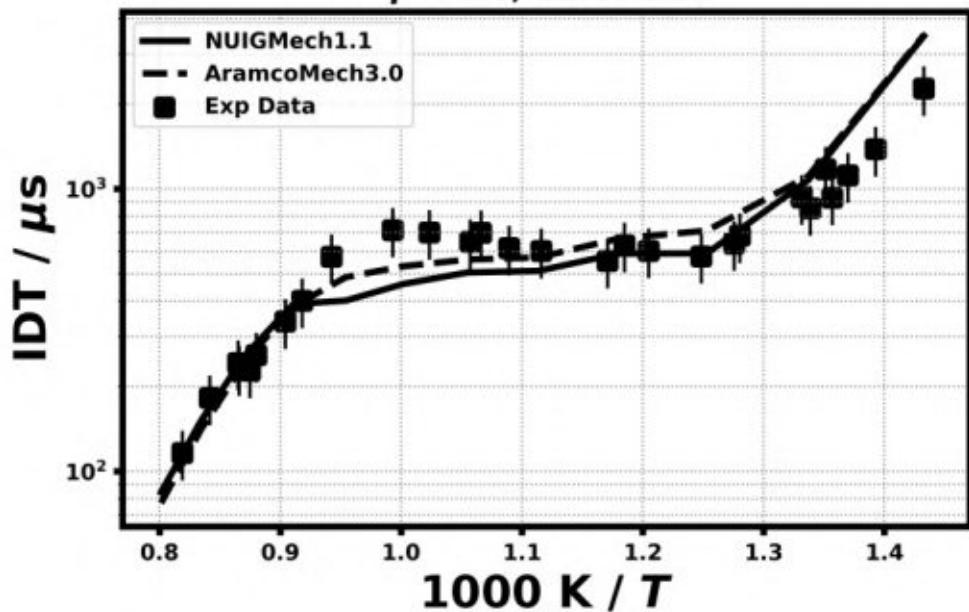


3.38% CH₃OCH₃
20.3% O₂, 76.62% N₂
 $\phi = 0.5, 22.26 \text{ atm}$

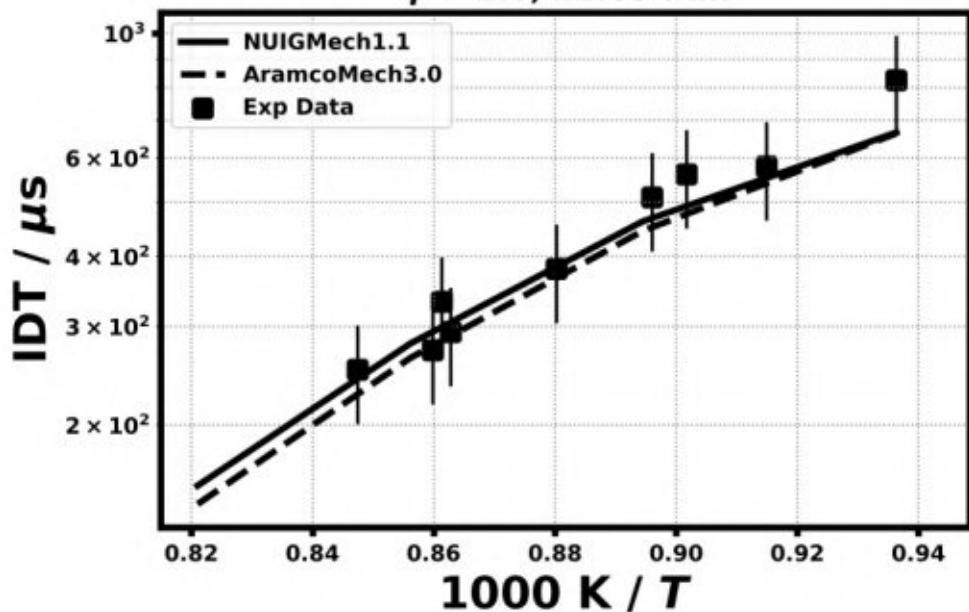




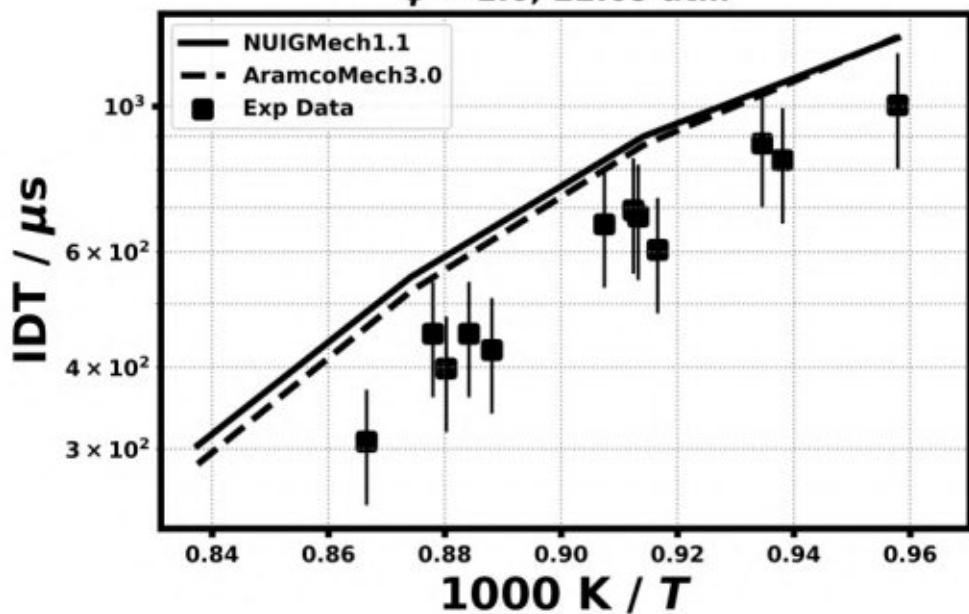
6.54% CH₃OCH₃
19.63% O₂, 73.82% N₂
 $\phi = 1.0, 22.44 \text{ atm}$



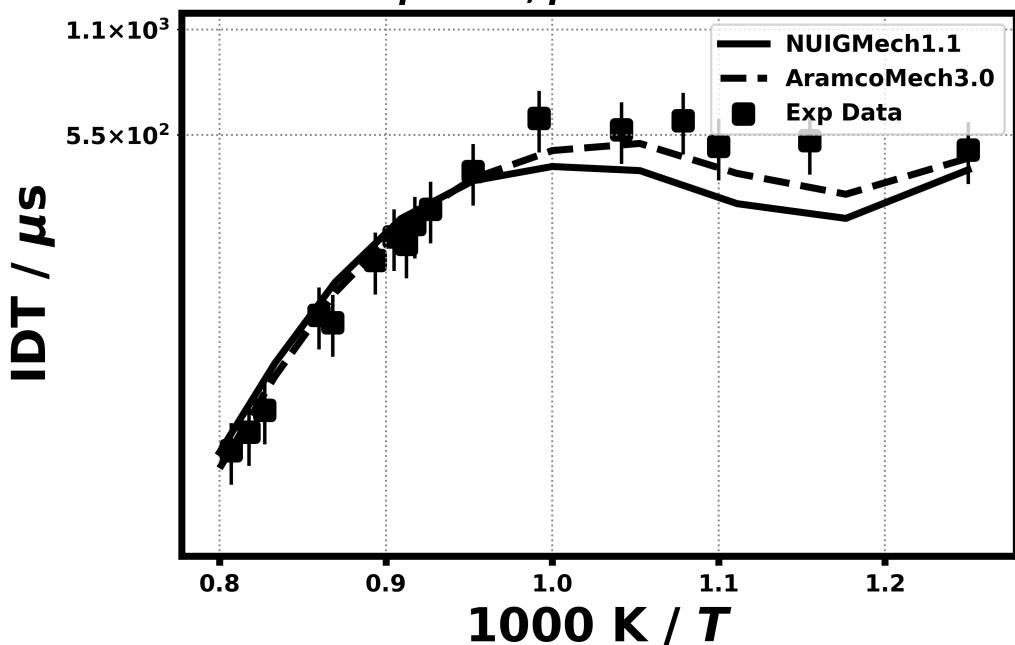
5.24% CH₃OCH₃
15.71% O₂, 79.06% N₂
 $\phi = 1.0, 22.65 \text{ atm}$



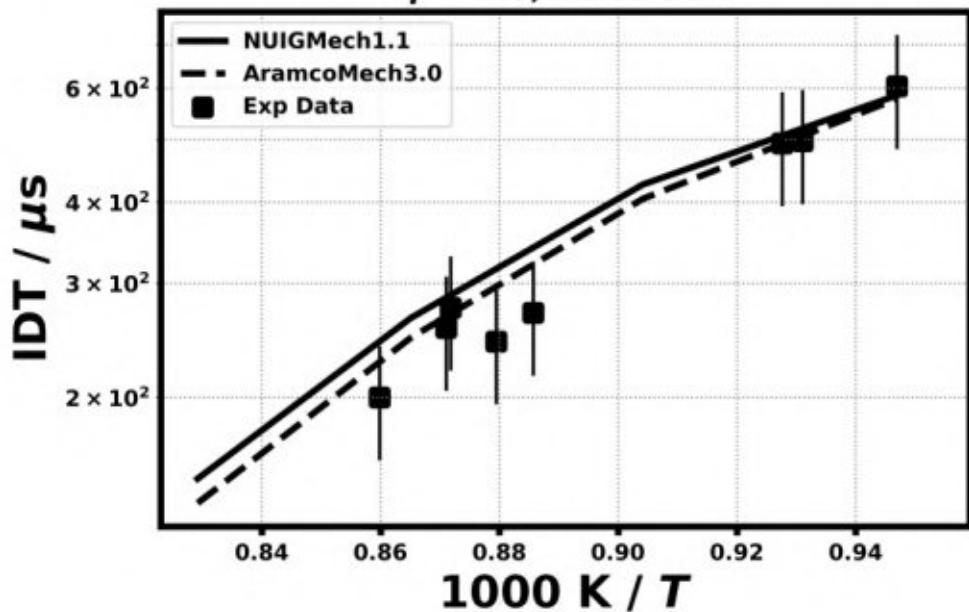
$3.93\% \text{CH}_3\text{OCH}_3$
 $11.78\% \text{O}_2, 84.29\% \text{N}_2$
 $\phi = 1.0, 22.09 \text{ atm}$



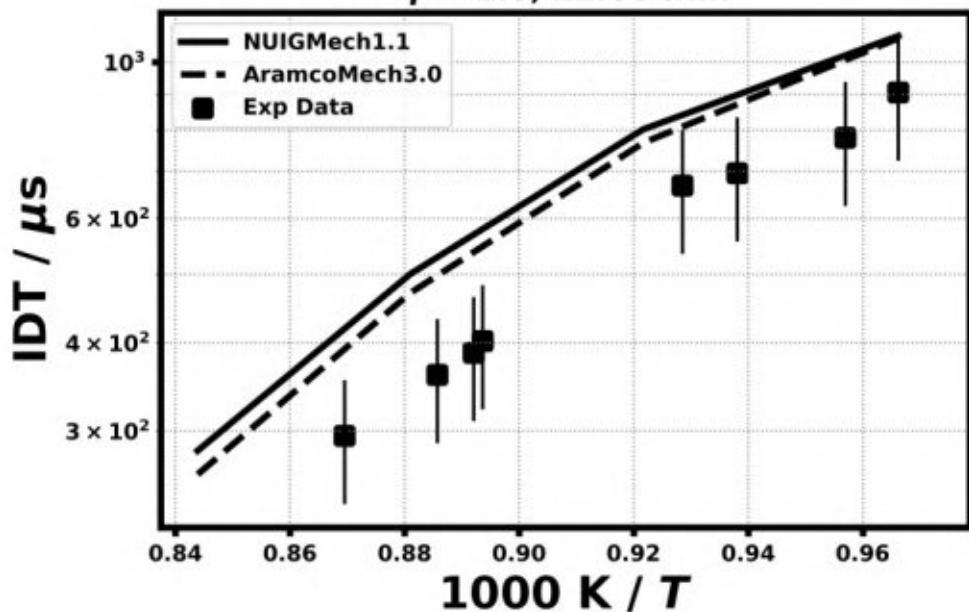
$9.51\% \text{CH}_3\text{OCH}_3$
 $19.01\% \text{O}_2, 71.48\% \text{N}_2$
 $\phi = 1.5, p = 22.44 \text{ atm}$

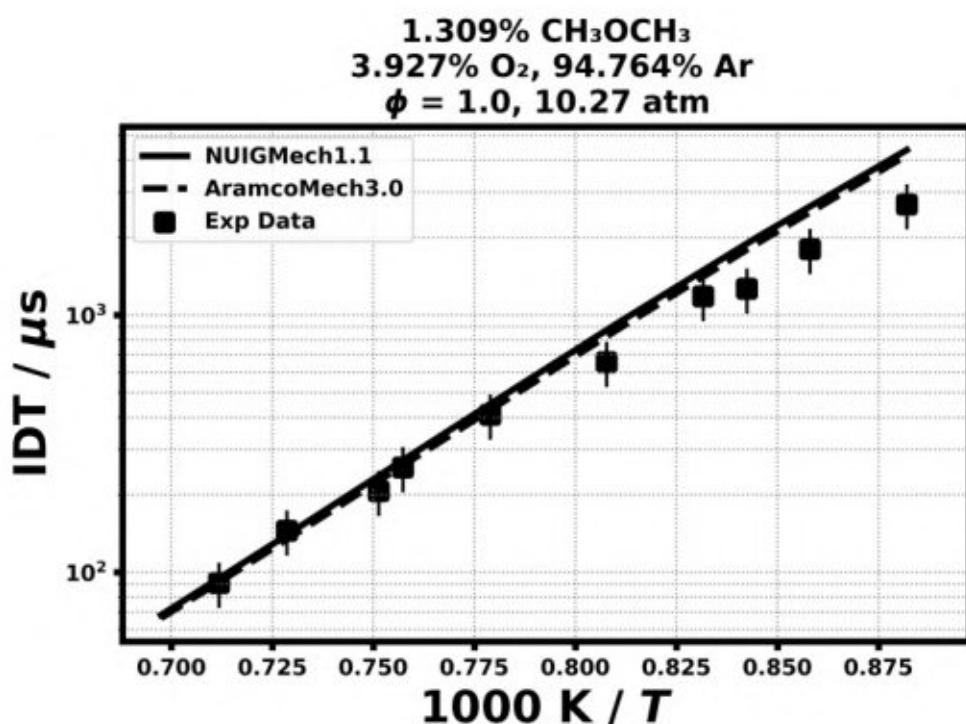
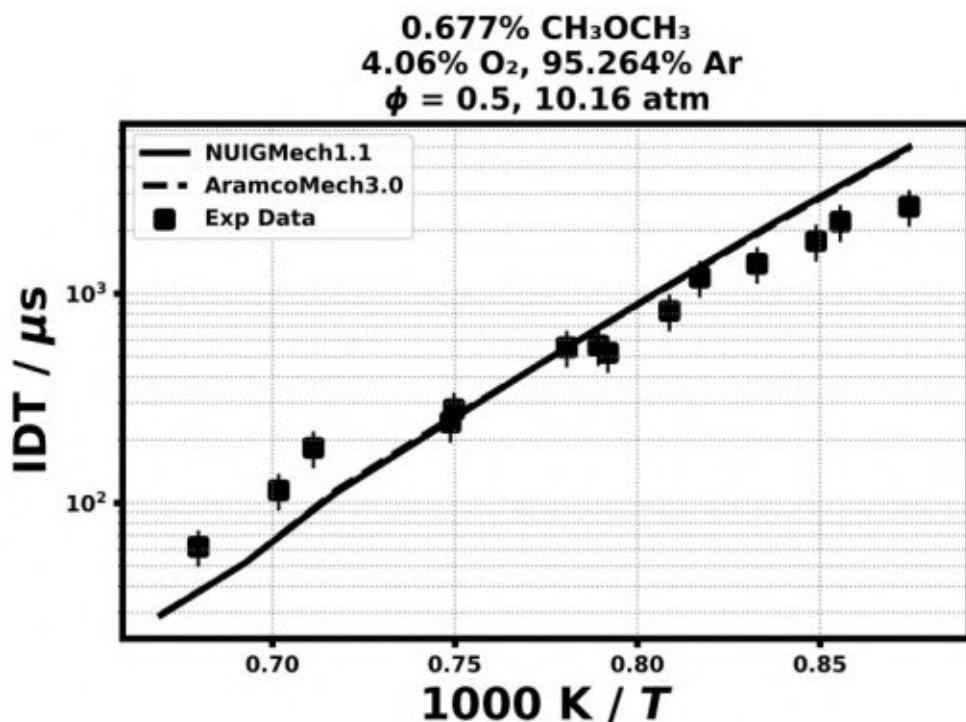


7.6% CH₃OCH₃
15.21% O₂, 77.19% N₂
 $\phi = 1.5, 22.51 \text{ atm}$

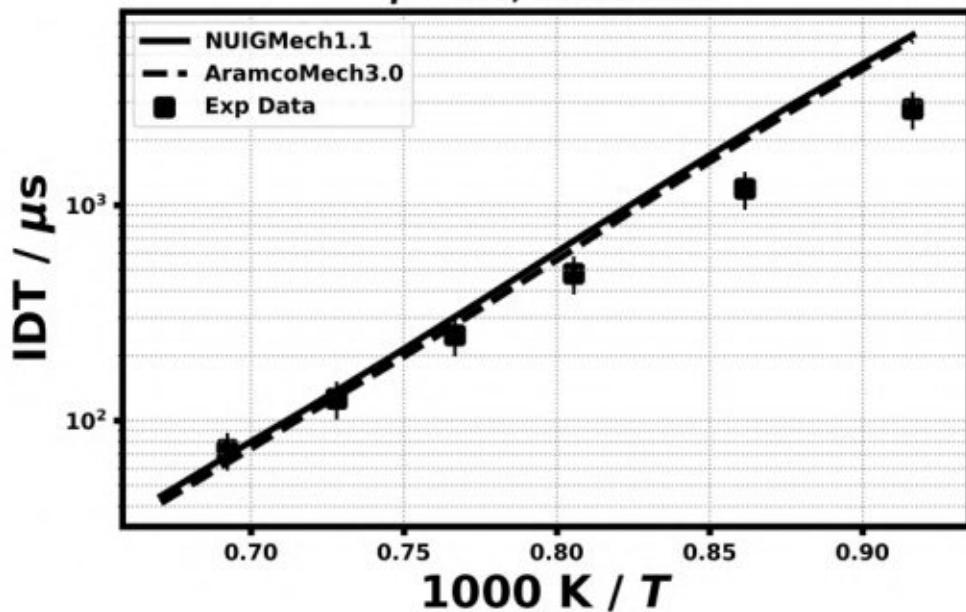


5.7% CH₃OCH₃
11.41% O₂, 82.89% N₂
 $\phi = 1.5, 22.06 \text{ atm}$

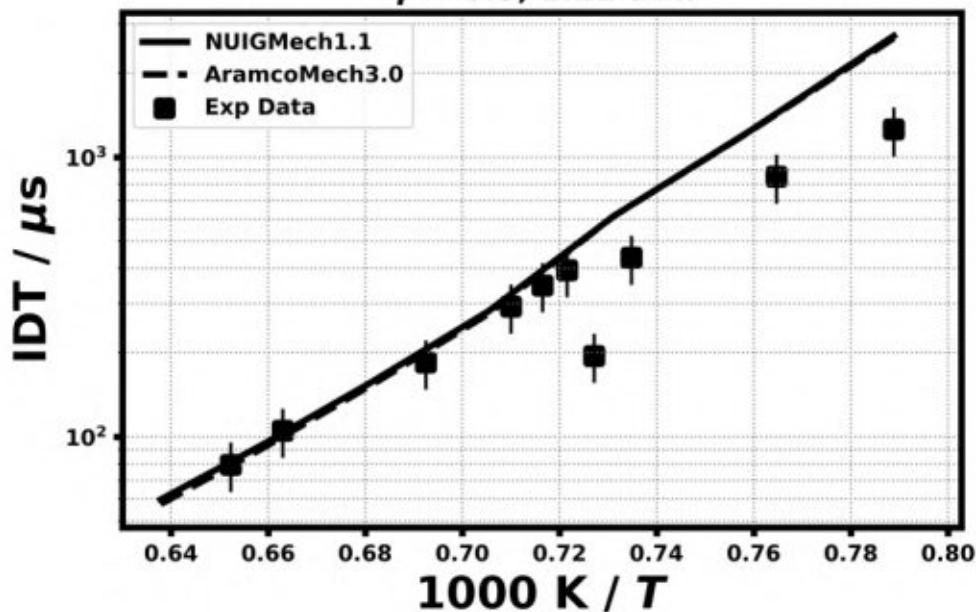




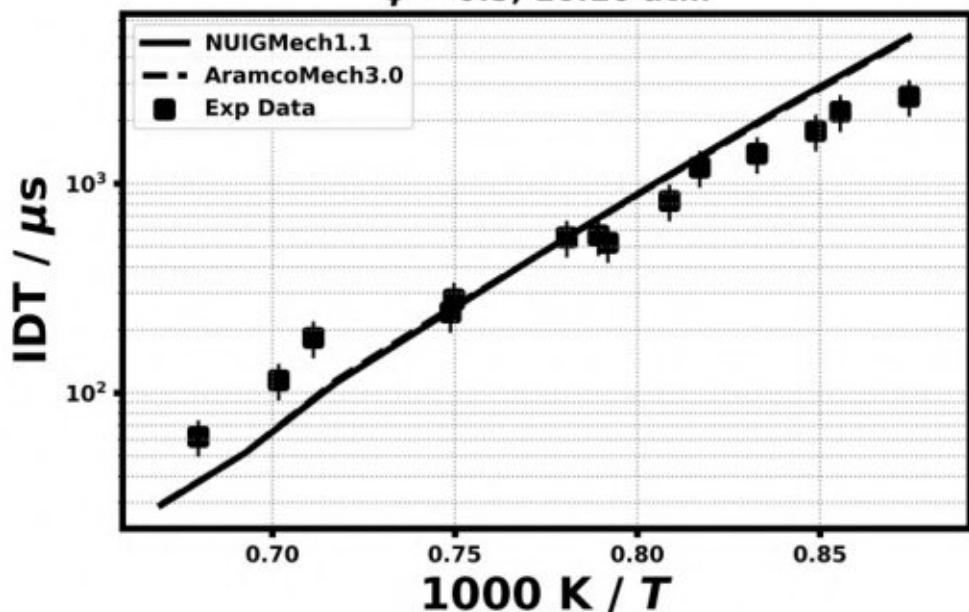
$2.457\% \text{CH}_3\text{OCH}_3$
 $3.686\% \text{O}_2, 93.857\% \text{Ar}$
 $\phi = 2.0, 10.25 \text{ atm}$



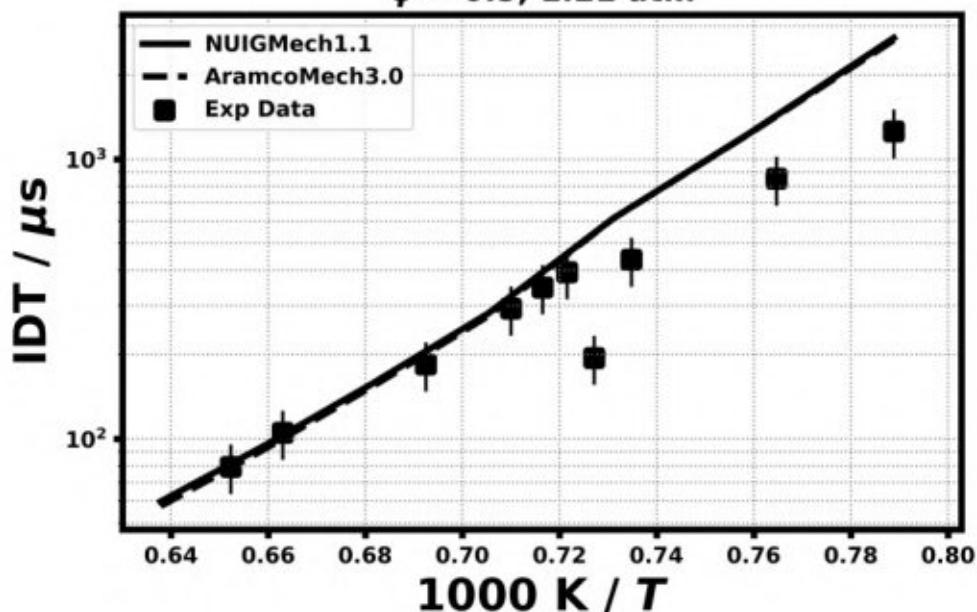
$0.677\% \text{CH}_3\text{OCH}_3$
 $4.06\% \text{O}_2, 95.264\% \text{Ar}$
 $\phi = 0.5, 1.21 \text{ atm}$



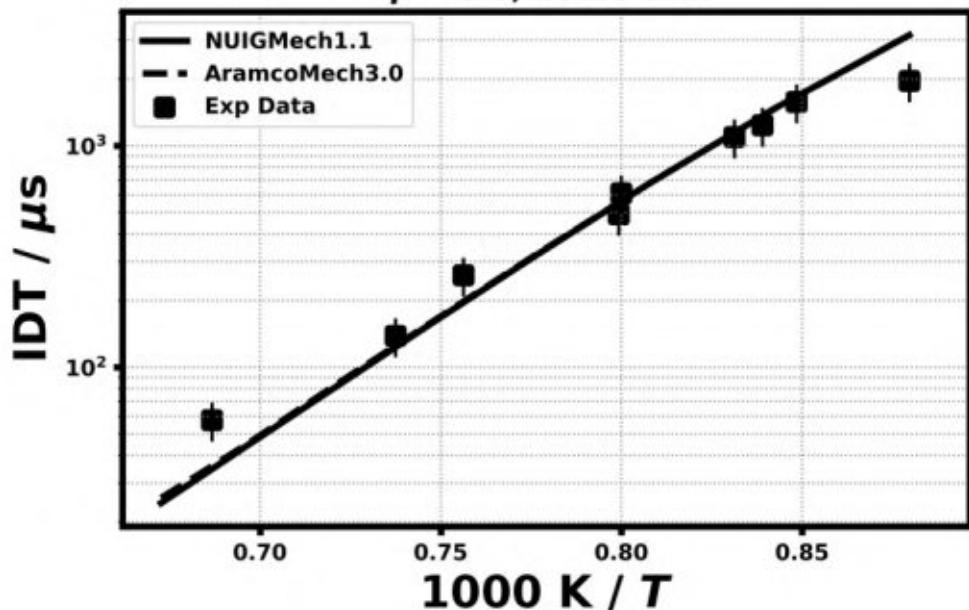
0.677% CH₃OCH₃
4.06% O₂, 95.264% Ar
 $\phi = 0.5, 10.16 \text{ atm}$



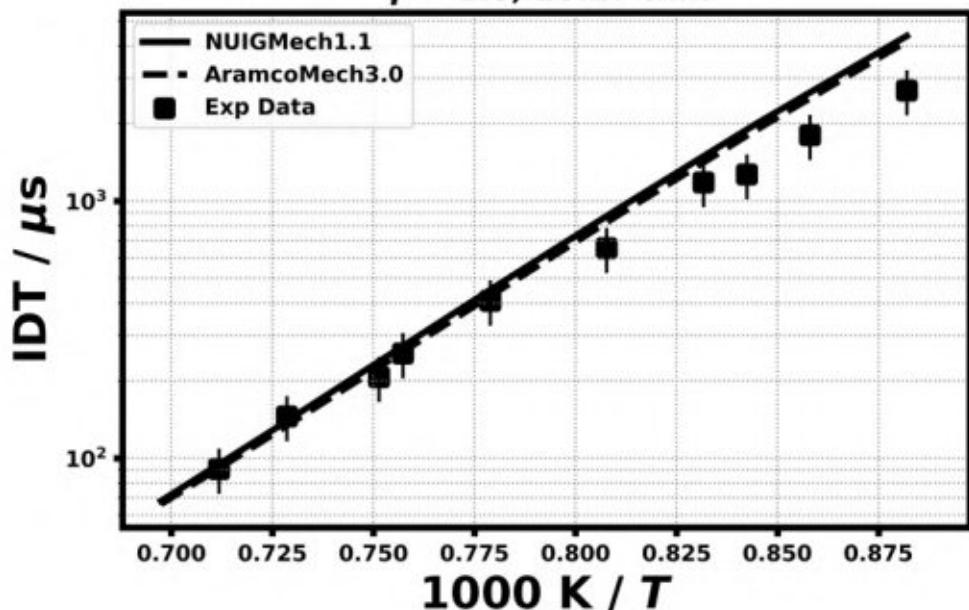
0.677% CH₃OCH₃
4.06% O₂, 95.264% Ar
 $\phi = 0.5, 1.21 \text{ atm}$



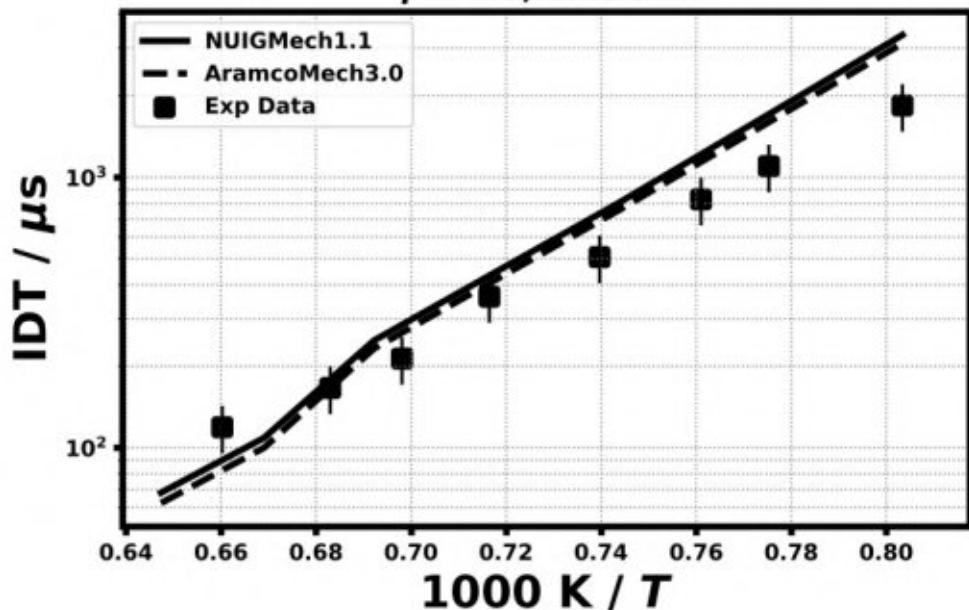
0.677% CH₃OCH₃
4.06% O₂, 95.264% Ar
 $\phi = 0.5, 20.26 \text{ atm}$



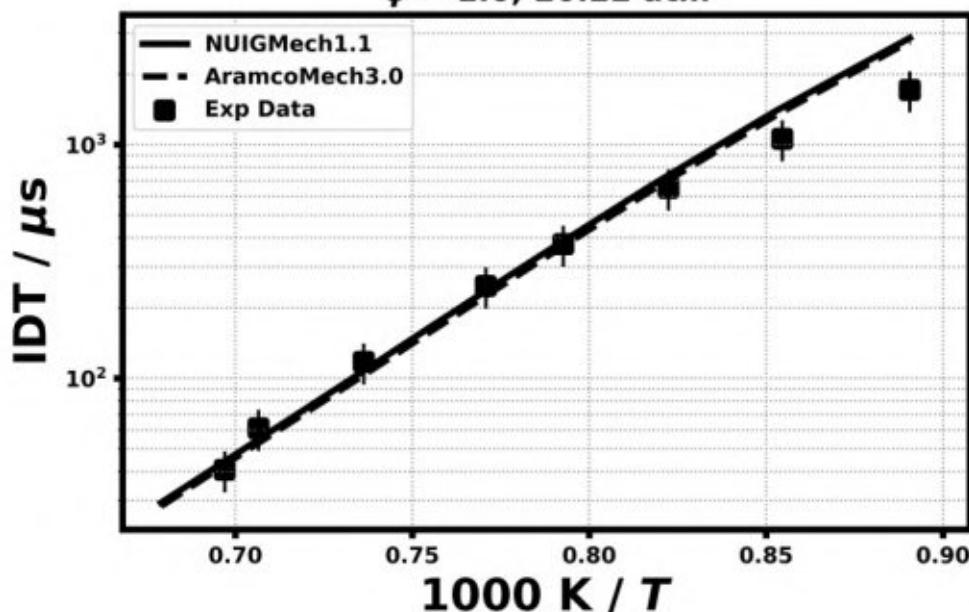
1.309% CH₃OCH₃
3.927% O₂, 94.764% Ar
 $\phi = 1.0, 10.27 \text{ atm}$



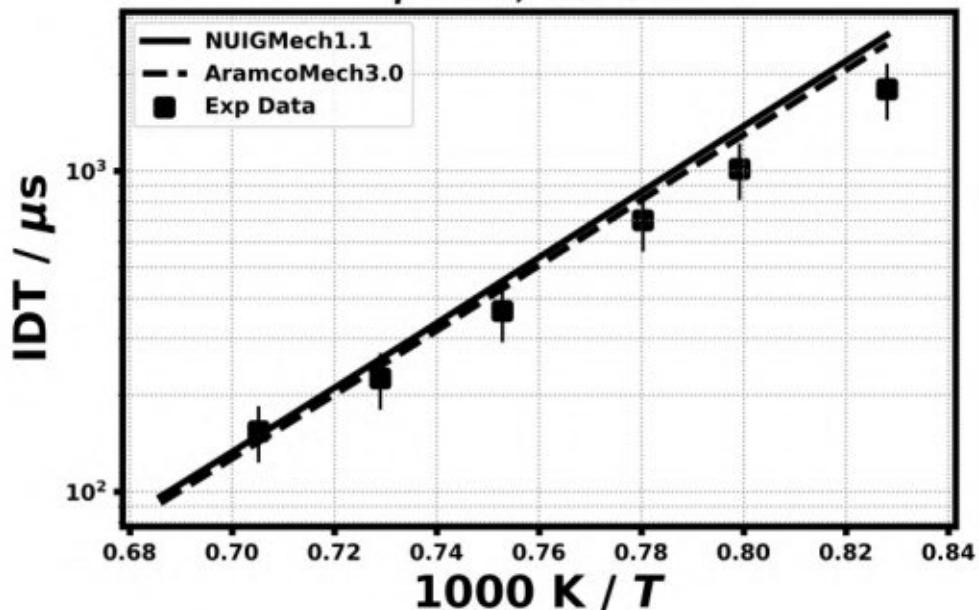
1.309% CH₃OCH₃
3.927% O₂, 94.764% Ar
 $\phi = 1.0, 1.23 \text{ atm}$



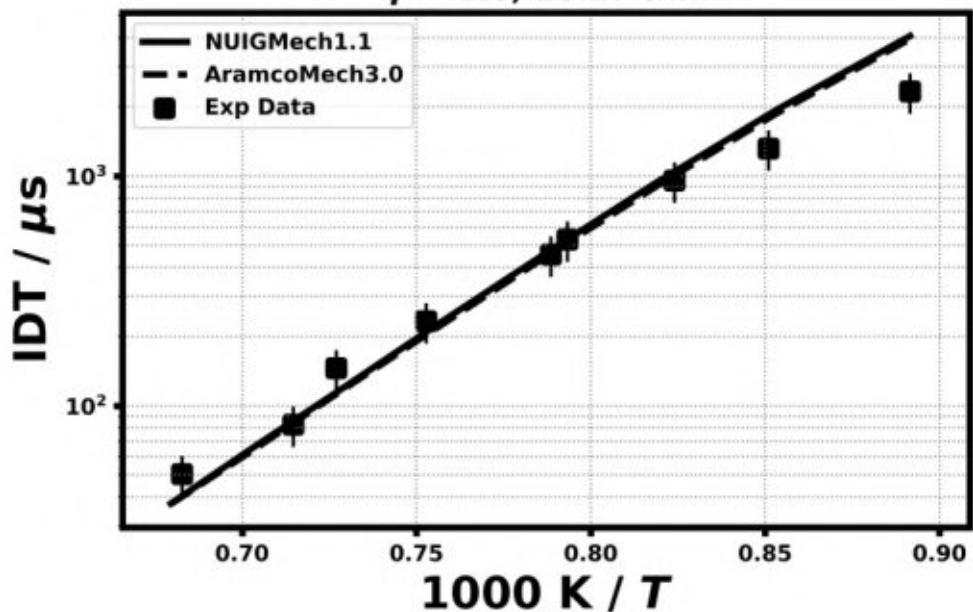
1.309% CH₃OCH₃
3.927% O₂, 94.764% Ar
 $\phi = 1.0, 20.22 \text{ atm}$



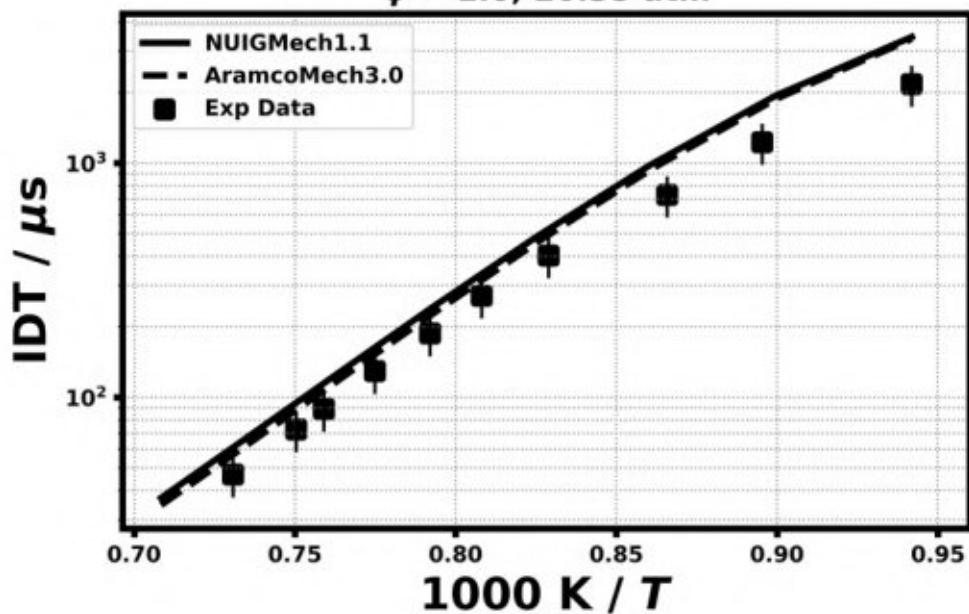
$1.309\% \text{CH}_3\text{OCH}_3$
 $3.927\% \text{O}_2, 94.764\% \text{Ar}$
 $\phi = 1.0, 4.07 \text{ atm}$



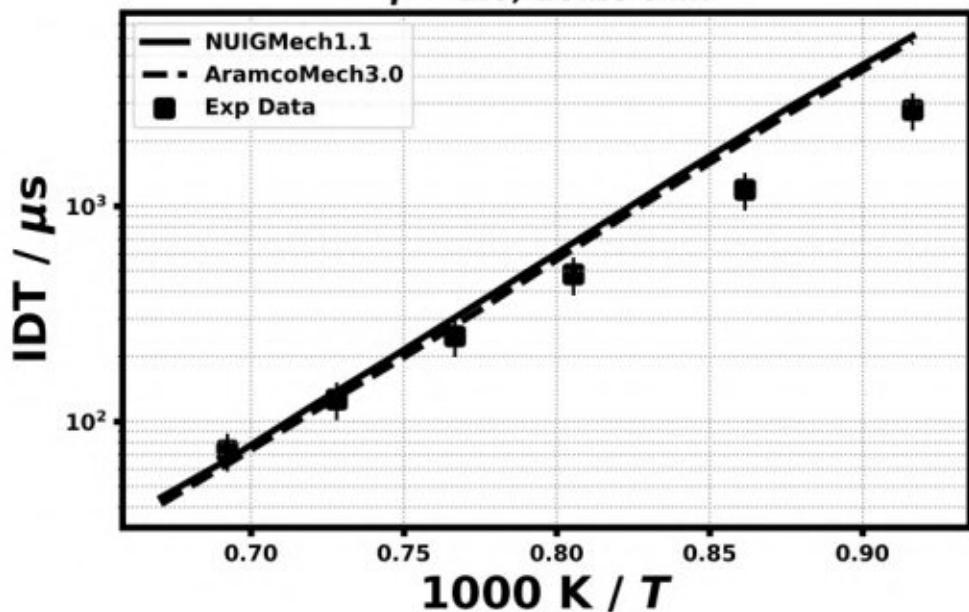
$1.0\% \text{CH}_3\text{OCH}_3$
 $3.0\% \text{O}_2, 96.0\% \text{Ar}$
 $\phi = 1.0, 20.27 \text{ atm}$

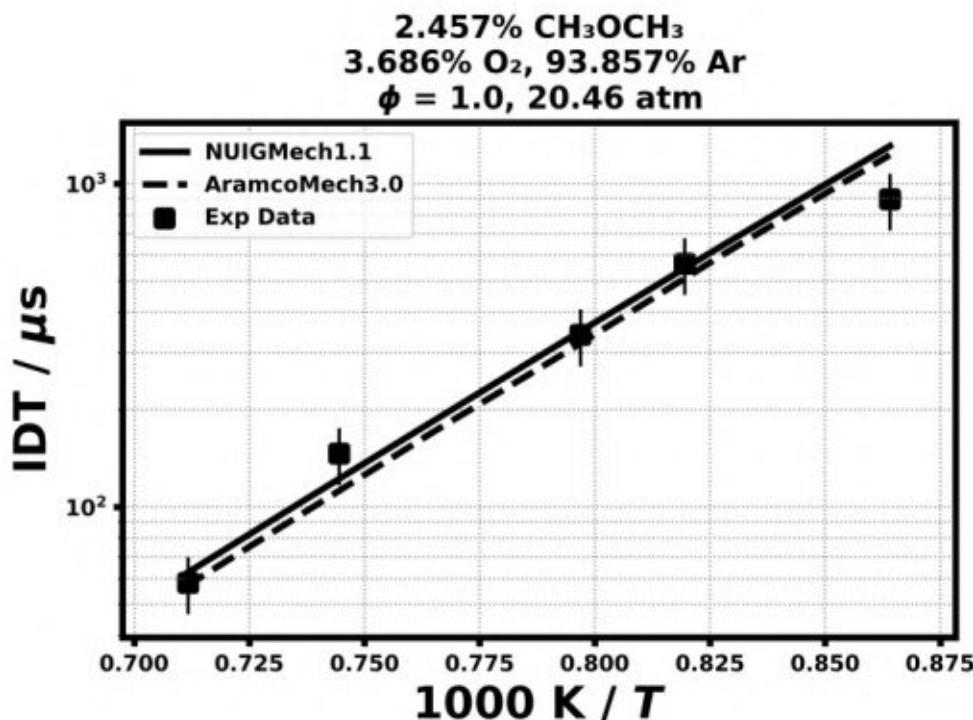
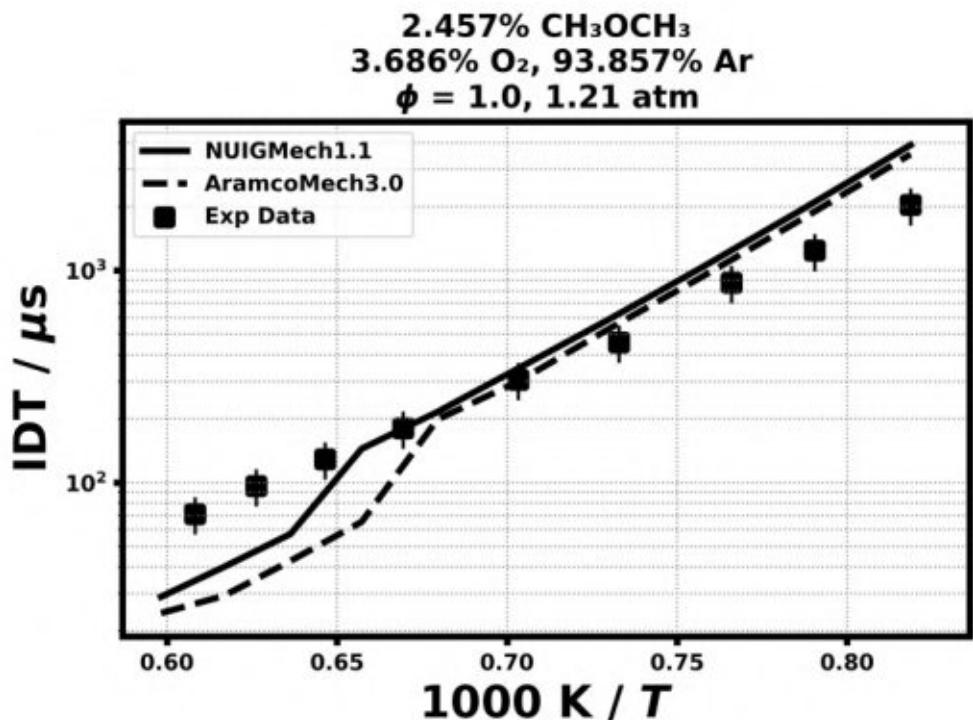


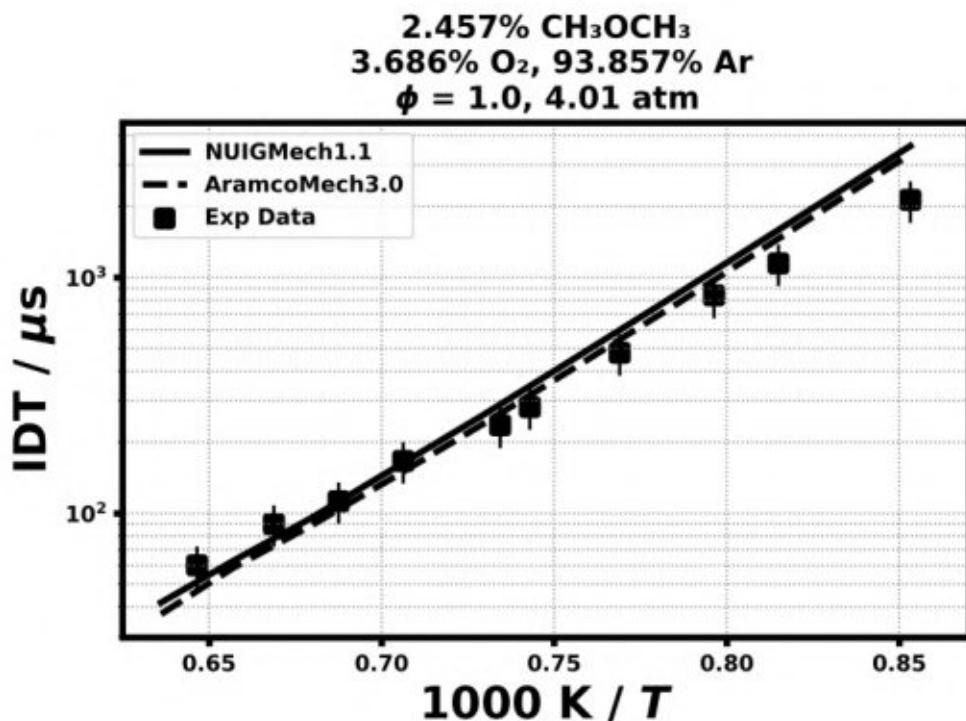
2.0% CH_3OCH_3
6.0% O_2 , 92.0% Ar
 $\phi = 1.0, 20.35 \text{ atm}$



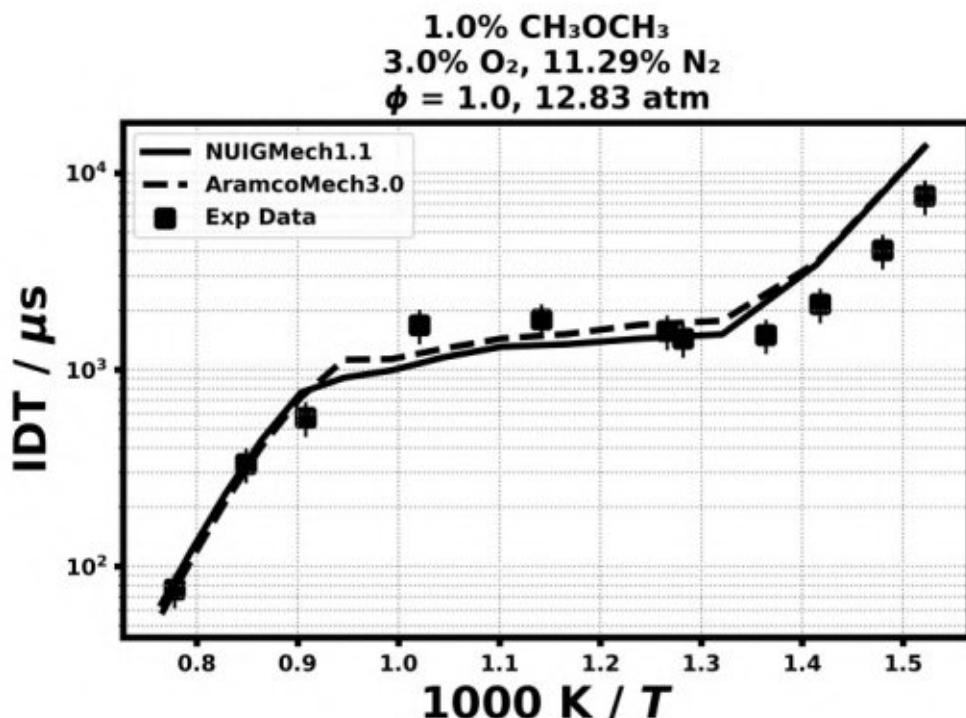
2.457% CH_3OCH_3
3.686% O_2 , 93.857% Ar
 $\phi = 1.0, 10.25 \text{ atm}$

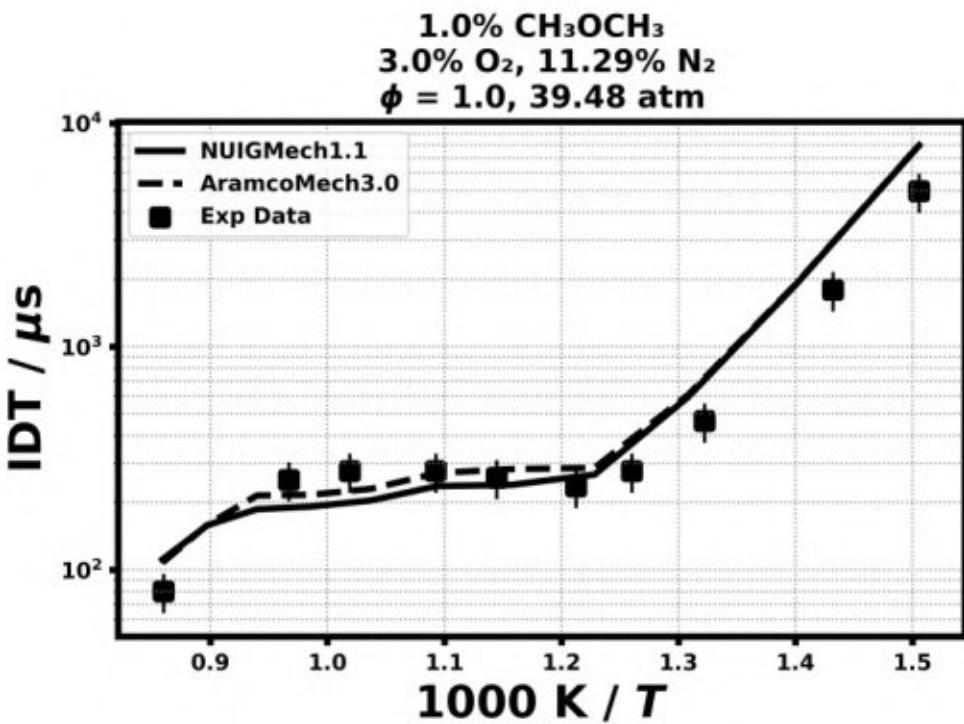




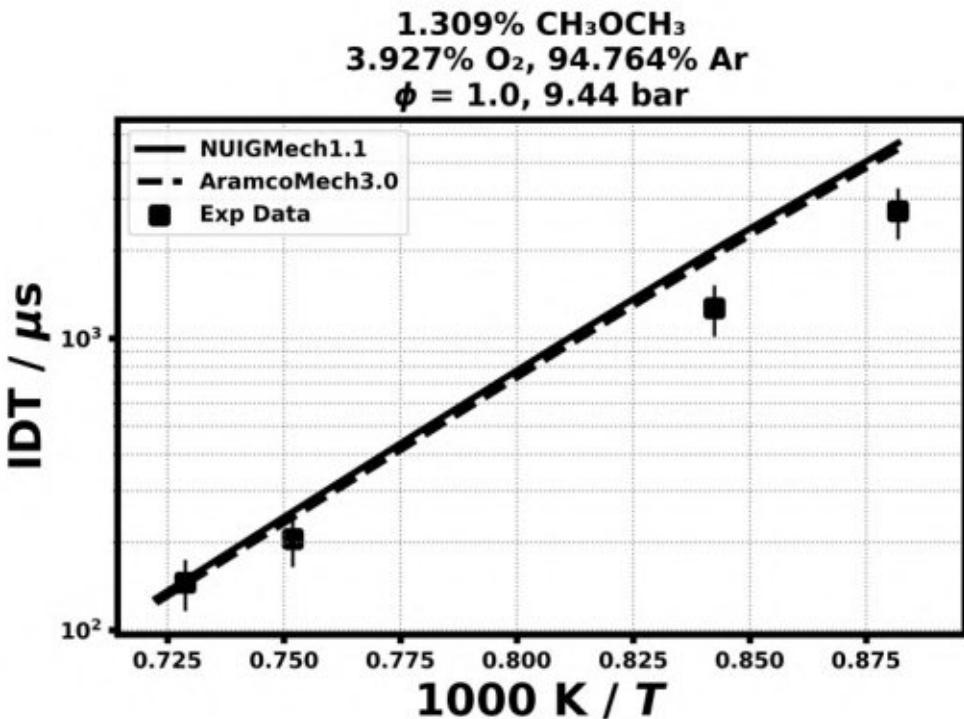


14.7) Z. Chen et al., Proceedings of the Combustion Institute 31, 1 (2007) 1215-1222.

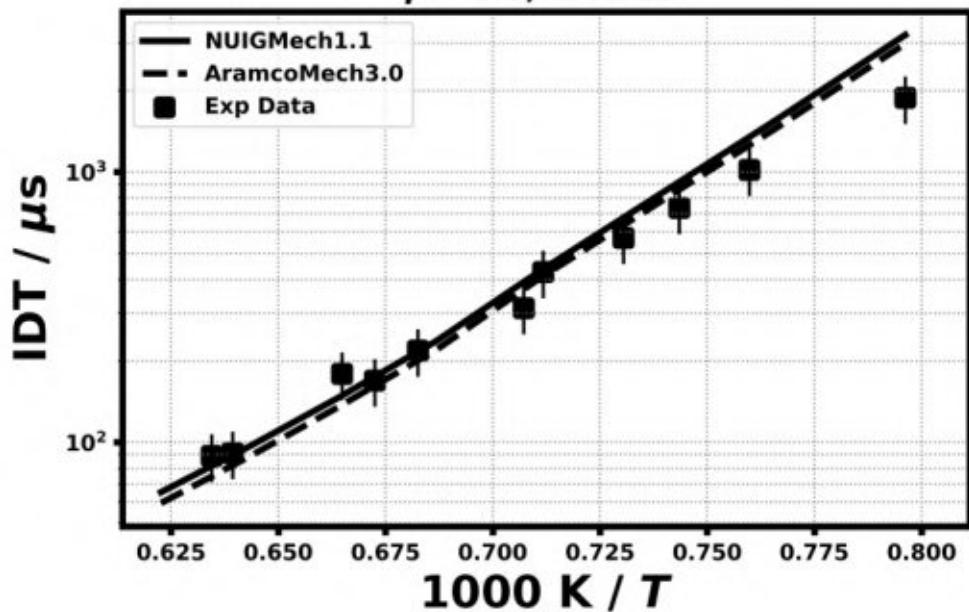




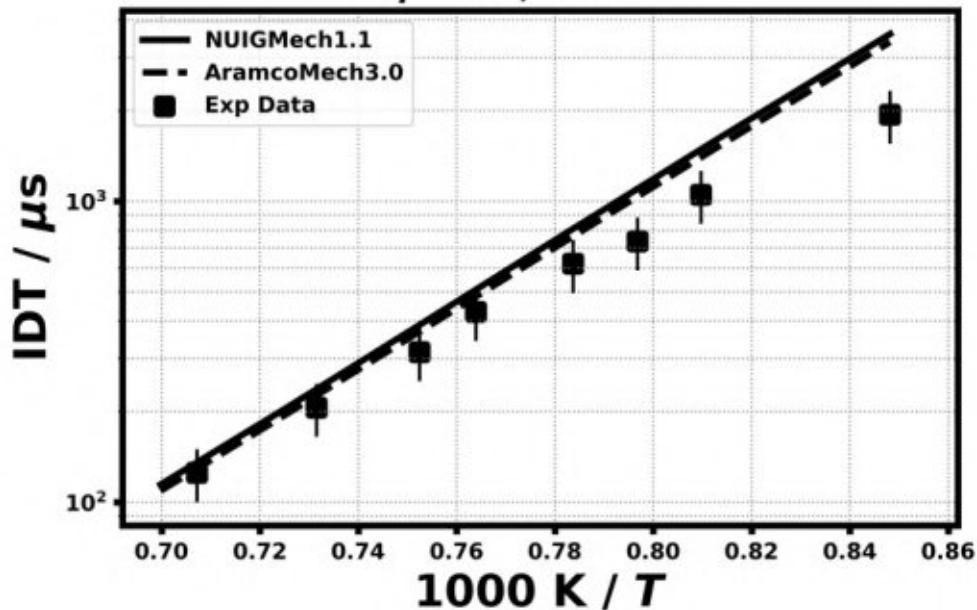
14.8) C. Tang, Energy & fuels 26, 11 (2012) 6720-6728.



1.309% CH₃OCH₃
3.927% O₂, 94.764% Ar
 $\phi = 1.0, 1.01 \text{ bar}$

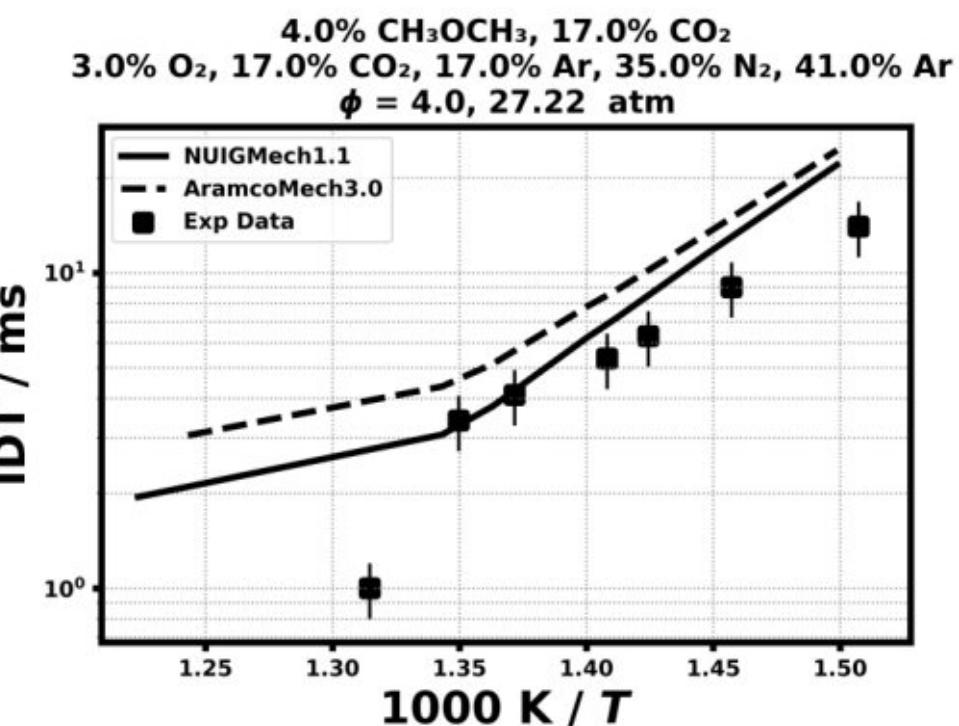
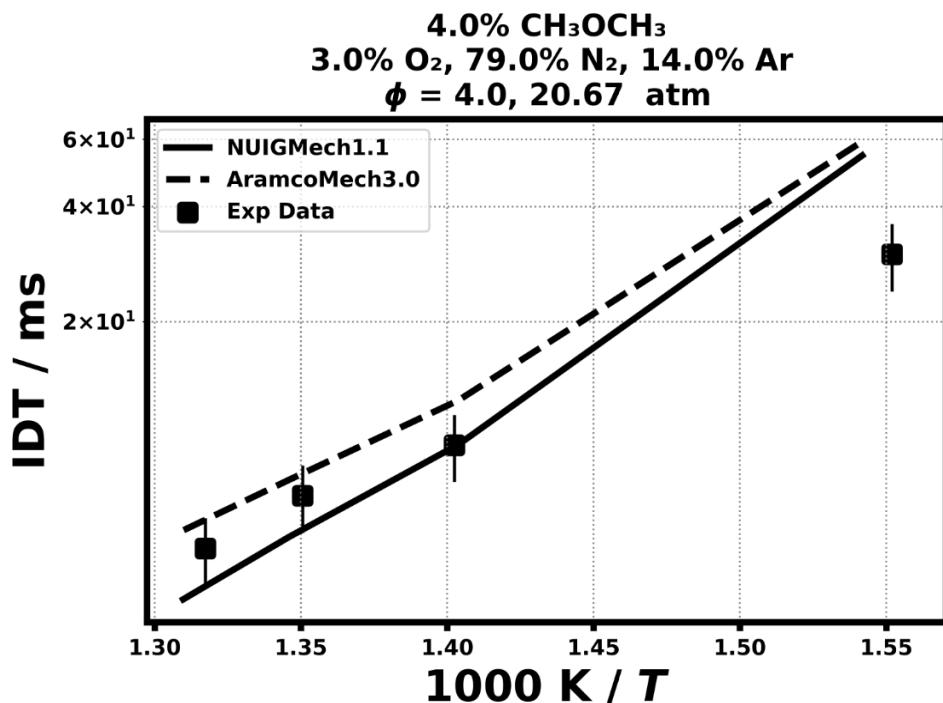


1.309% CH₃OCH₃
3.927% O₂, 94.764% Ar
 $\phi = 1.0, 5.08 \text{ bar}$

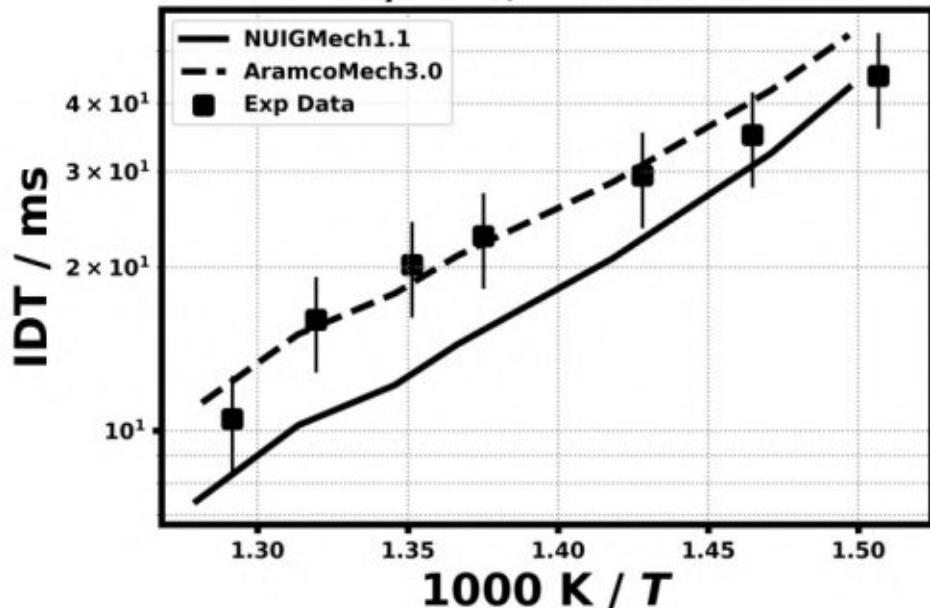


RCM Ignition delay time

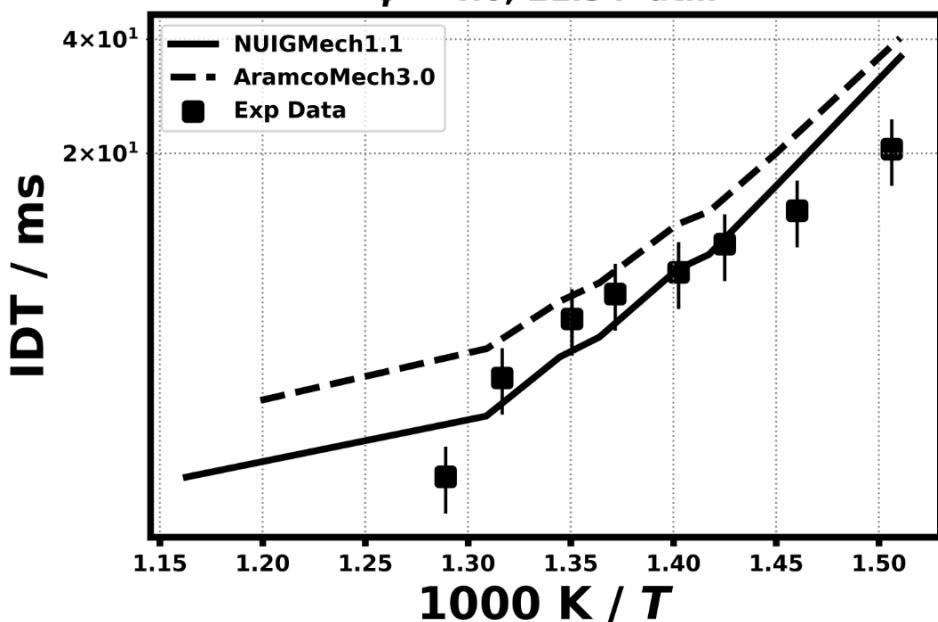
14.10) Mittal, Gaurav, Marcos Chaos, Chih-Jen Sung, and Frederick L. Dryer, Fuel Processing Technology 89, 12 (2008) 1244-1254.



$4.0\% \text{CH}_3\text{OCH}_3, 17.0\%\text{CO}_2$
 $3.0\%\text{O}_2, 17.0\%\text{CO}_2, 17.0\%\text{Ar}, 35.0\%\text{N}_2, 41.0\%\text{Ar}$
 $\phi = 4.0, 14.27 \text{ atm}$

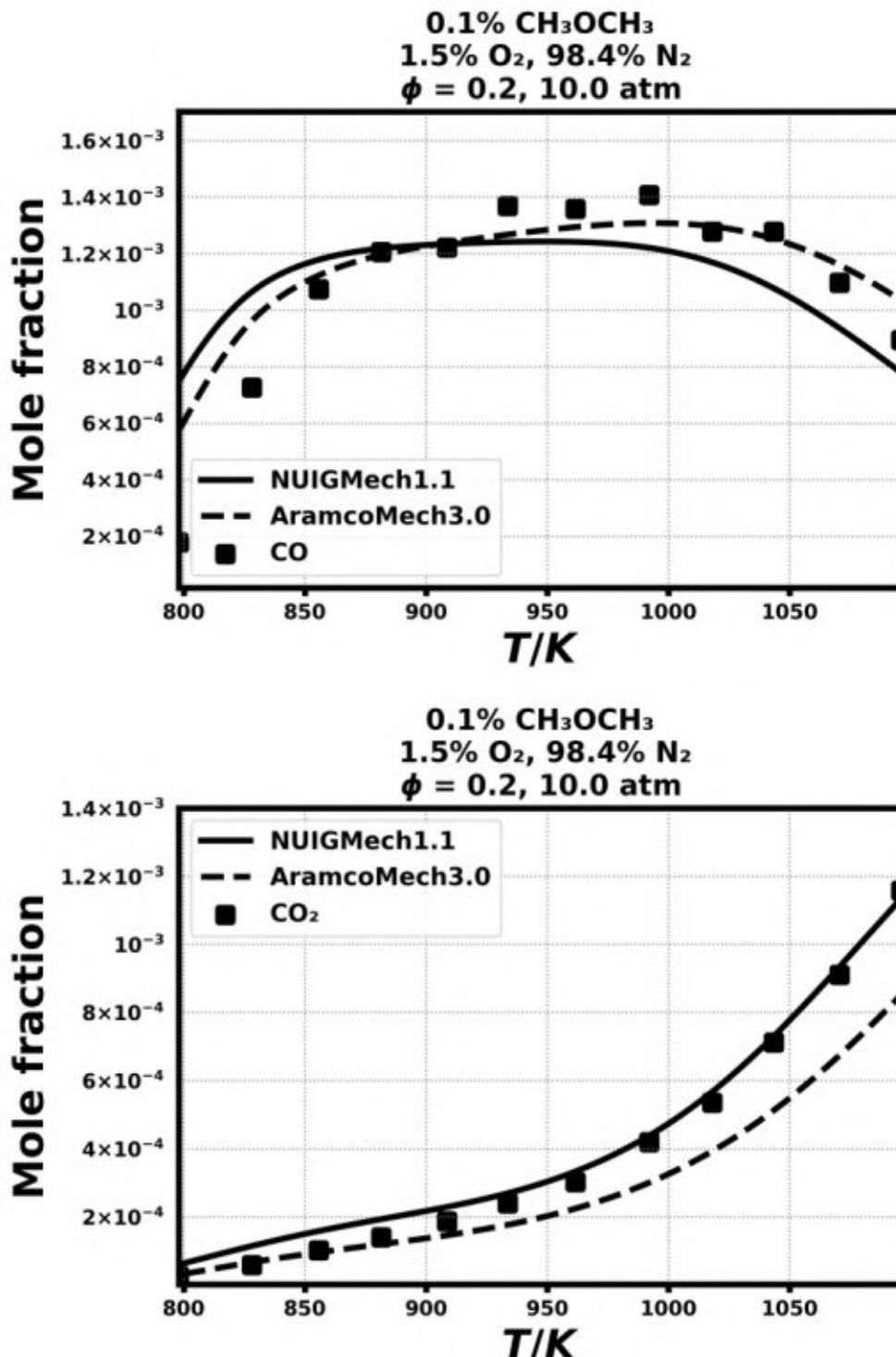


$4.0\% \text{CH}_3\text{OCH}_3, 17.0\%\text{CO}_2$
 $3.0\%\text{O}_2, 17.0\%\text{CO}_2, 17.0\%\text{Ar}, 35.0\%\text{N}_2, 41.0\%\text{Ar}$
 $\phi = 4.0, 21.34 \text{ atm}$

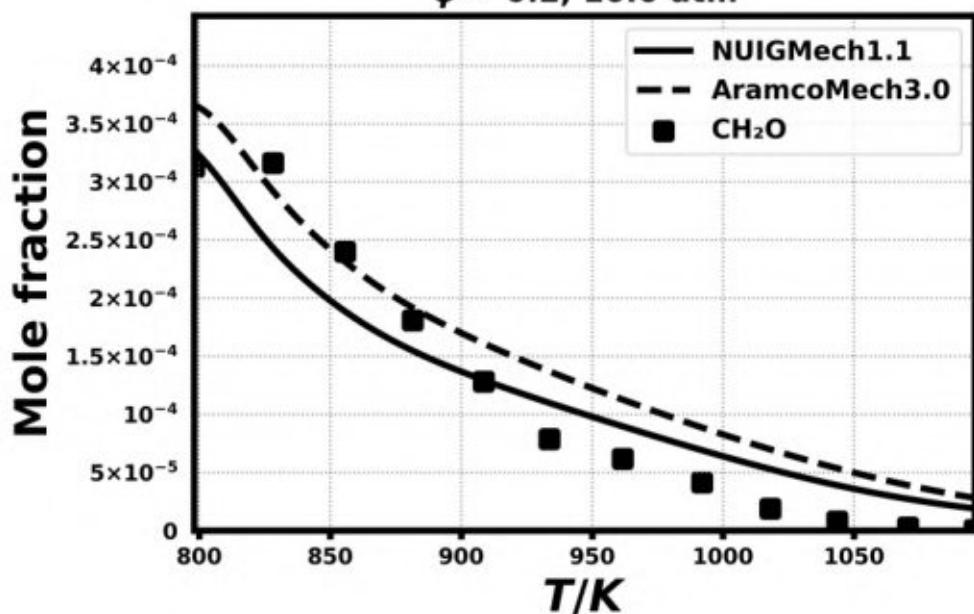


Speciation in Jet-stirred reactor

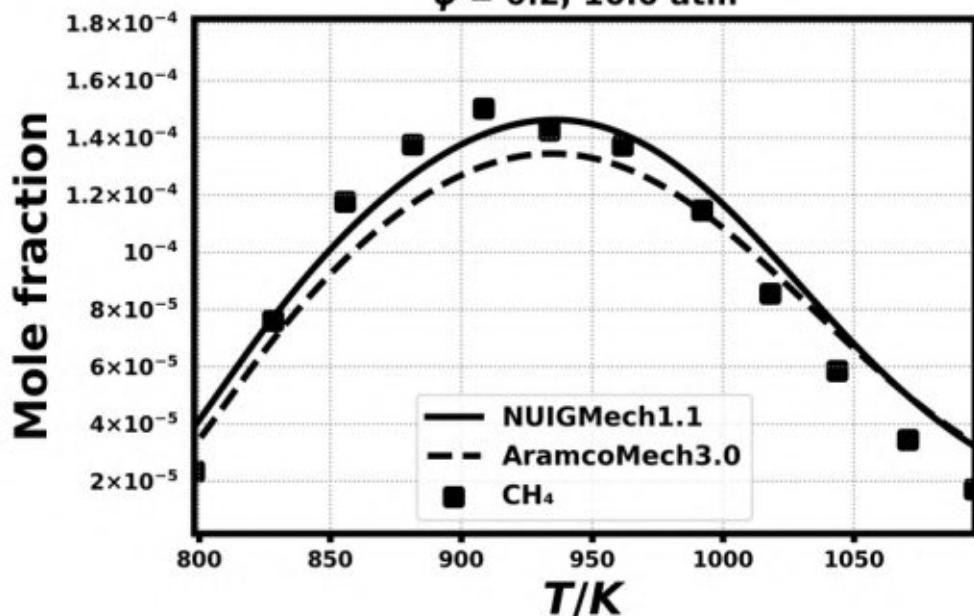
14.10) Dagaut, Philippe, Jean-Claude Boettner, and Michel Cathonnet., In Symposium (International) on Combustion, 26 (1996) 627-632.

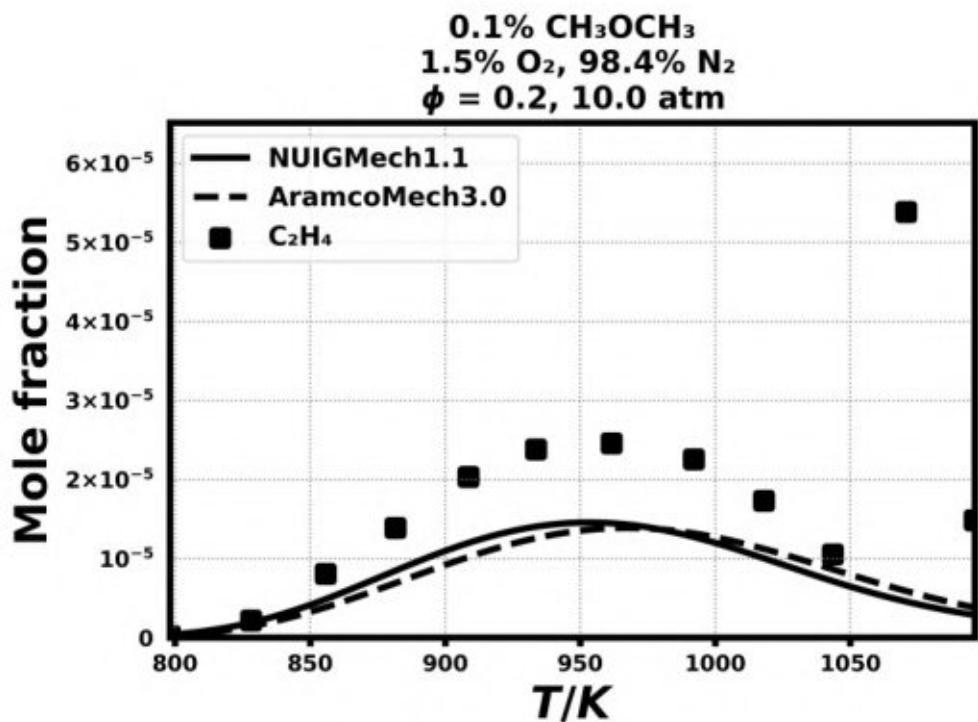
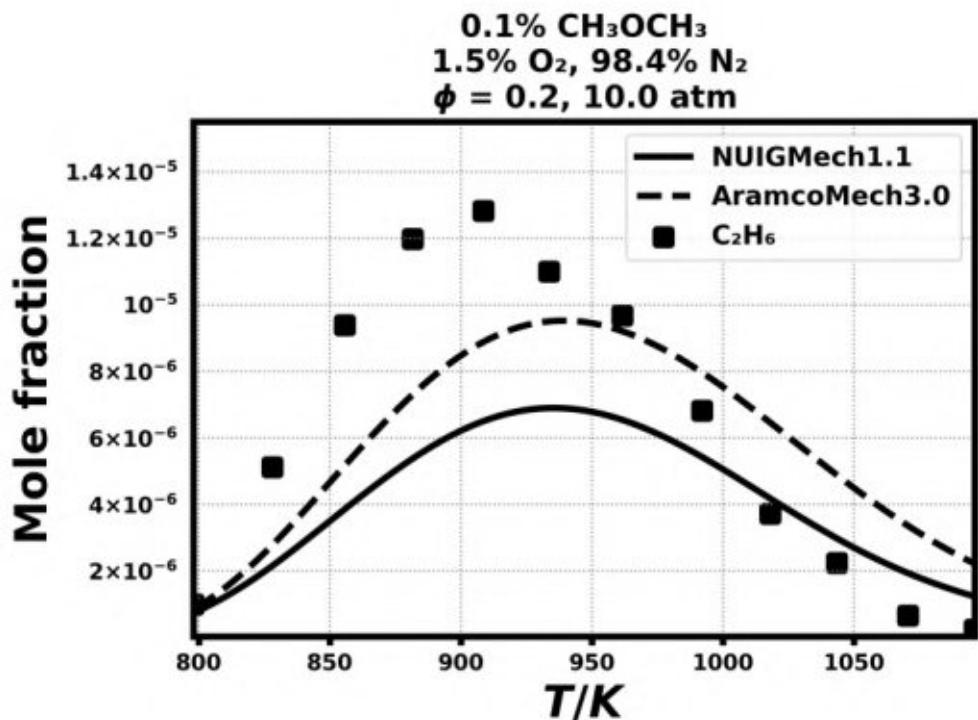


$0.1\% \text{CH}_3\text{OCH}_3$
 $1.5\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.2, 10.0 \text{ atm}$

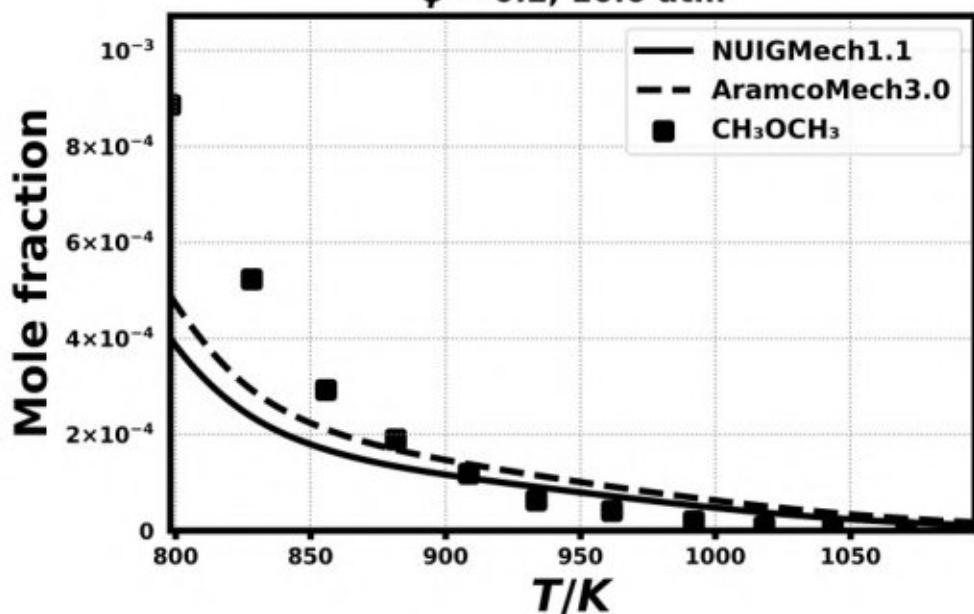


$0.1\% \text{CH}_3\text{OCH}_3$
 $1.5\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.2, 10.0 \text{ atm}$

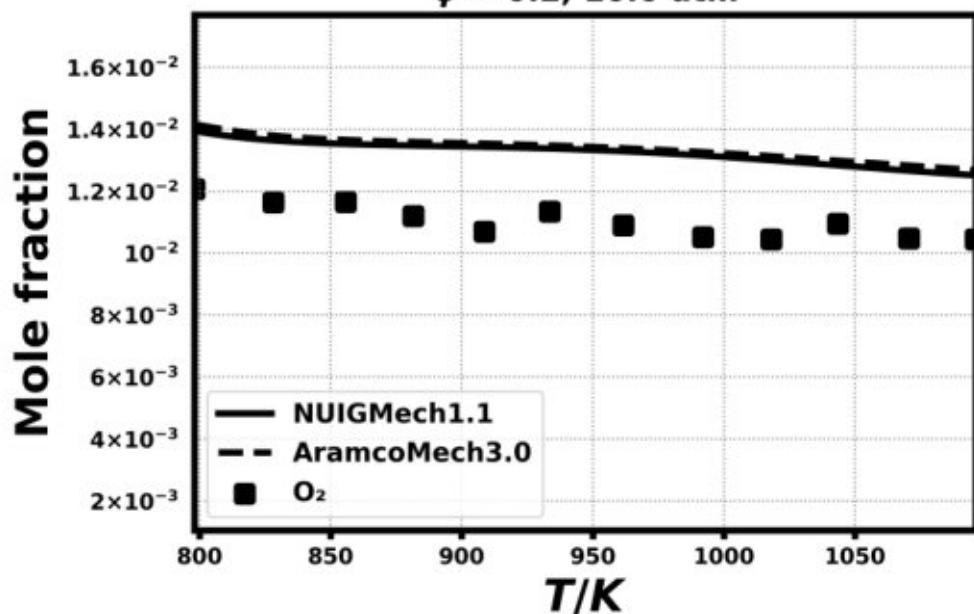


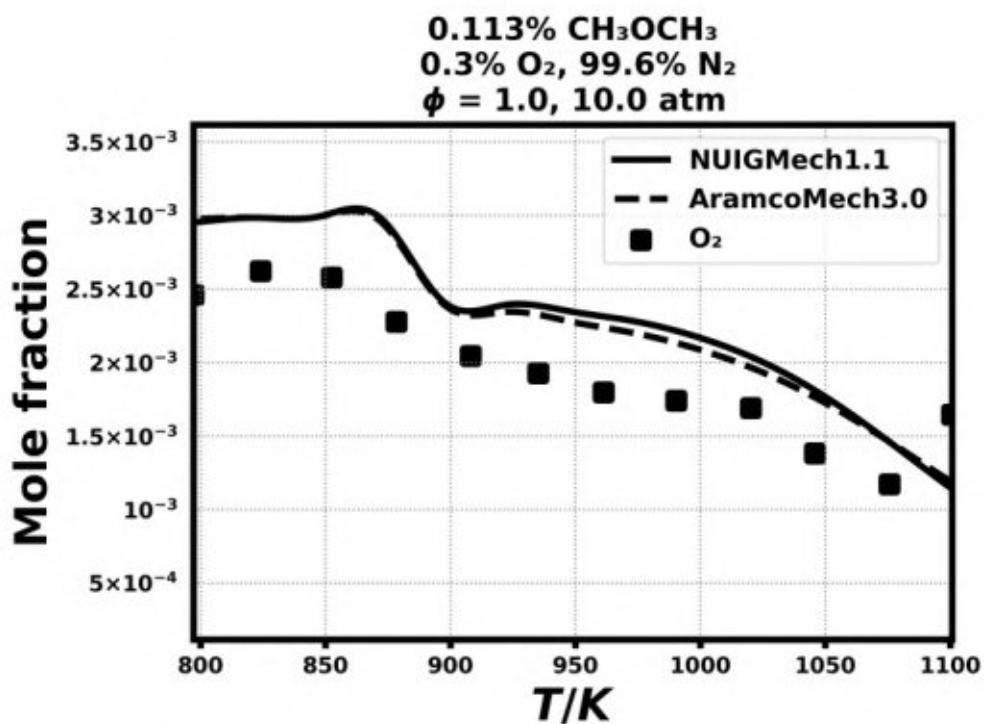
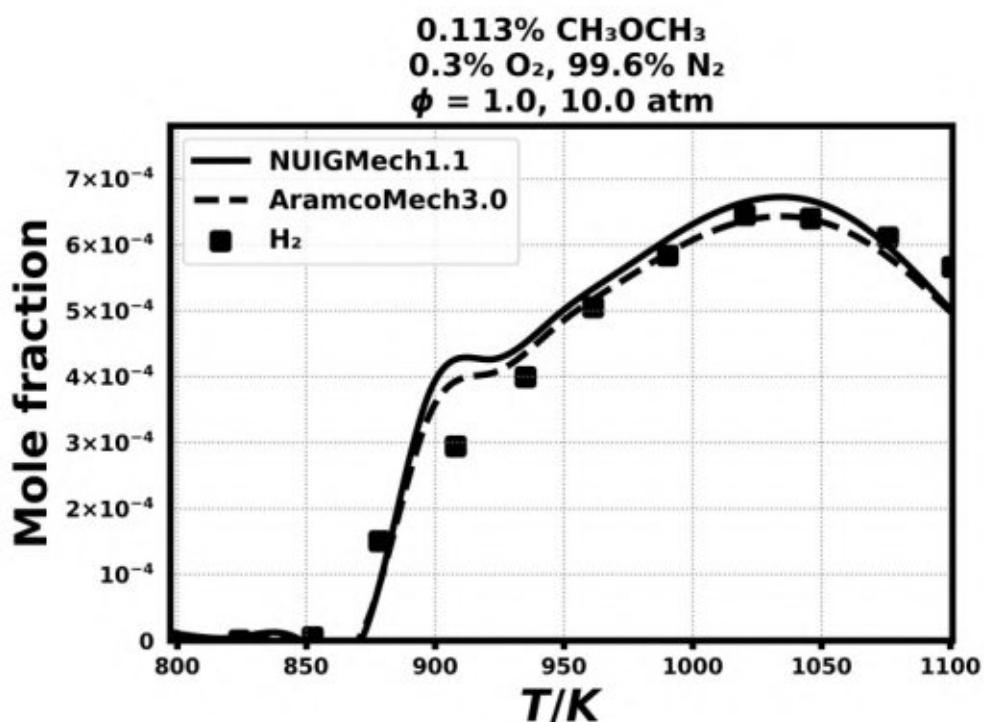


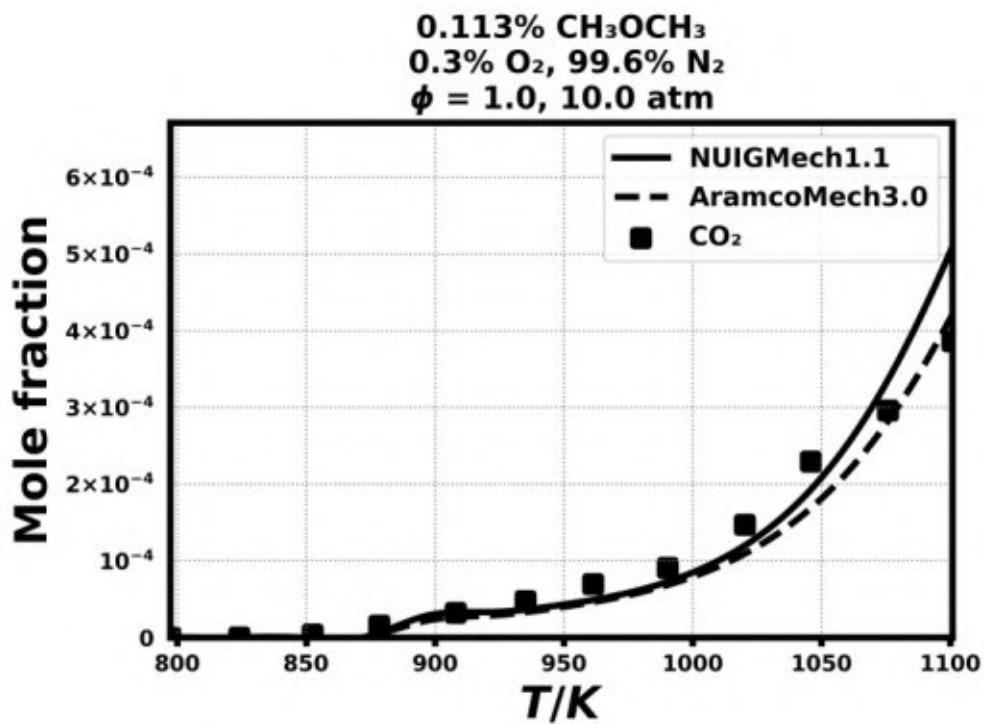
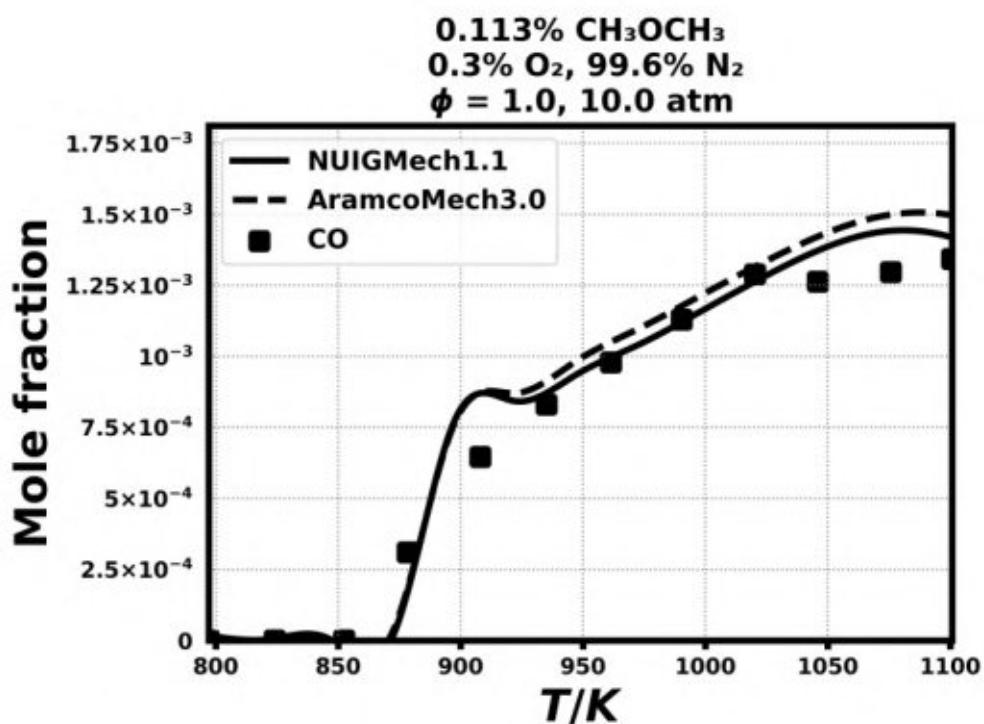
$0.1\% \text{CH}_3\text{OCH}_3$
 $1.5\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.2, 10.0 \text{ atm}$



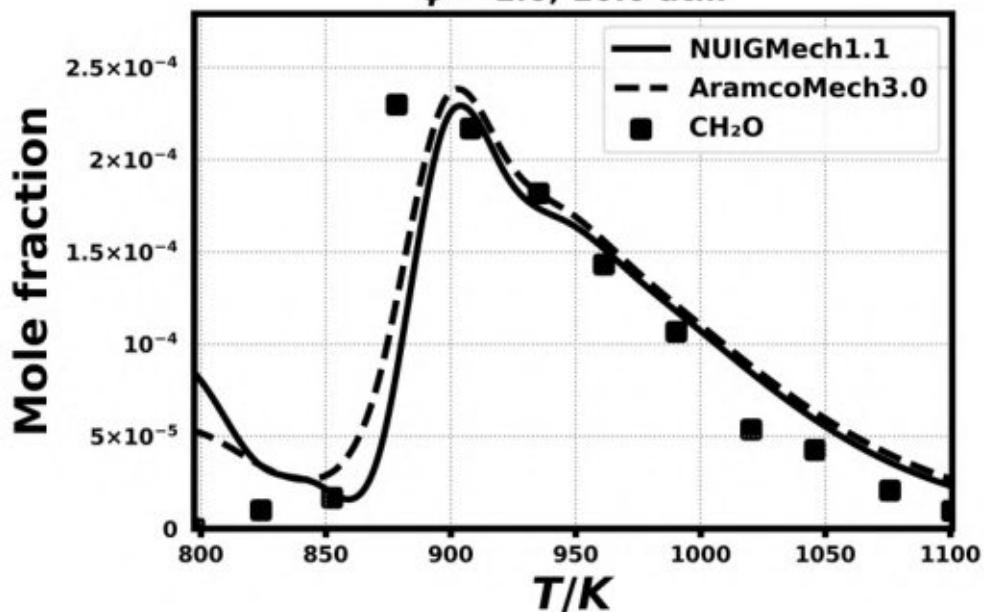
$0.1\% \text{CH}_3\text{OCH}_3$
 $1.5\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.2, 10.0 \text{ atm}$



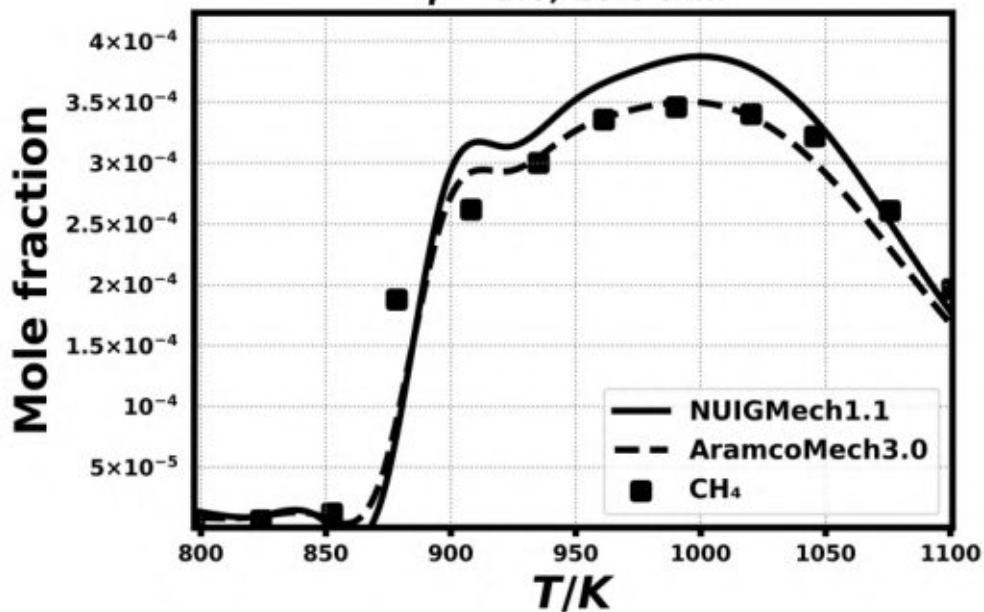


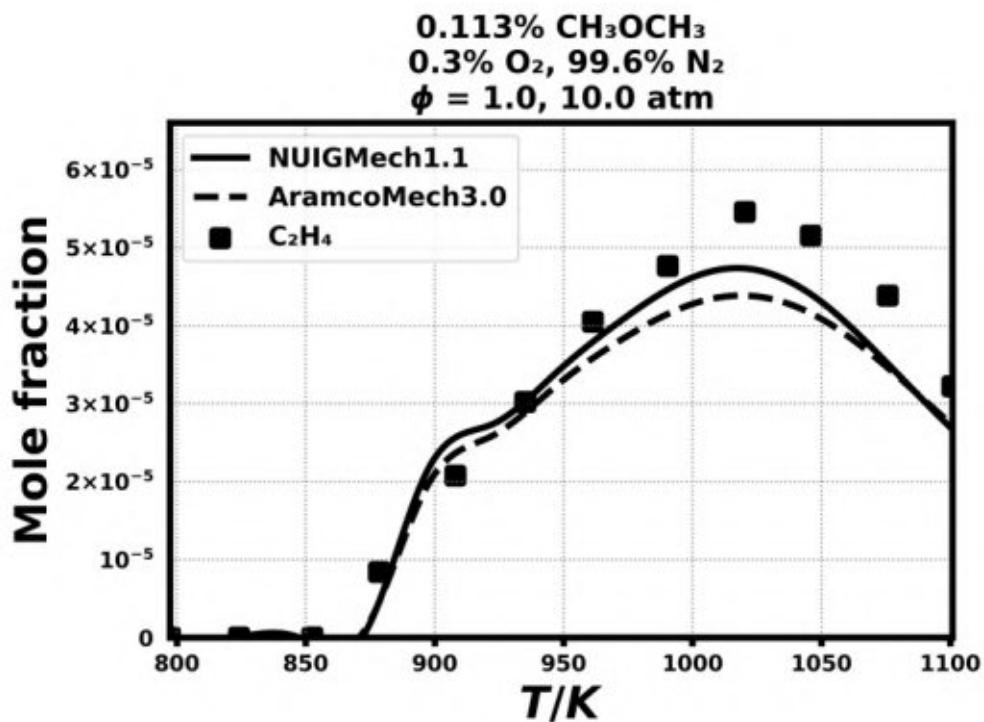
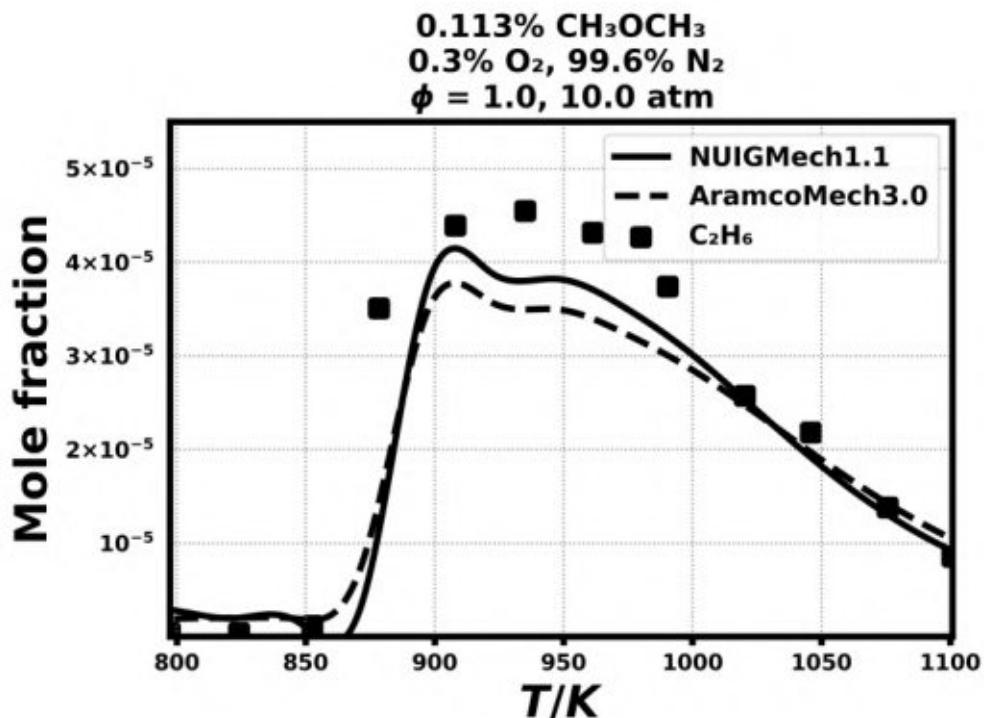


$0.113\% \text{CH}_3\text{OCH}_3$
 $0.3\% \text{O}_2, 99.6\% \text{N}_2$
 $\phi = 1.0, 10.0 \text{ atm}$

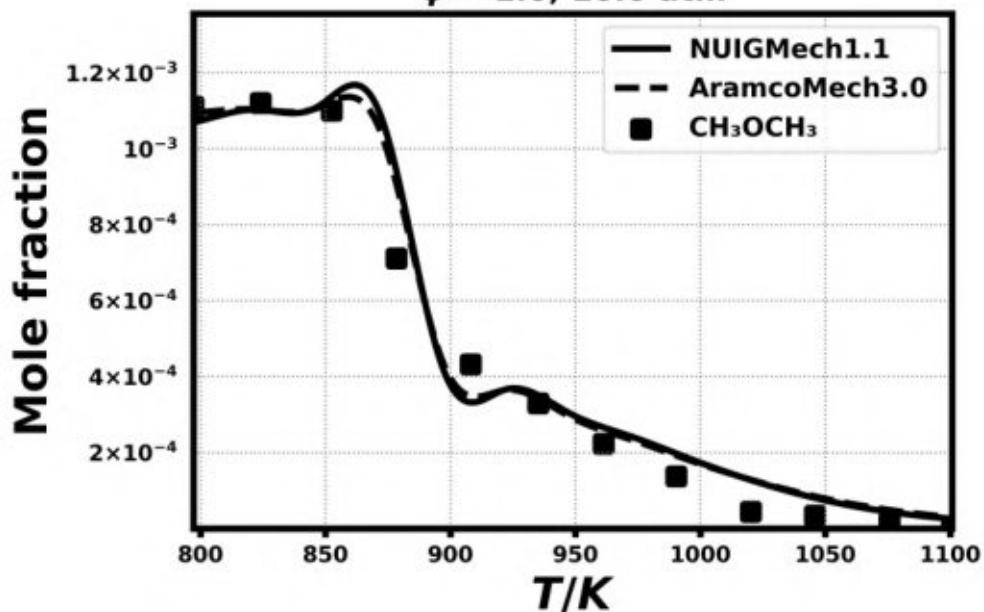


$0.113\% \text{CH}_3\text{OCH}_3$
 $0.3\% \text{O}_2, 99.6\% \text{N}_2$
 $\phi = 1.0, 10.0 \text{ atm}$

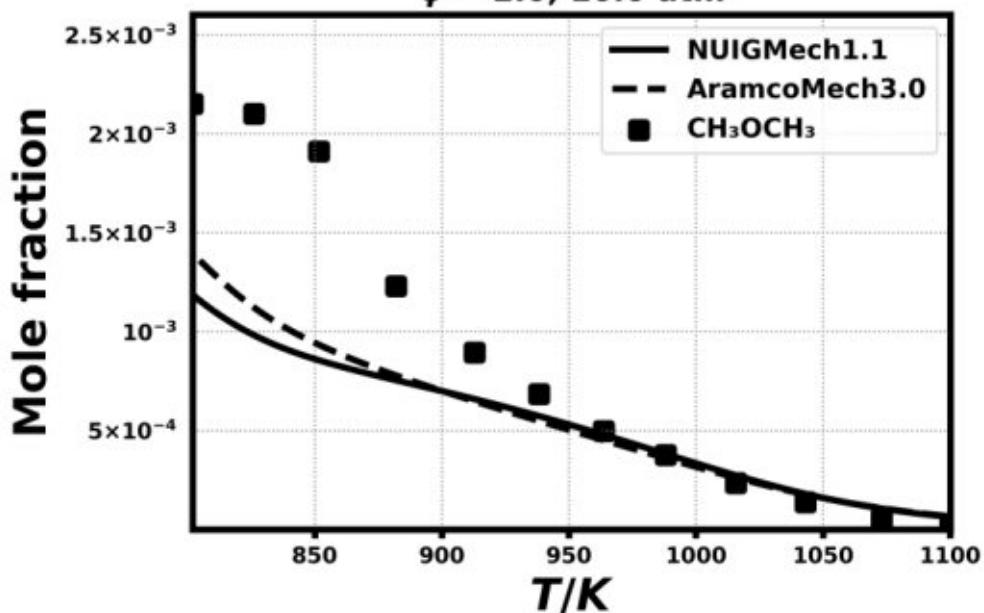




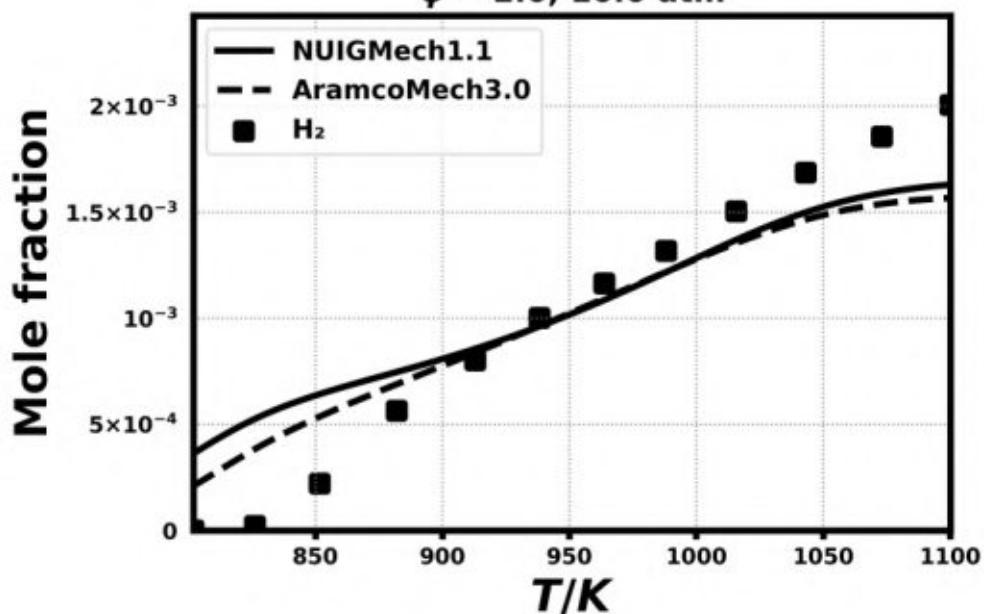
0.113% CH₃OCH₃
0.3% O₂, 99.6% N₂
 $\phi = 1.0, 10.0 \text{ atm}$



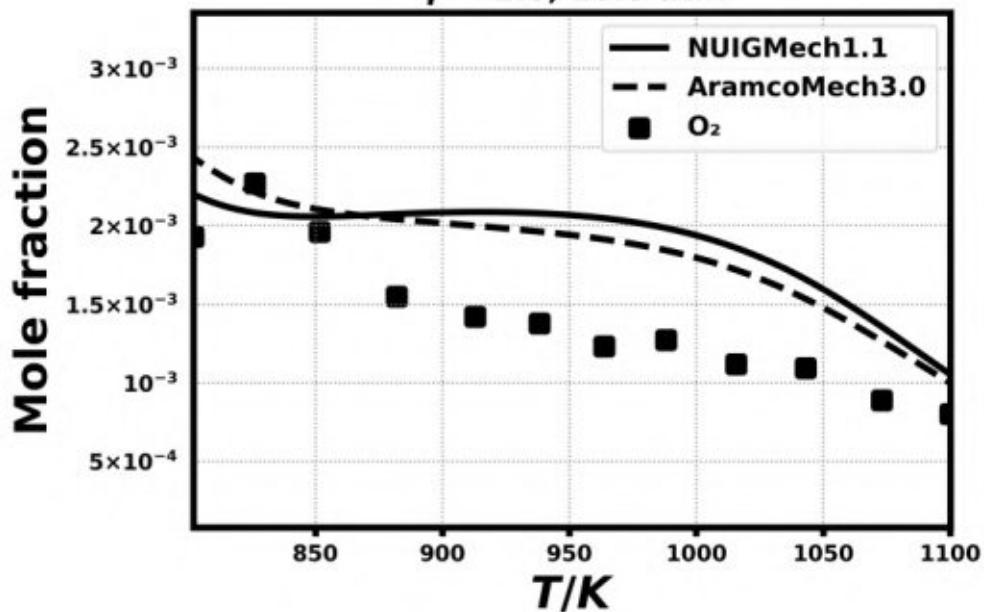
0.2% CH₃OCH₃
0.3% O₂, 99.5% N₂
 $\phi = 2.0, 10.0 \text{ atm}$

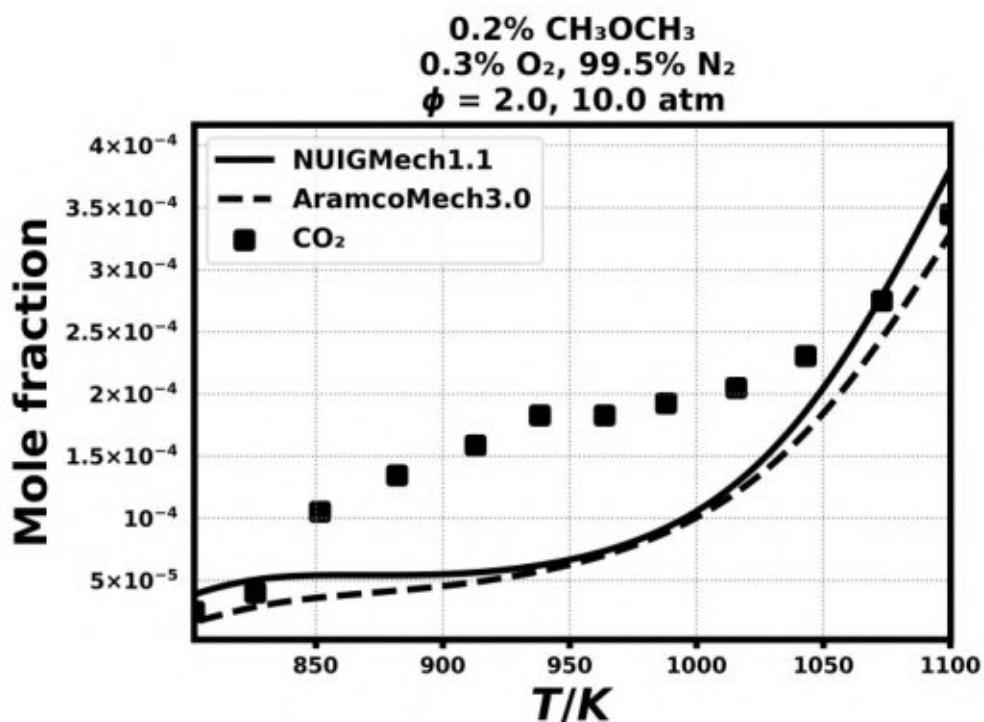
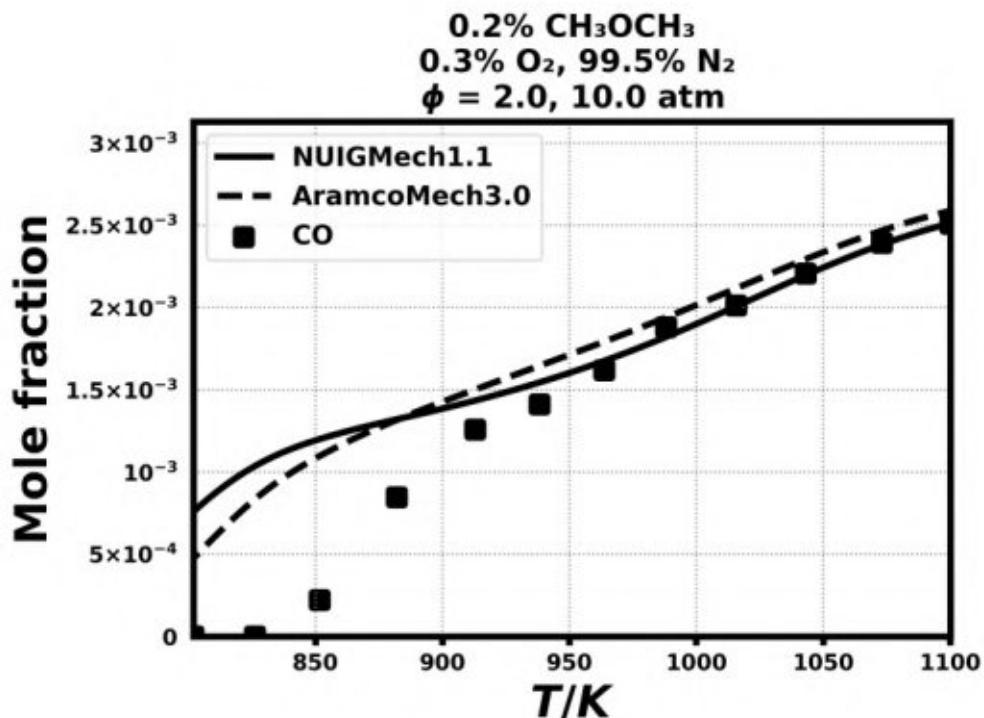


$0.2\% \text{CH}_3\text{OCH}_3$
 $0.3\% \text{O}_2, 99.5\% \text{N}_2$
 $\phi = 2.0, 10.0 \text{ atm}$

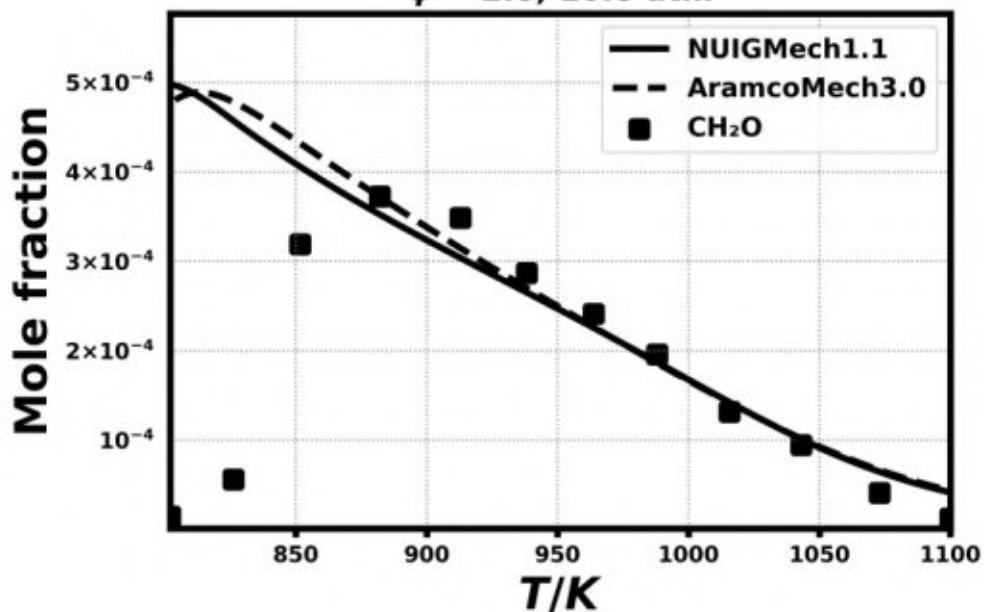


$0.2\% \text{CH}_3\text{OCH}_3$
 $0.3\% \text{O}_2, 99.5\% \text{N}_2$
 $\phi = 2.0, 10.0 \text{ atm}$

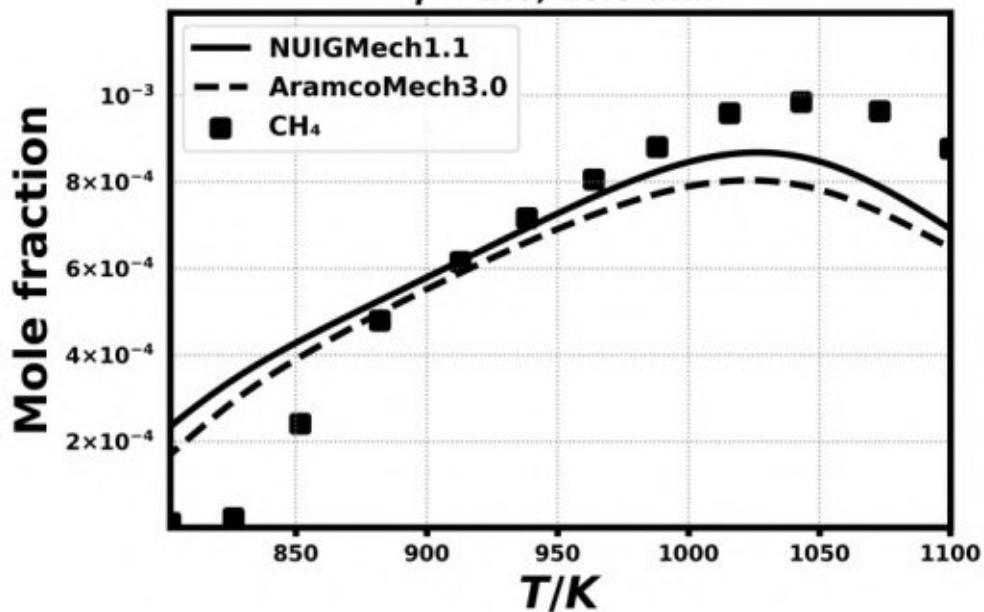




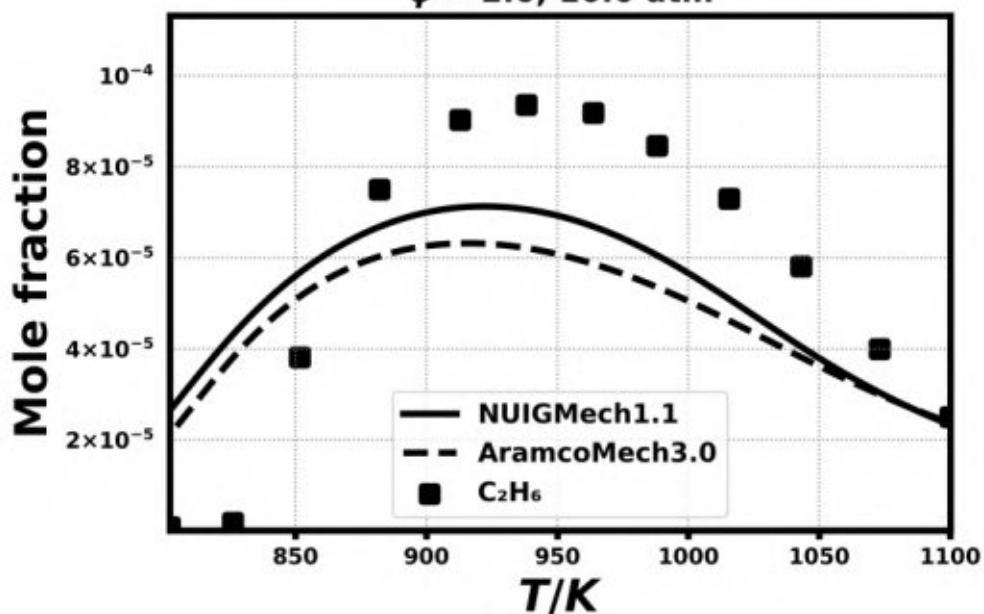
0.2% CH_3OCH_3
0.3% O_2 , 99.5% N_2
 $\phi = 2.0, 10.0 \text{ atm}$



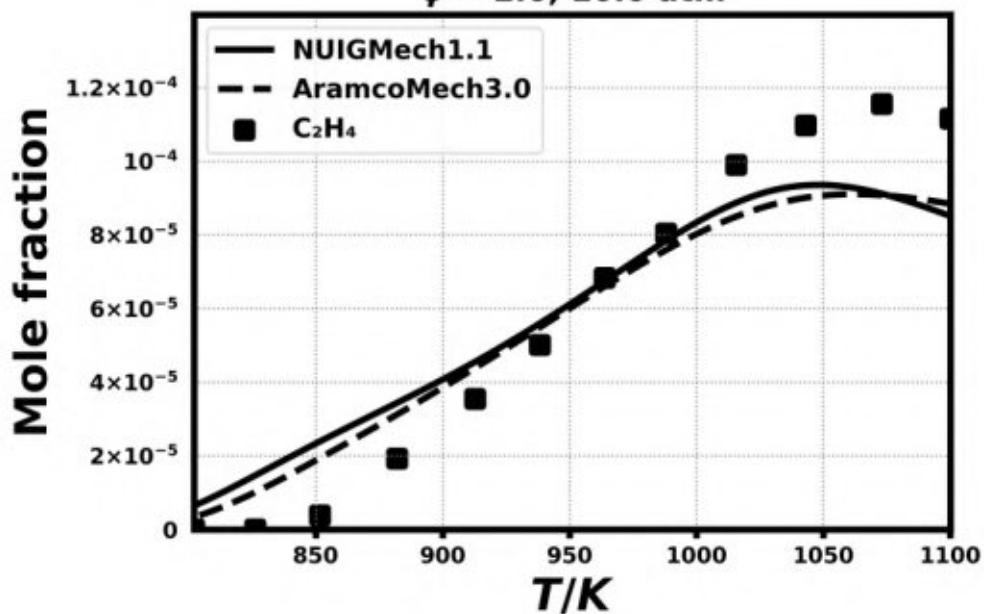
0.2% CH_3OCH_3
0.3% O_2 , 99.5% N_2
 $\phi = 2.0, 10.0 \text{ atm}$



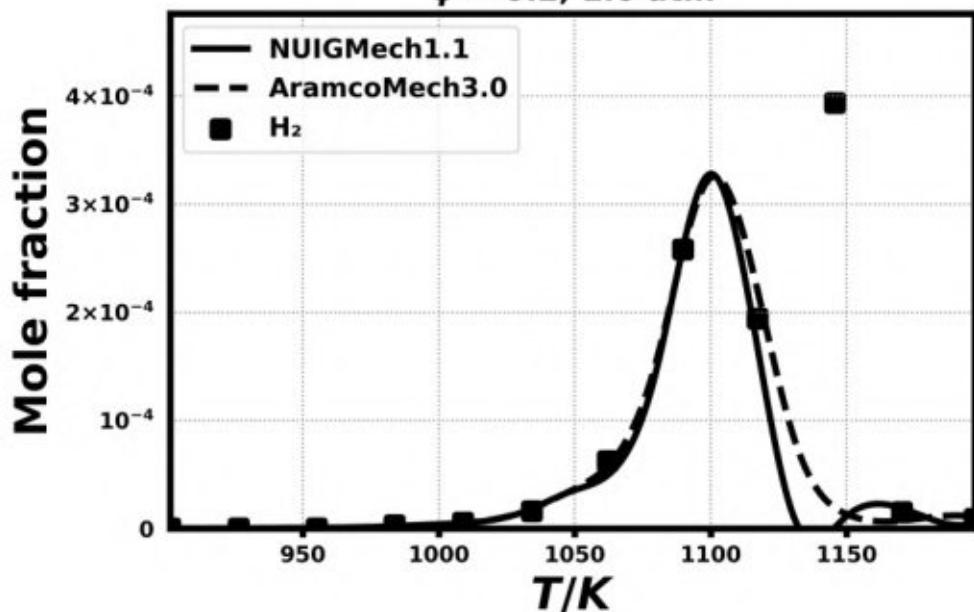
$0.2\% \text{CH}_3\text{OCH}_3$
 $0.3\% \text{O}_2, 99.5\% \text{N}_2$
 $\phi = 2.0, 10.0 \text{ atm}$



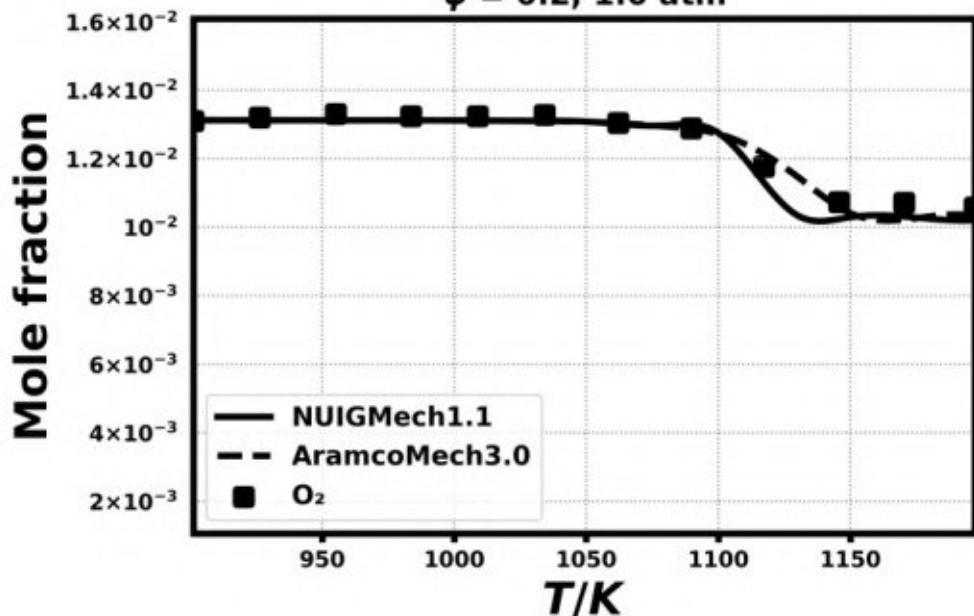
$0.2\% \text{CH}_3\text{OCH}_3$
 $0.3\% \text{O}_2, 99.5\% \text{N}_2$
 $\phi = 2.0, 10.0 \text{ atm}$



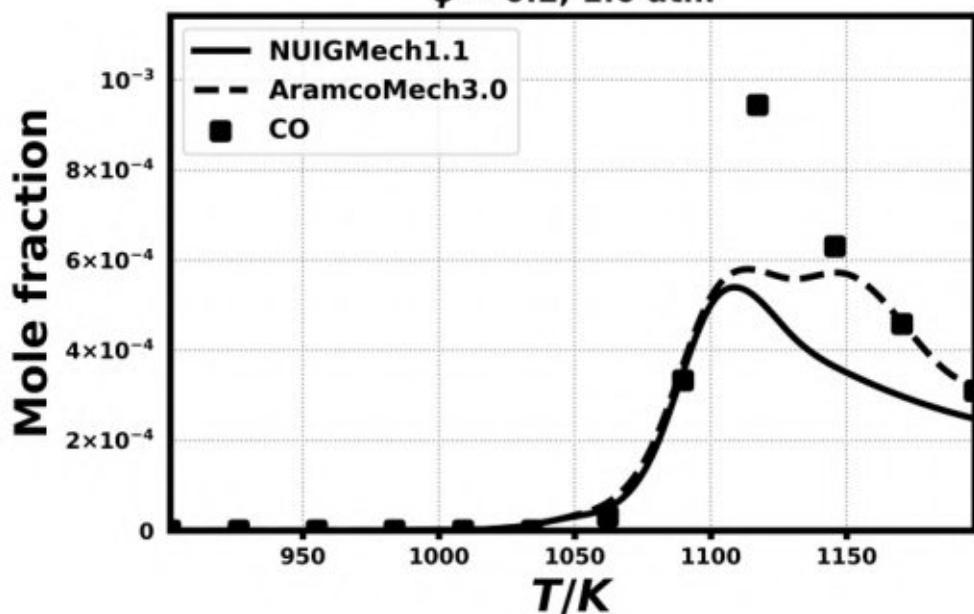
$0.1\% \text{CH}_3\text{OCH}_3$
 $1.31\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.2, 1.0 \text{ atm}$



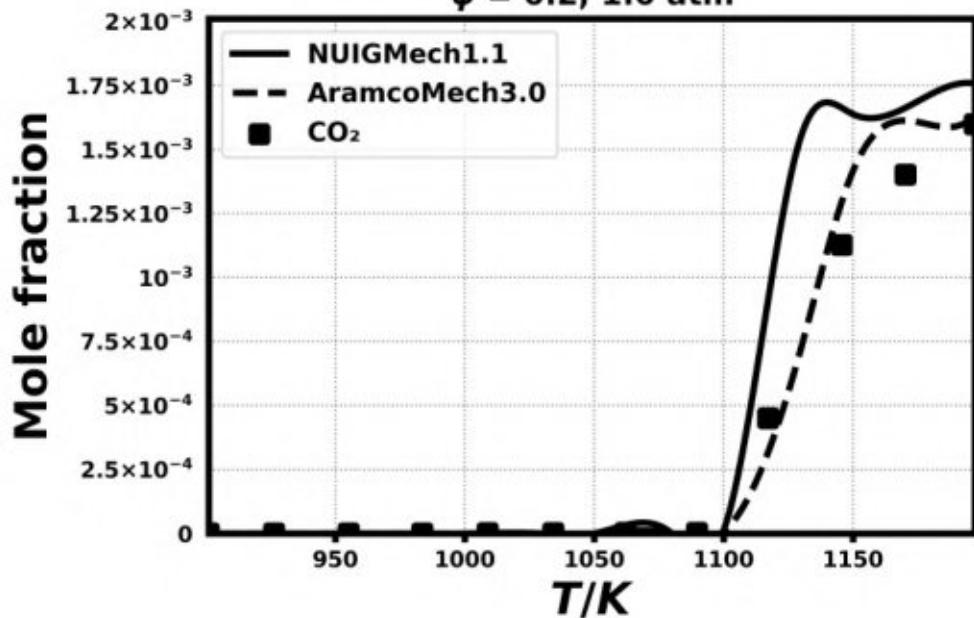
$0.1\% \text{CH}_3\text{OCH}_3$
 $1.31\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.2, 1.0 \text{ atm}$

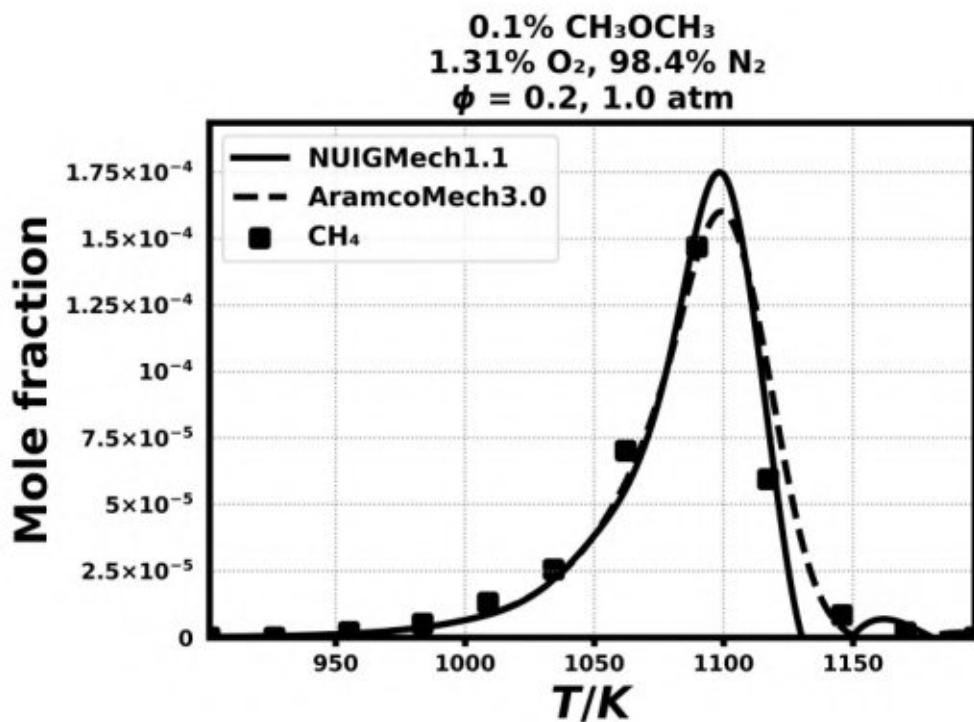
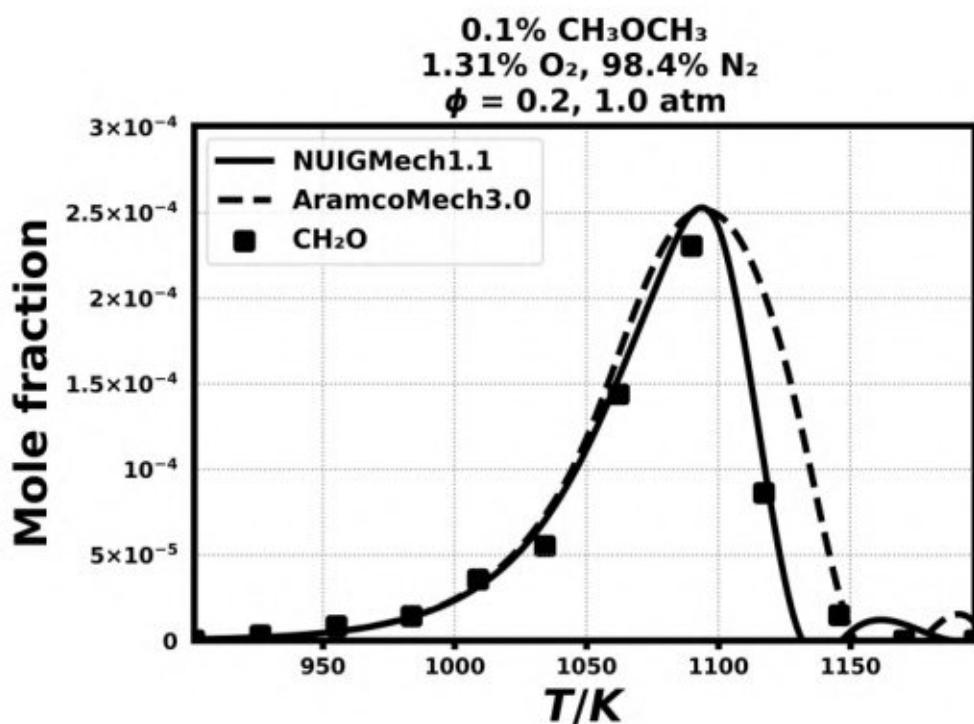


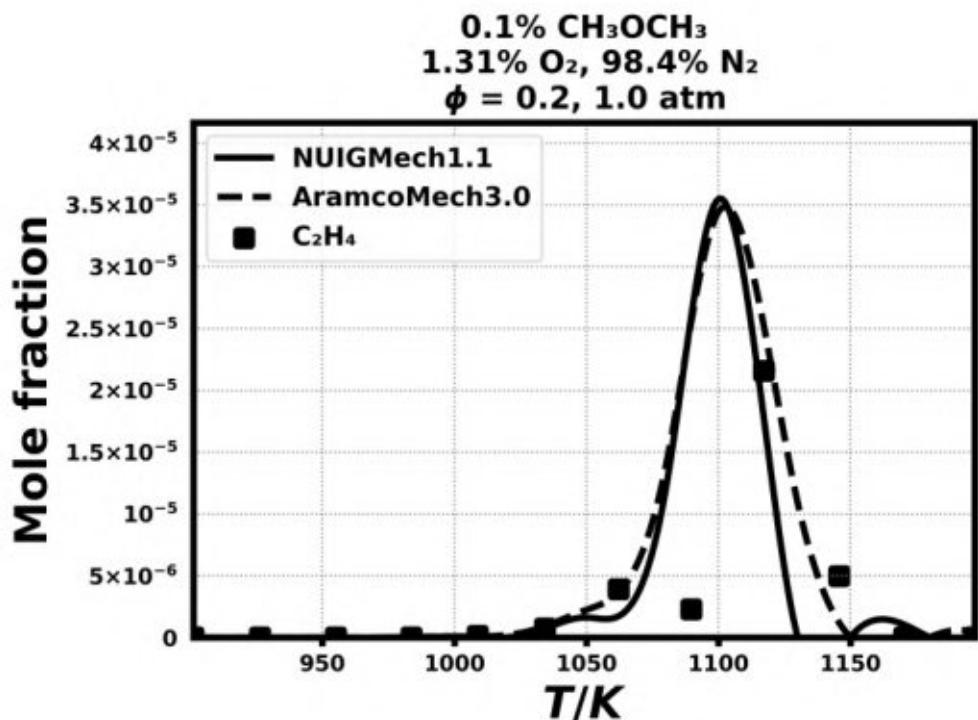
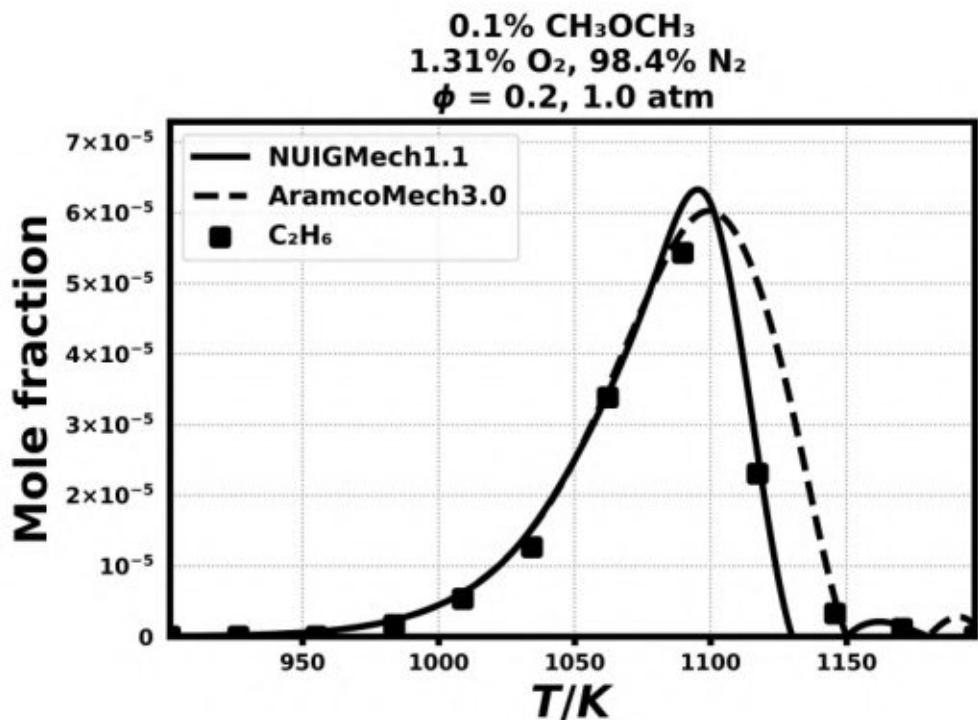
0.1% CH₃OCH₃
1.31% O₂, 98.4% N₂
 $\phi = 0.2, 1.0 \text{ atm}$

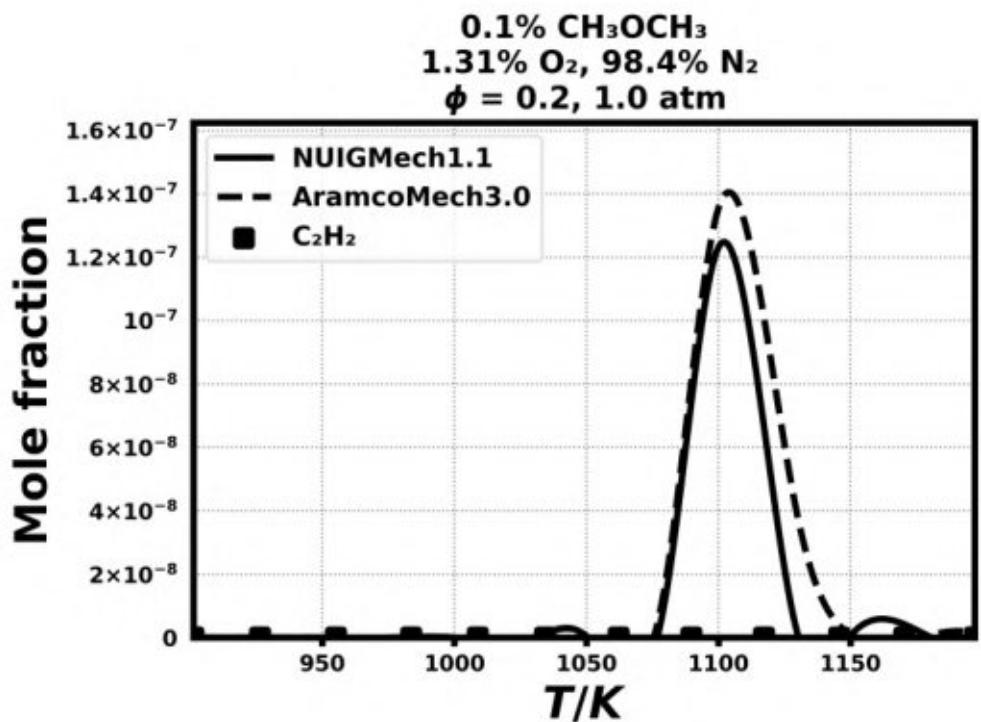
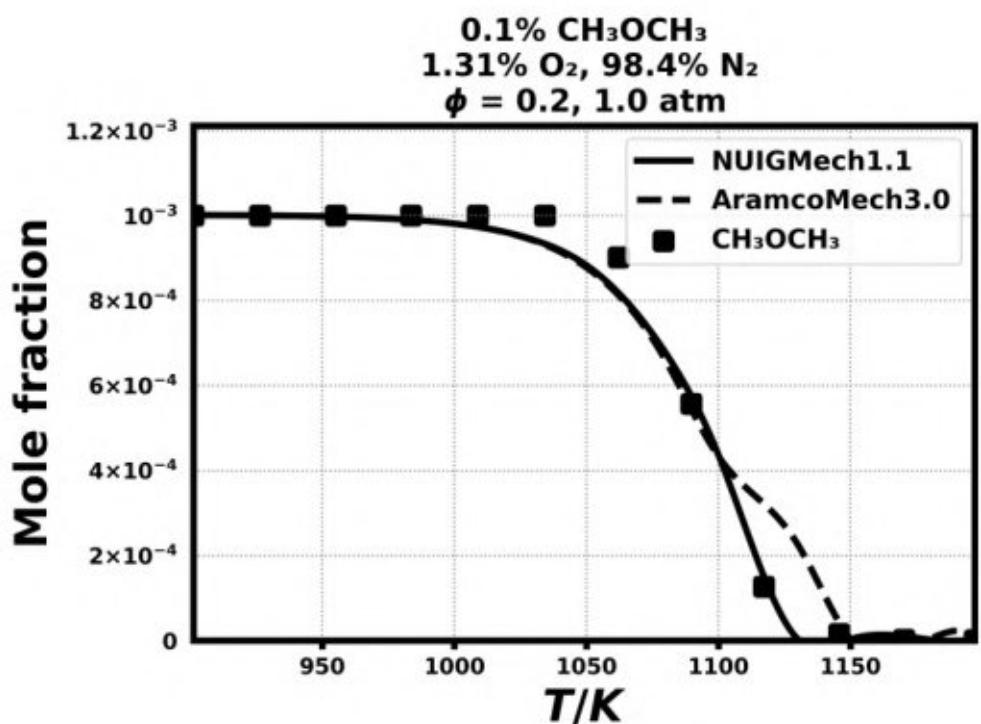


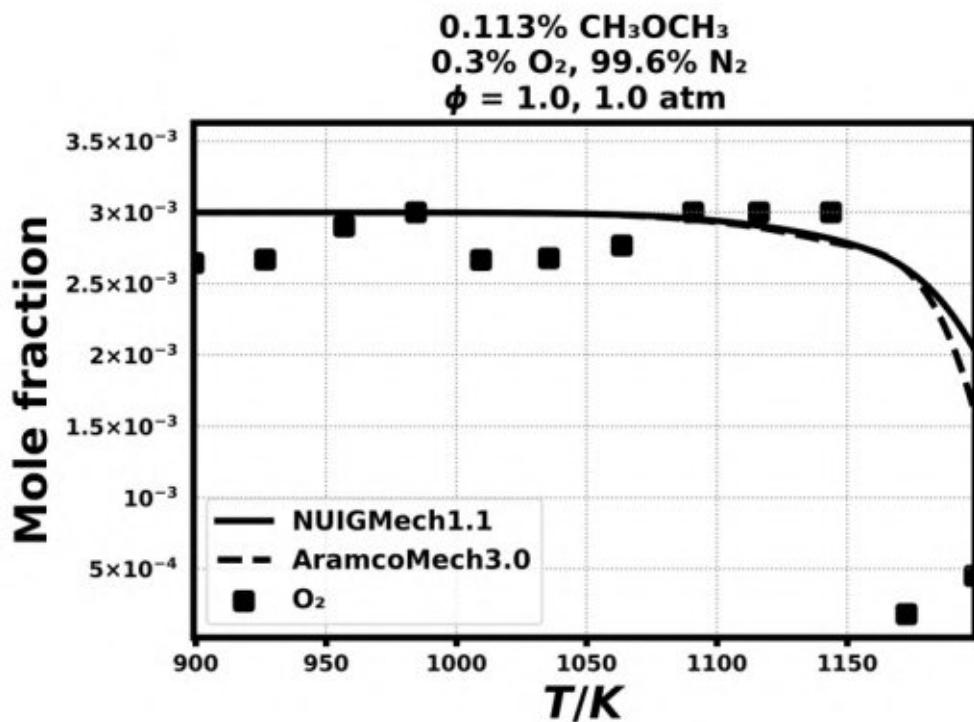
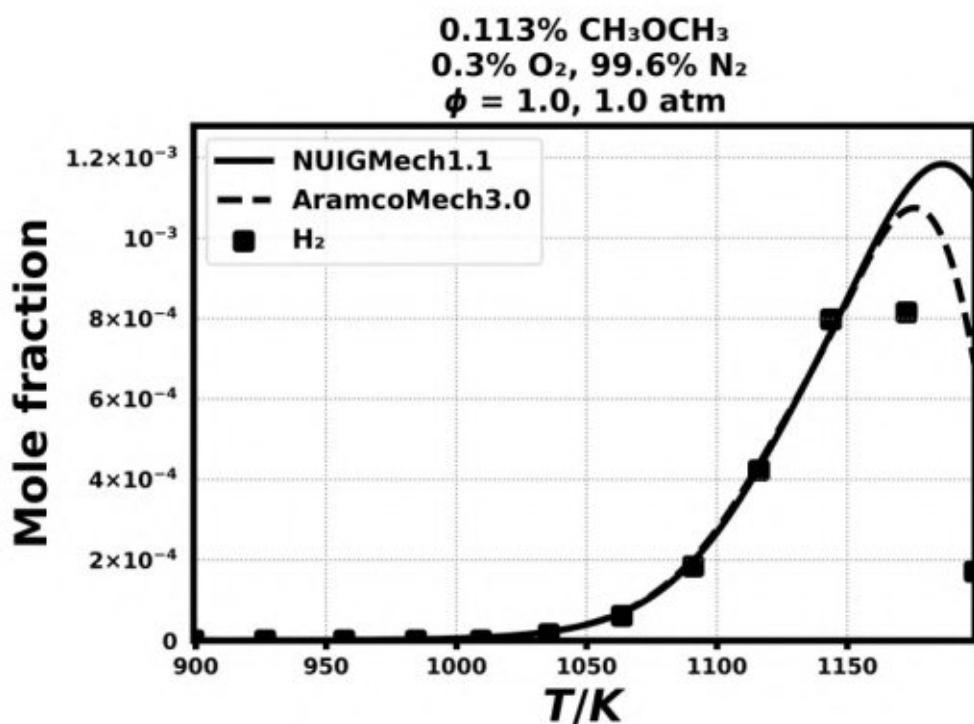
0.1% CH₃OCH₃
1.31% O₂, 98.4% N₂
 $\phi = 0.2, 1.0 \text{ atm}$

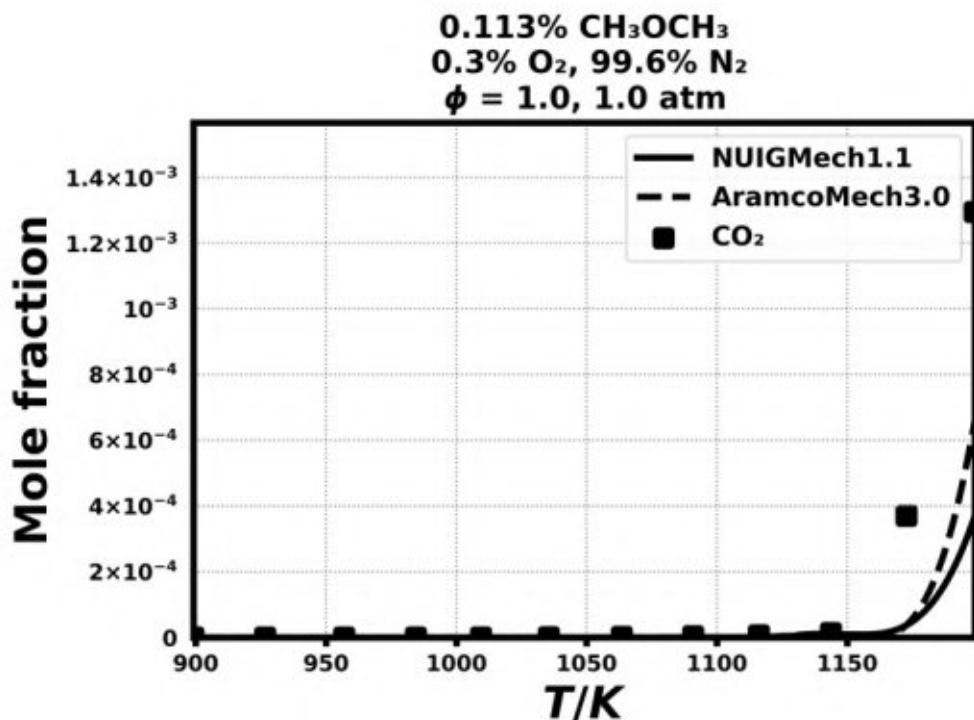
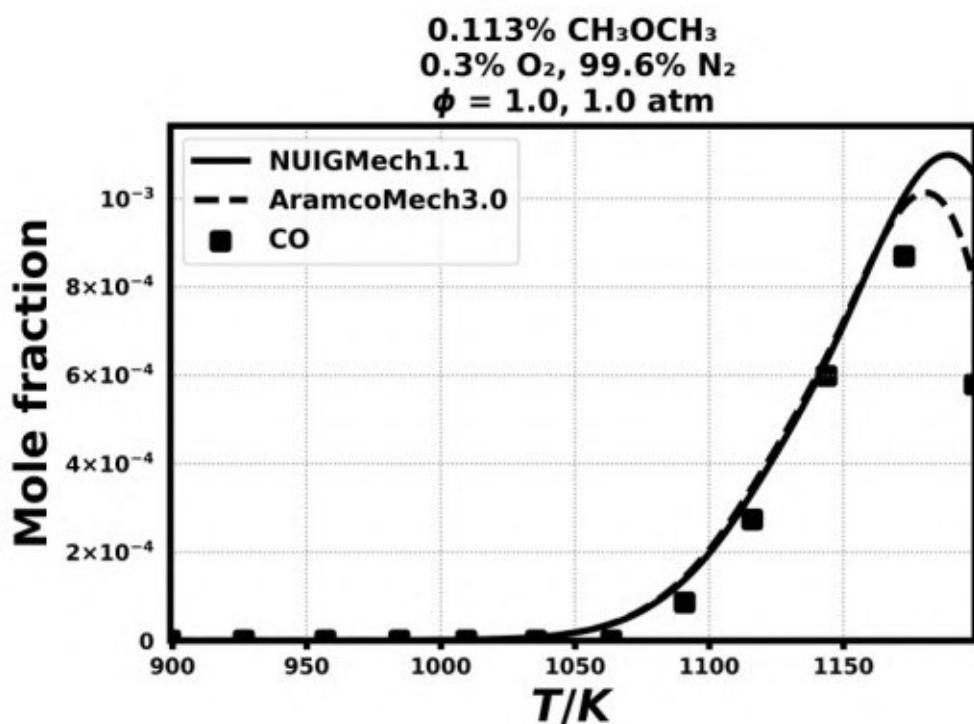


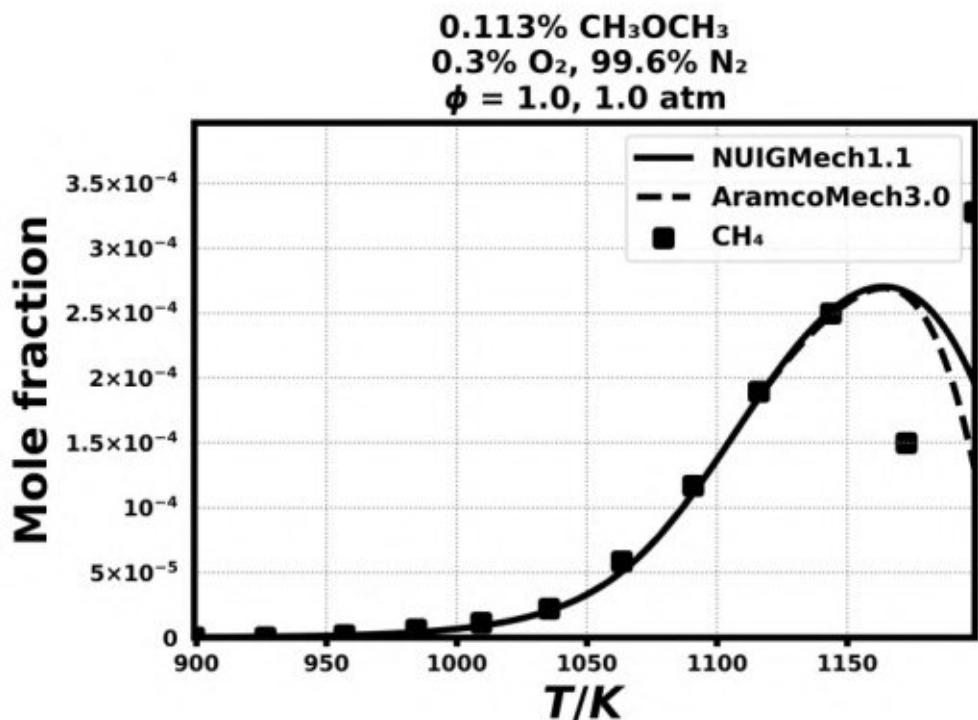
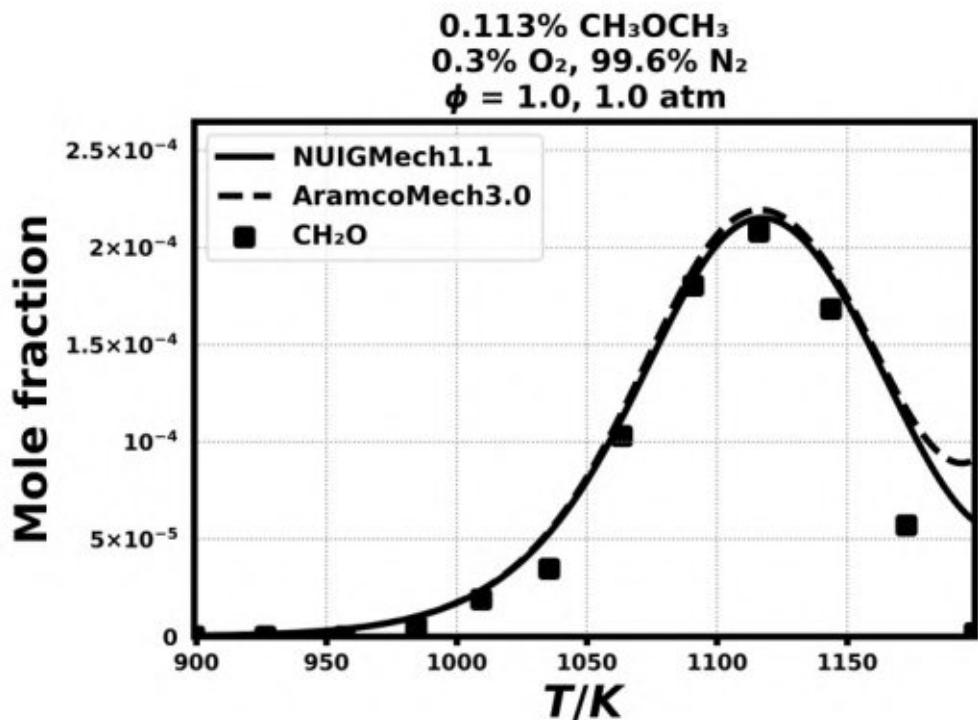




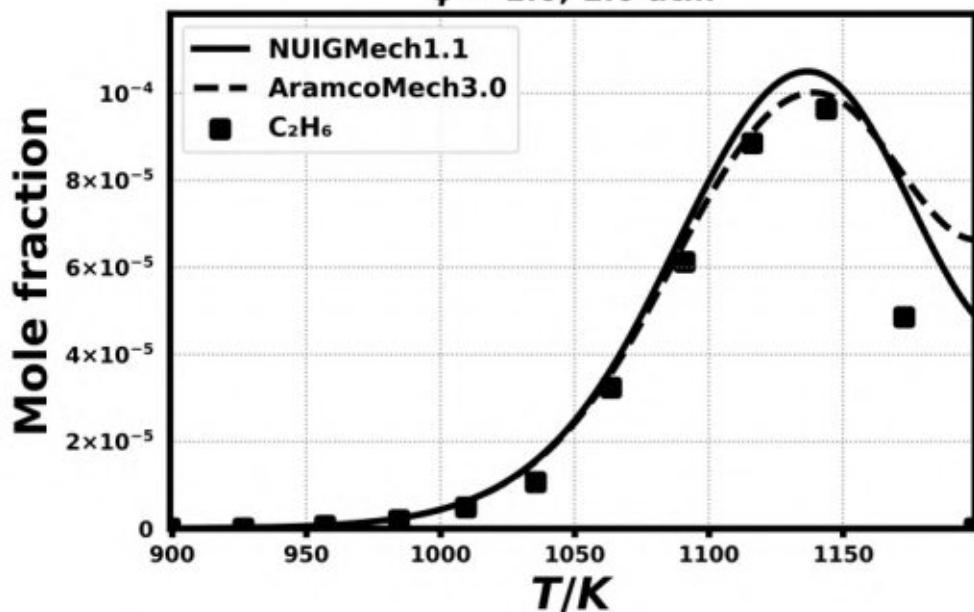




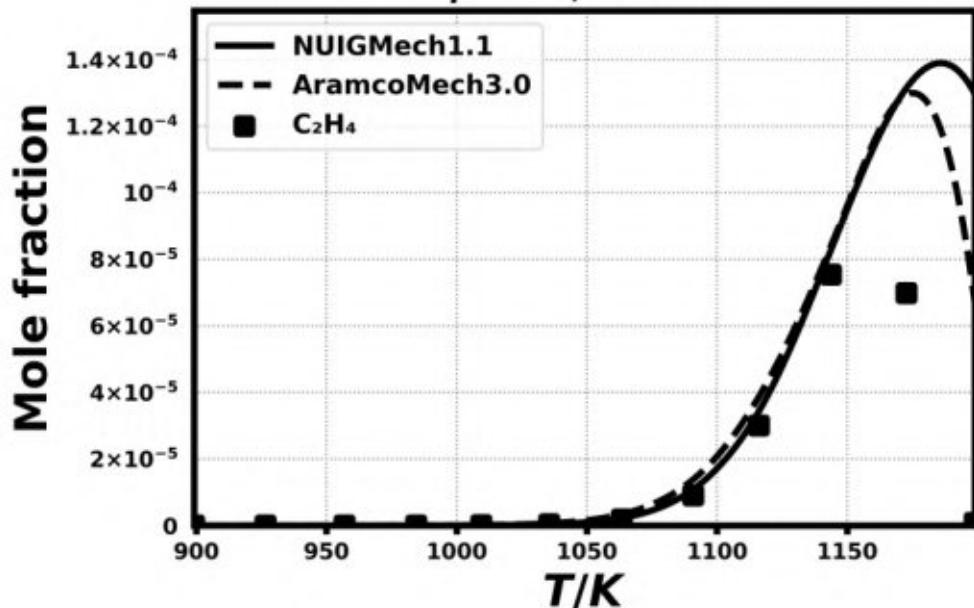


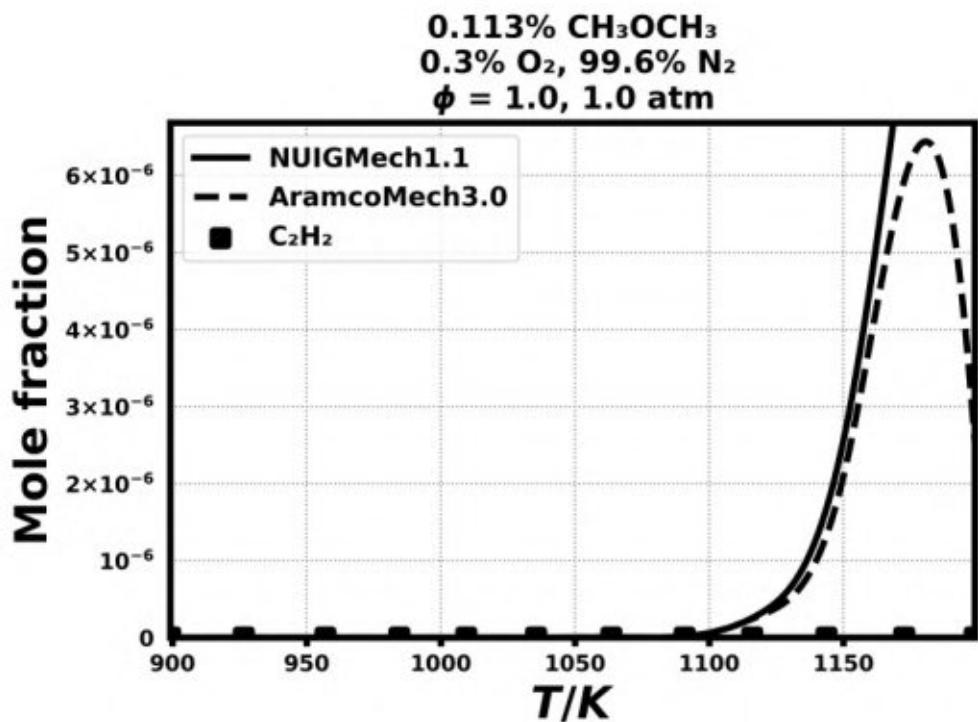
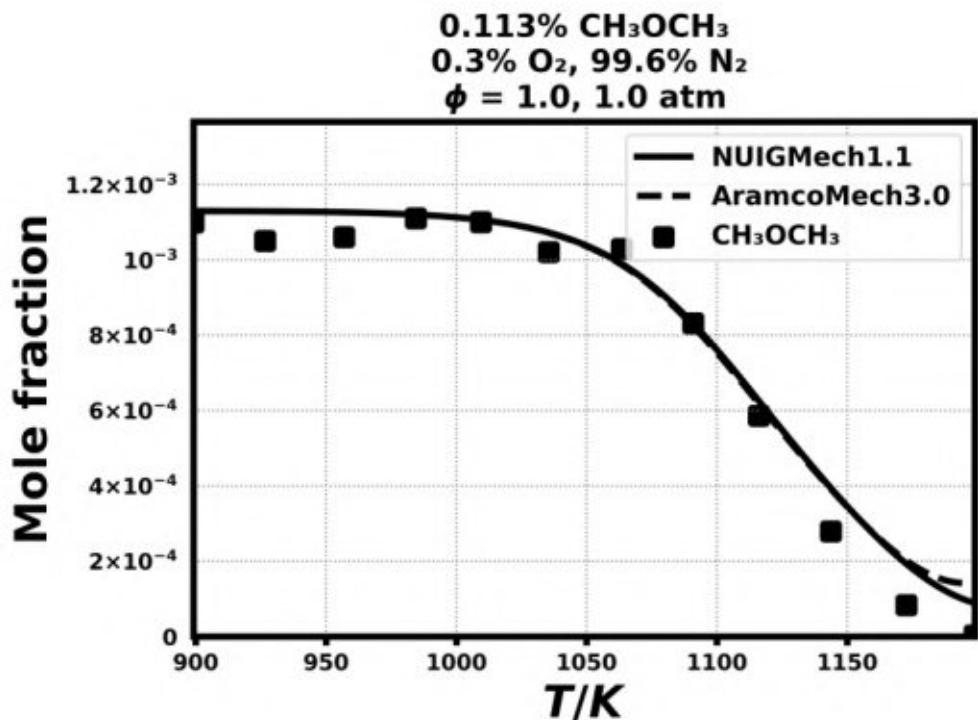


0.113% CH₃OCH₃
0.3% O₂, 99.6% N₂
 $\phi = 1.0, 1.0 \text{ atm}$

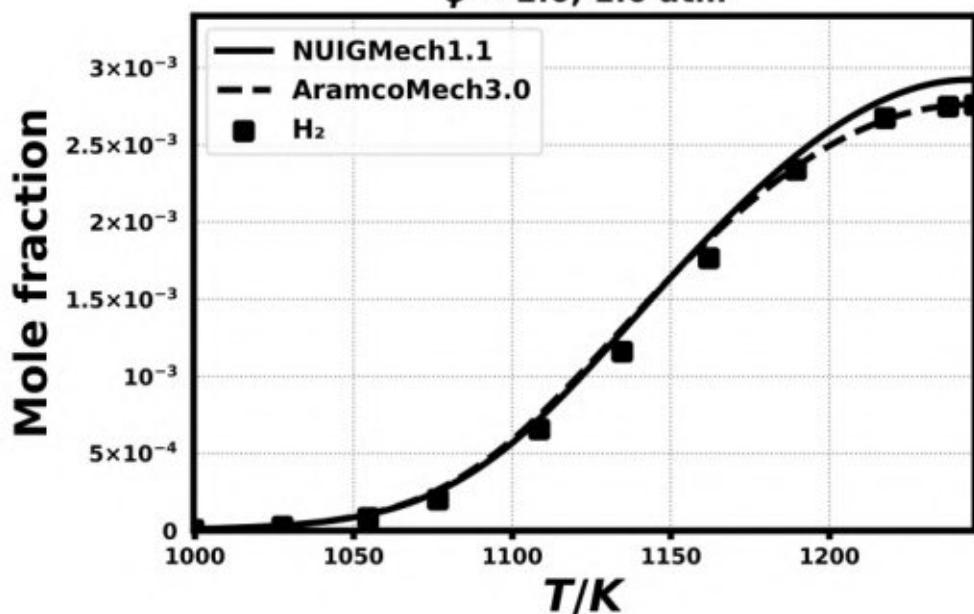


0.113% CH₃OCH₃
0.3% O₂, 99.6% N₂
 $\phi = 1.0, 1.0 \text{ atm}$

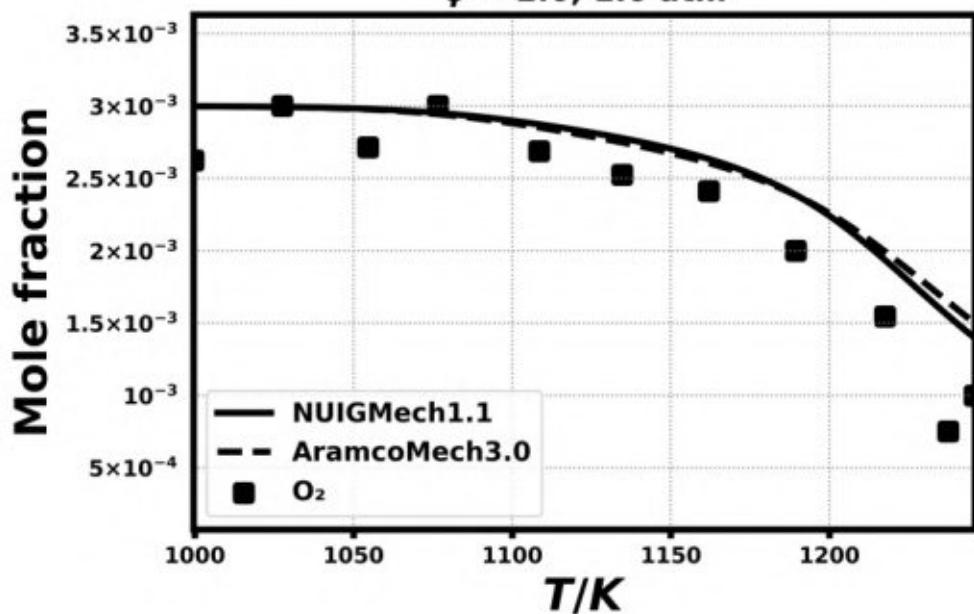




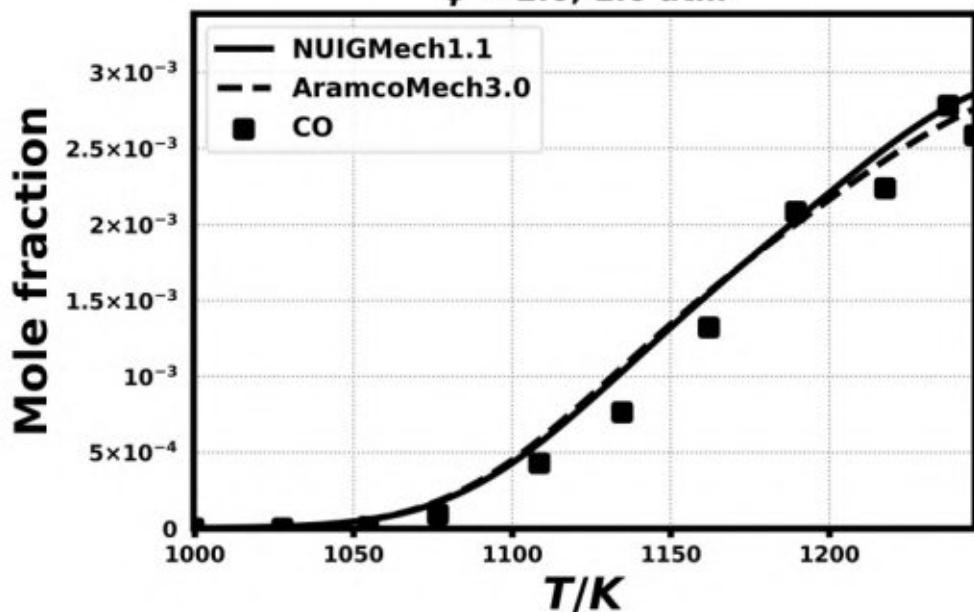
0.215% CH₃OCH₃
0.3% O₂, 99.5% N₂
 $\phi = 2.0, 1.0 \text{ atm}$



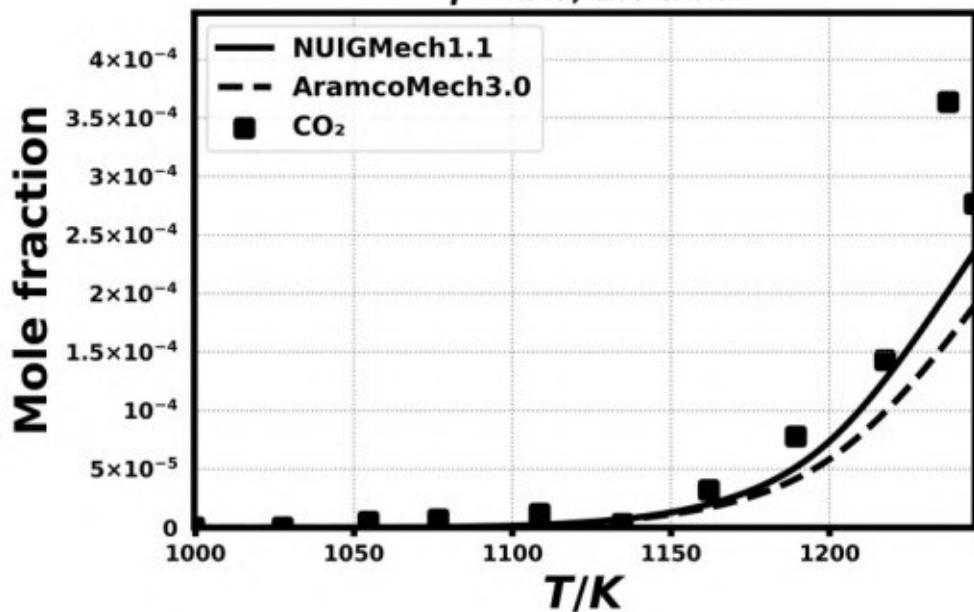
0.215% CH₃OCH₃
0.3% O₂, 99.5% N₂
 $\phi = 2.0, 1.0 \text{ atm}$

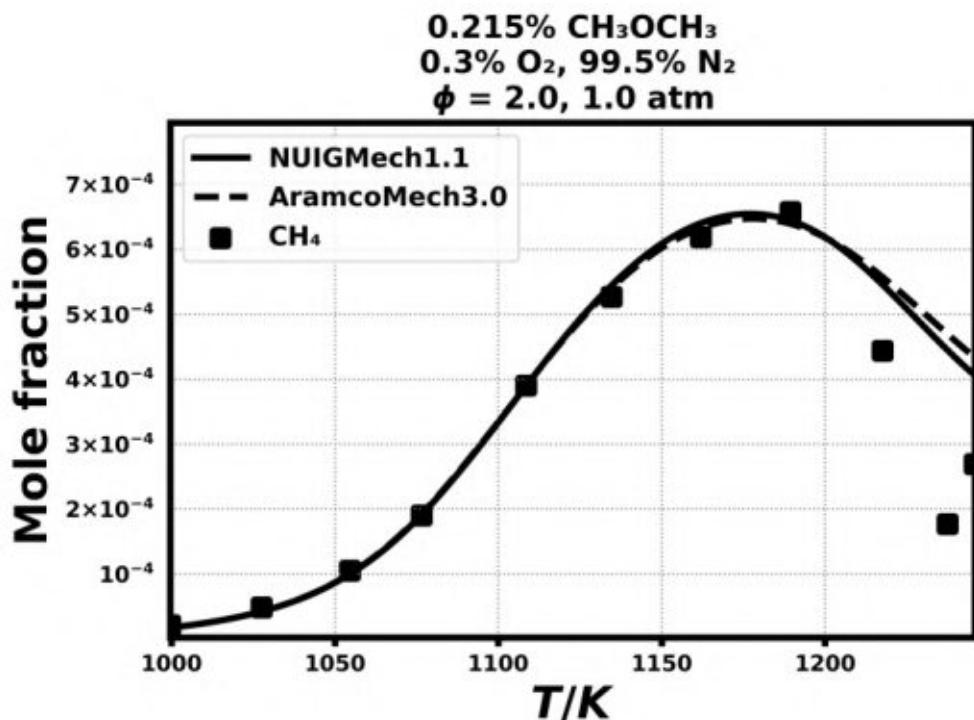
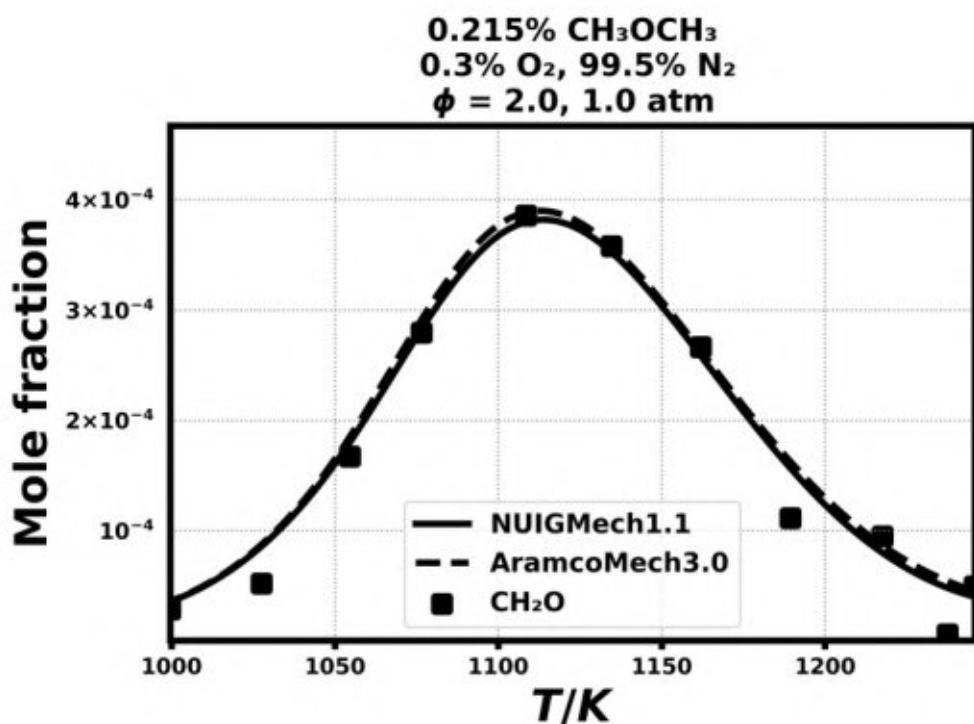


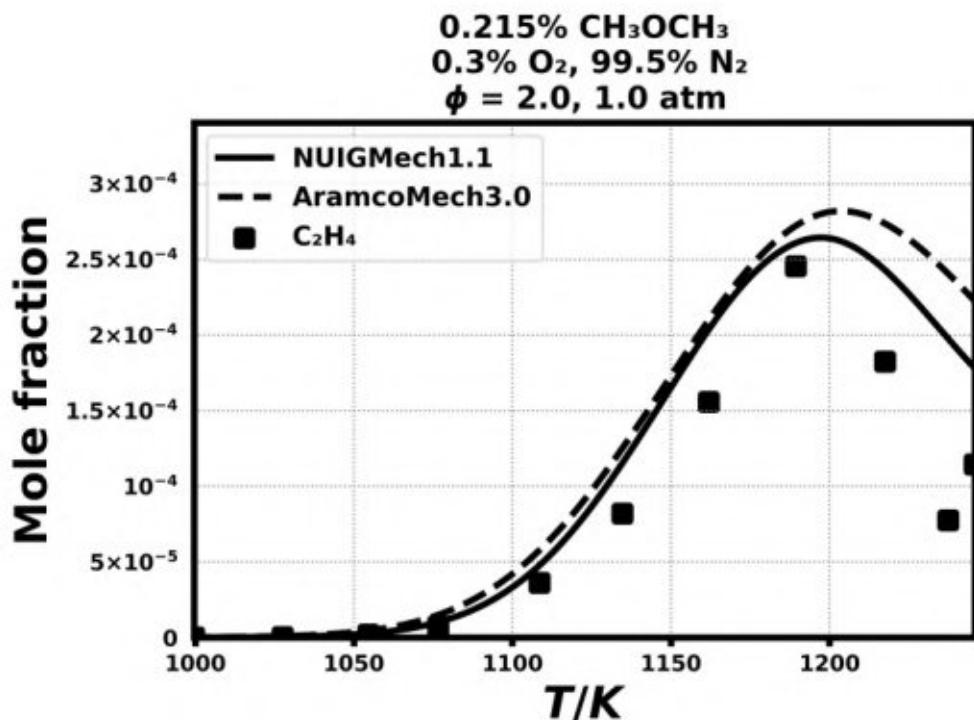
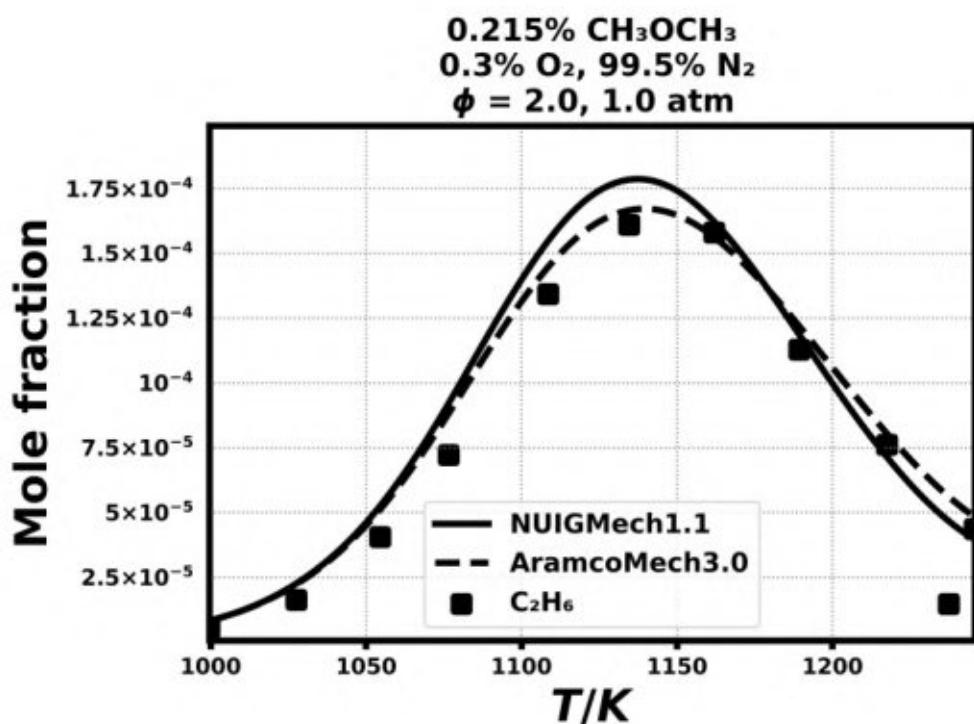
0.215% CH₃OCH₃
0.3% O₂, 99.5% N₂
 $\phi = 2.0, 1.0 \text{ atm}$

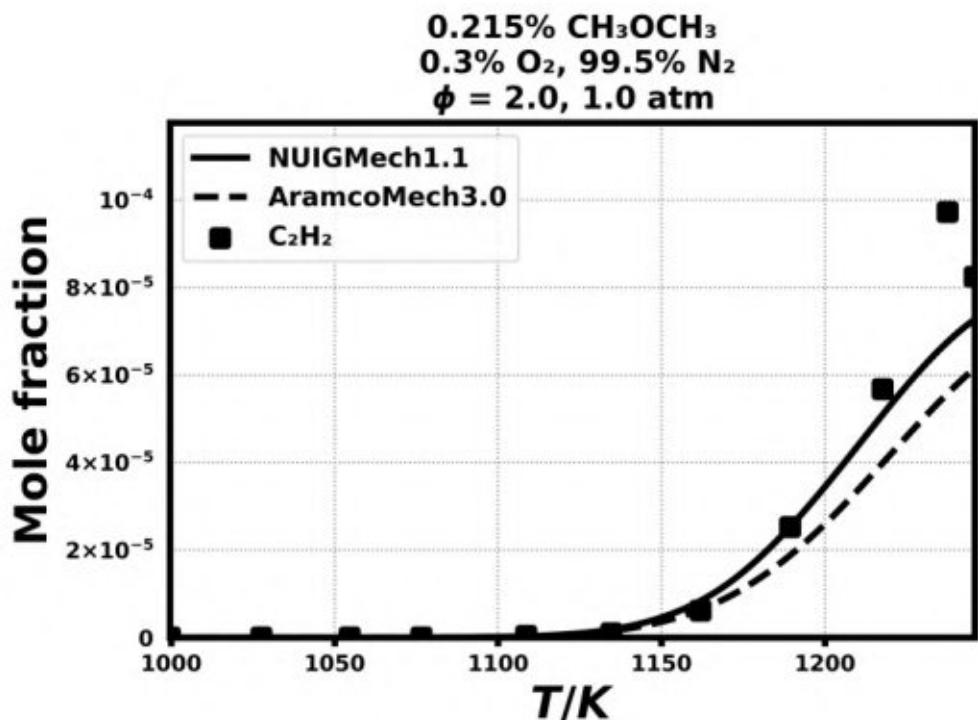
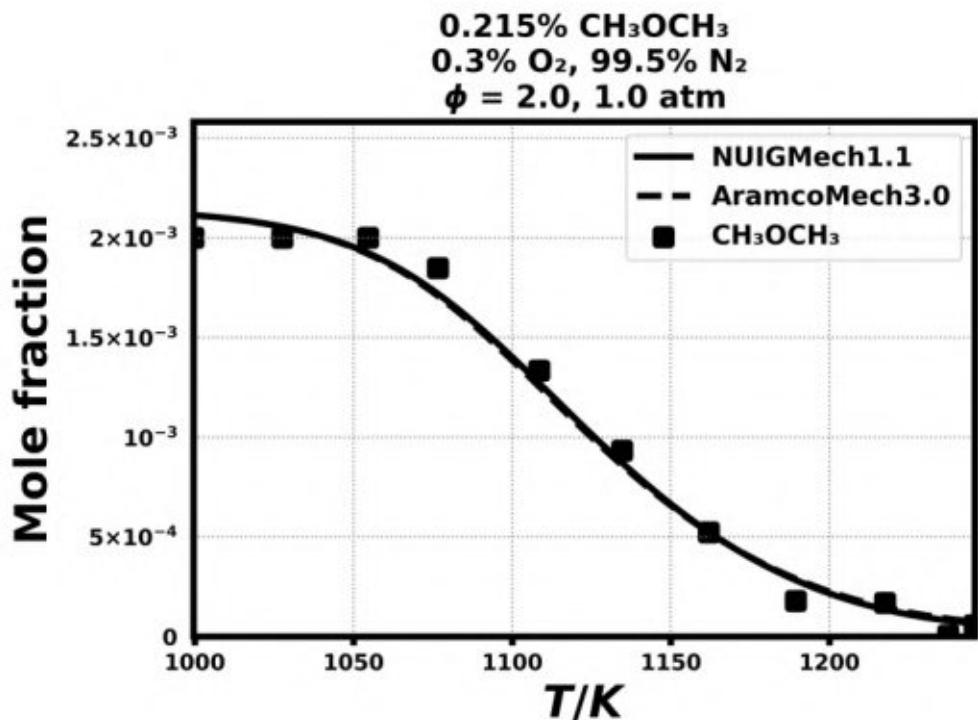


0.215% CH₃OCH₃
0.3% O₂, 99.5% N₂
 $\phi = 2.0, 1.0 \text{ atm}$

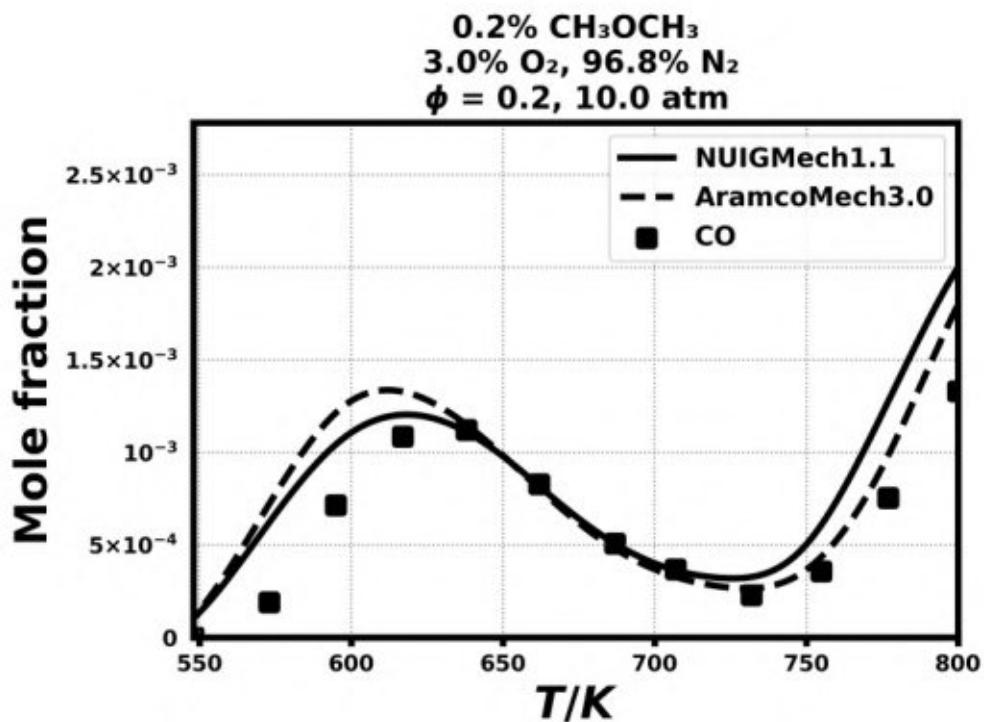
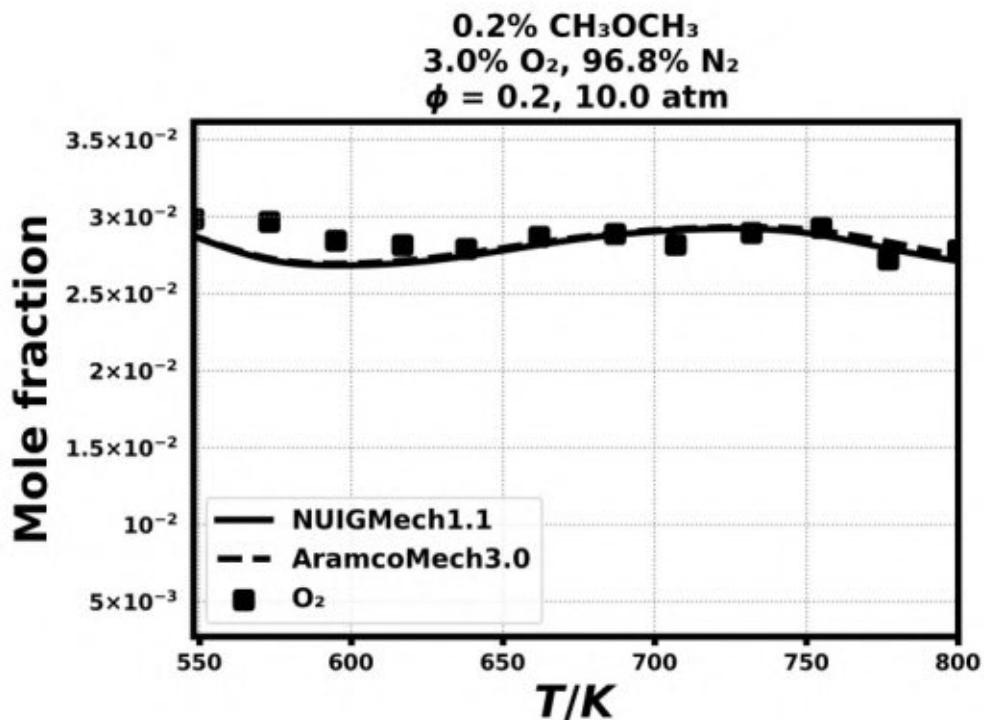




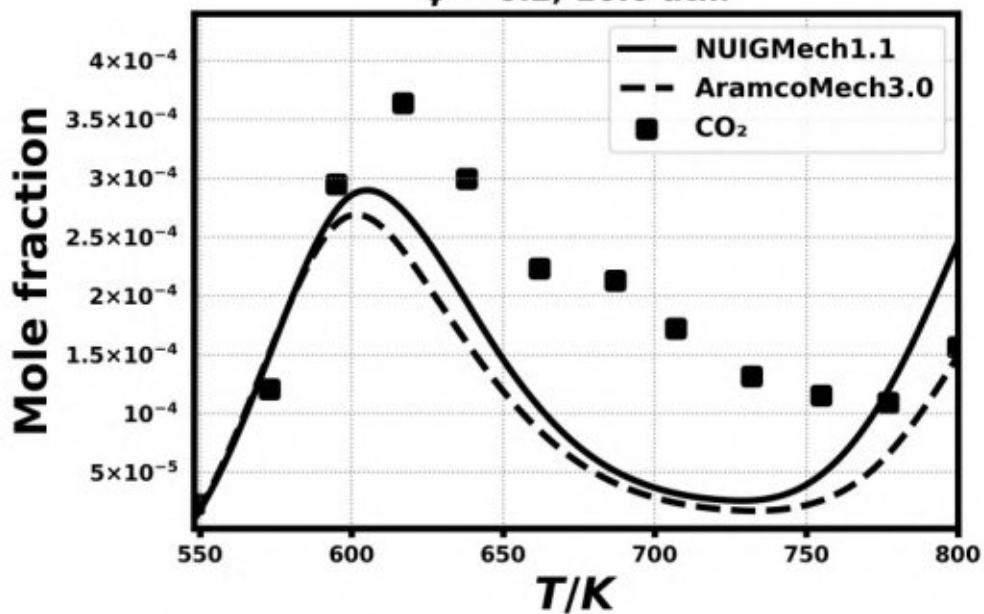




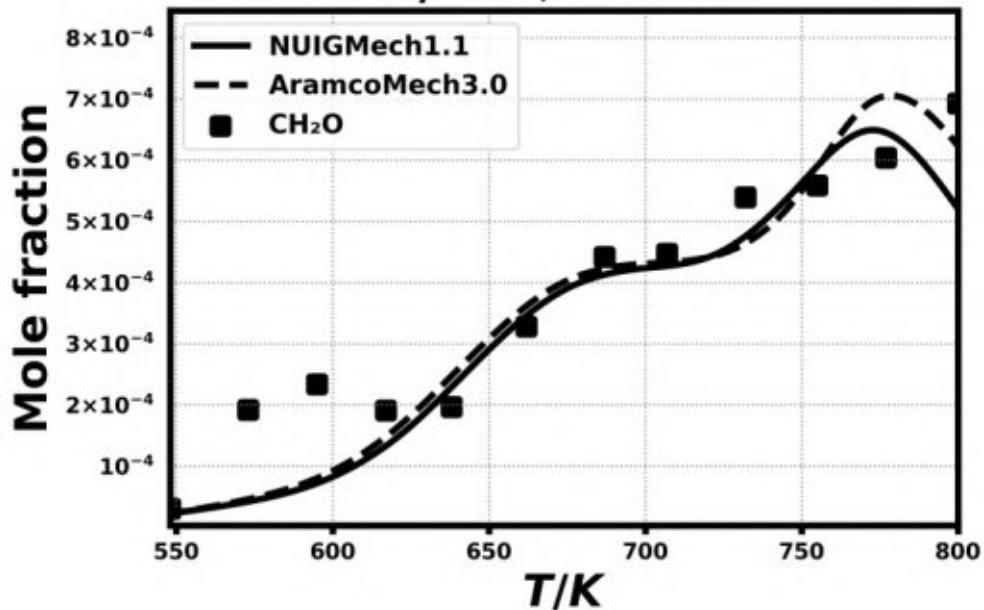
14.12) Dagaut, Philippe, Catherine Daly, John M. Simmie, and Michel Cathonnet. In Symposium (International) on Combustion., 27 (1998) 361-369



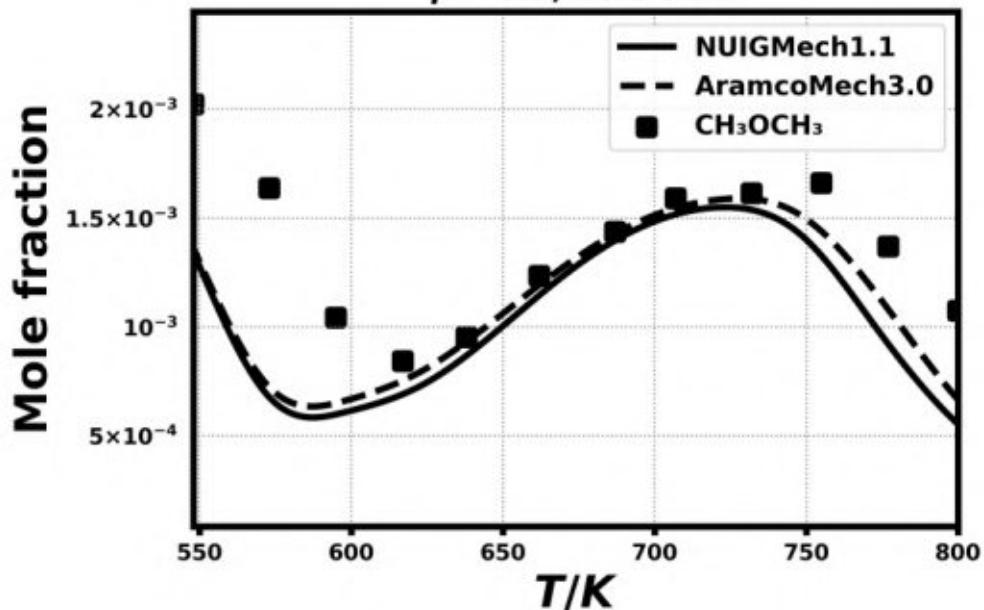
$0.2\% \text{CH}_3\text{OCH}_3$
 $3.0\% \text{O}_2, 96.8\% \text{N}_2$
 $\phi = 0.2, 10.0 \text{ atm}$



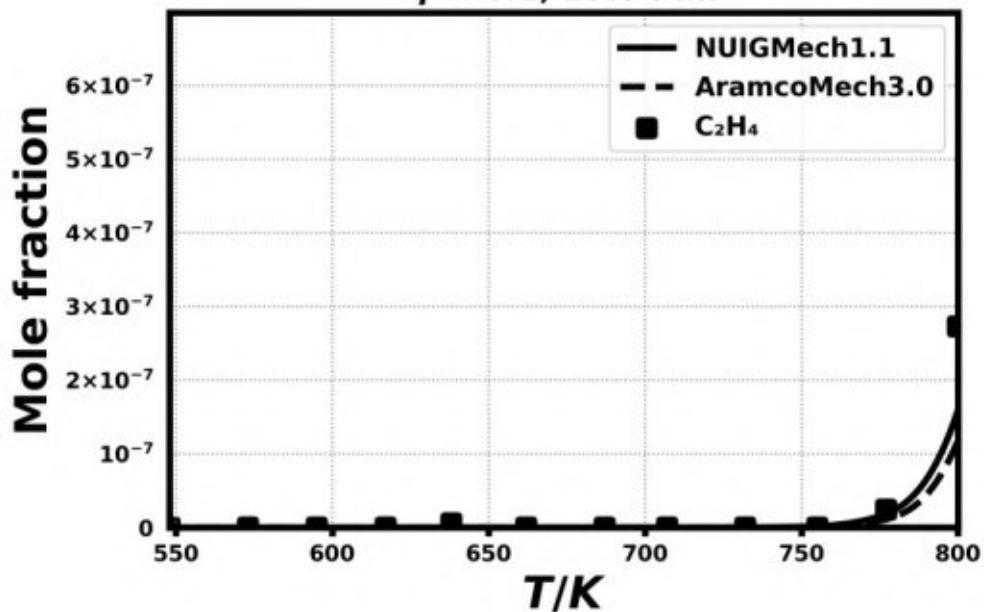
$0.2\% \text{CH}_3\text{OCH}_3$
 $3.0\% \text{O}_2, 96.8\% \text{N}_2$
 $\phi = 0.2, 10.0 \text{ atm}$



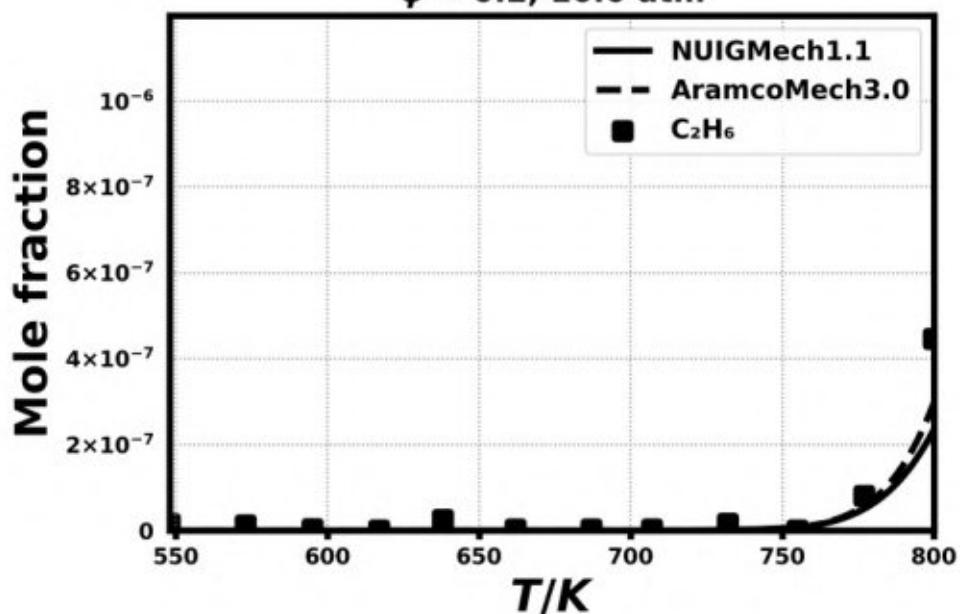
0.2% CH₃OCH₃
3.0% O₂, 96.8% N₂
 $\phi = 0.2, 10.0 \text{ atm}$



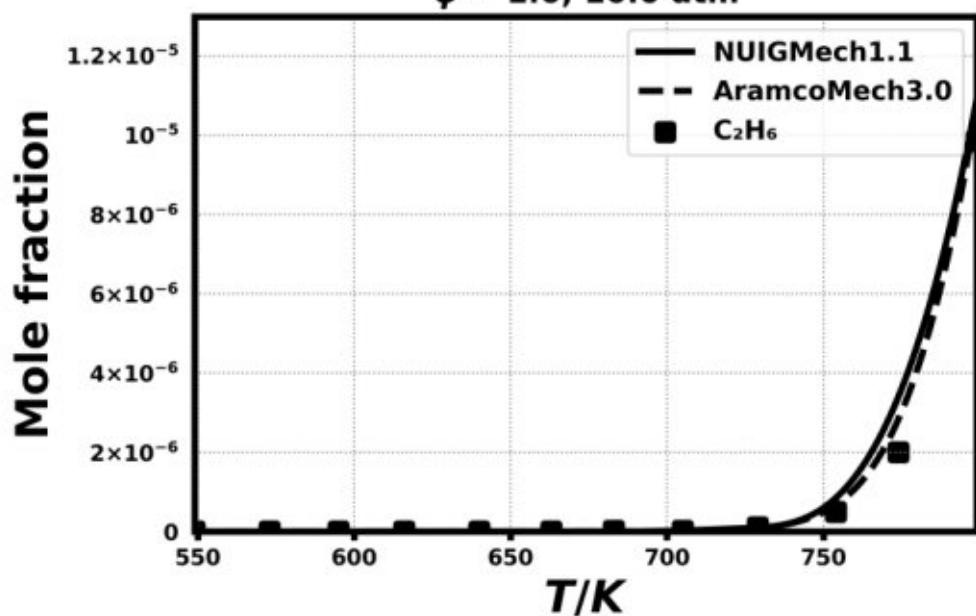
0.2% CH₃OCH₃
3.0% O₂, 96.8% N₂
 $\phi = 0.2, 10.0 \text{ atm}$



0.2% CH₃OCH₃
3.0% O₂, 96.8% N₂
 $\phi = 0.2, 10.0 \text{ atm}$

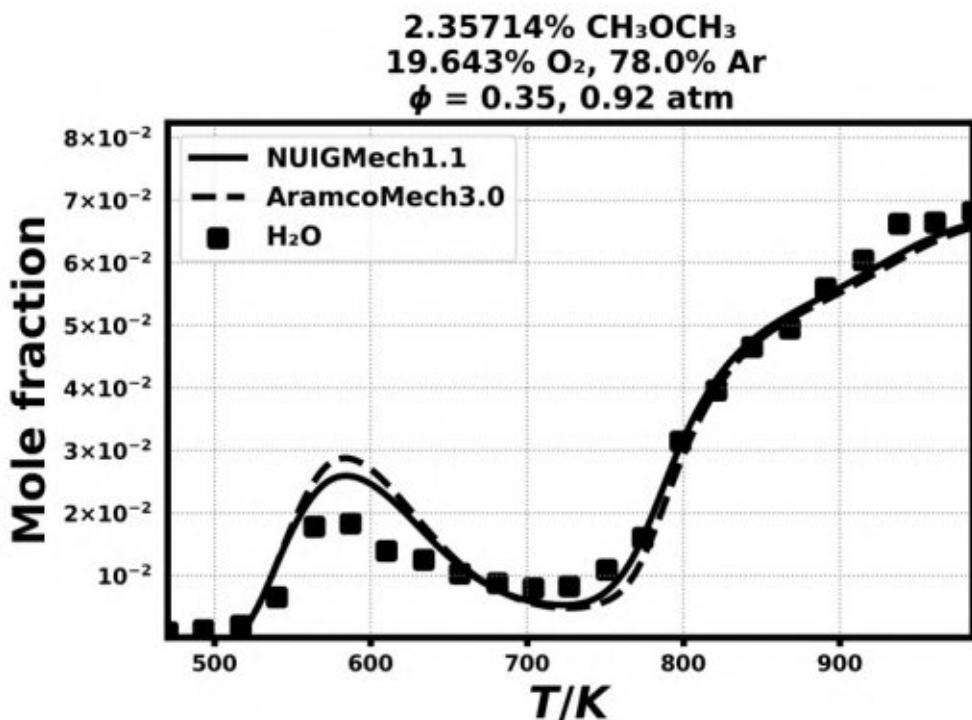
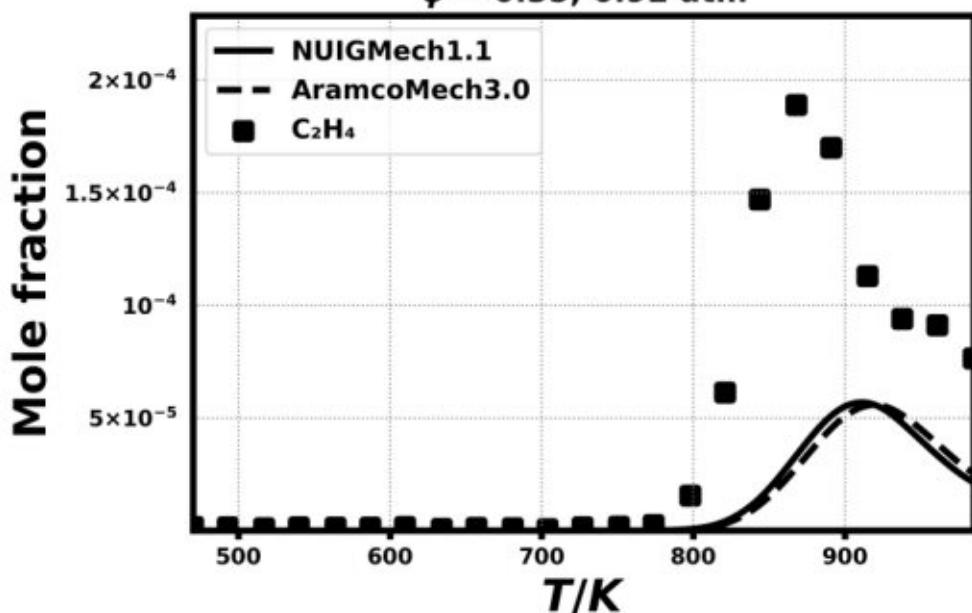


0.2% CH₃OCH₃
0.6% O₂, 99.2% N₂
 $\phi = 1.0, 10.0 \text{ atm}$

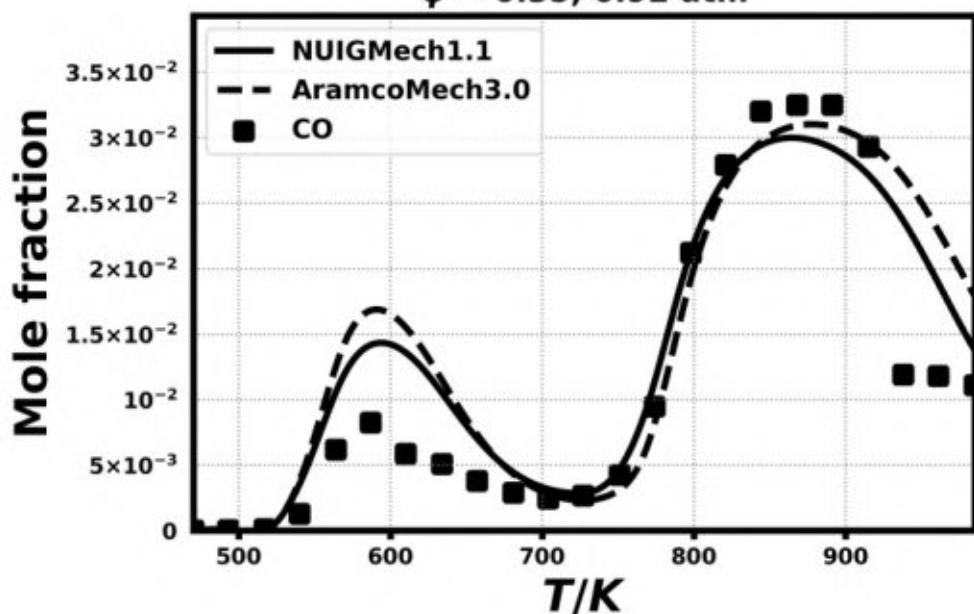


14.14) K. Moshammer, A. W. Jasper, D. M. Popolan-Vaida, Z. Wang, V. Shankar, L. Ruwe, C. A. Taatjes, P. Dagaut, and N. Hansen, The Journal of Physical Chemistry A 120, no. 40 (2016): 7890-7901.

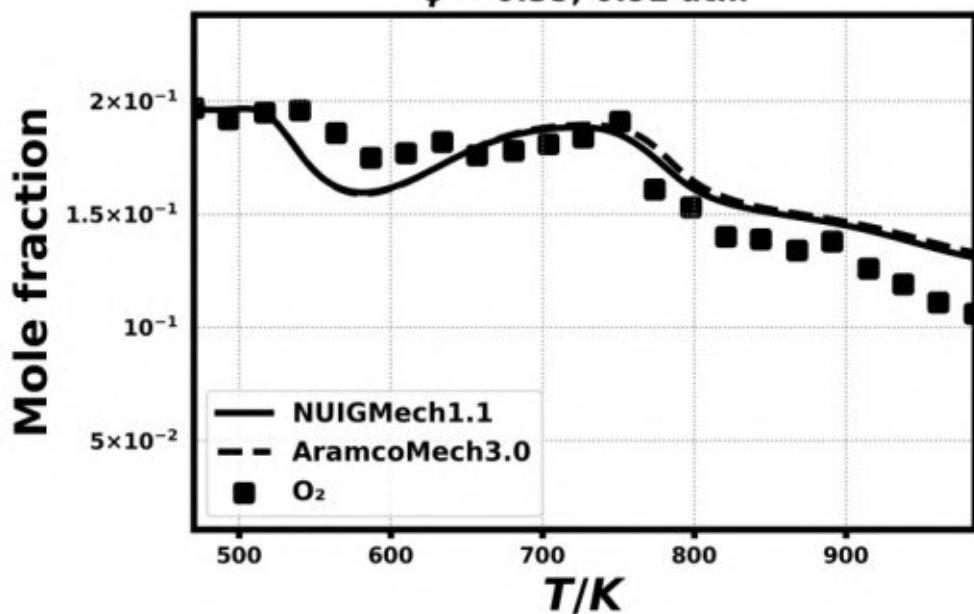
2.35714% CH_3OCH_3
19.643% O_2 , 78.0% Ar
 $\phi = 0.35, 0.92 \text{ atm}$



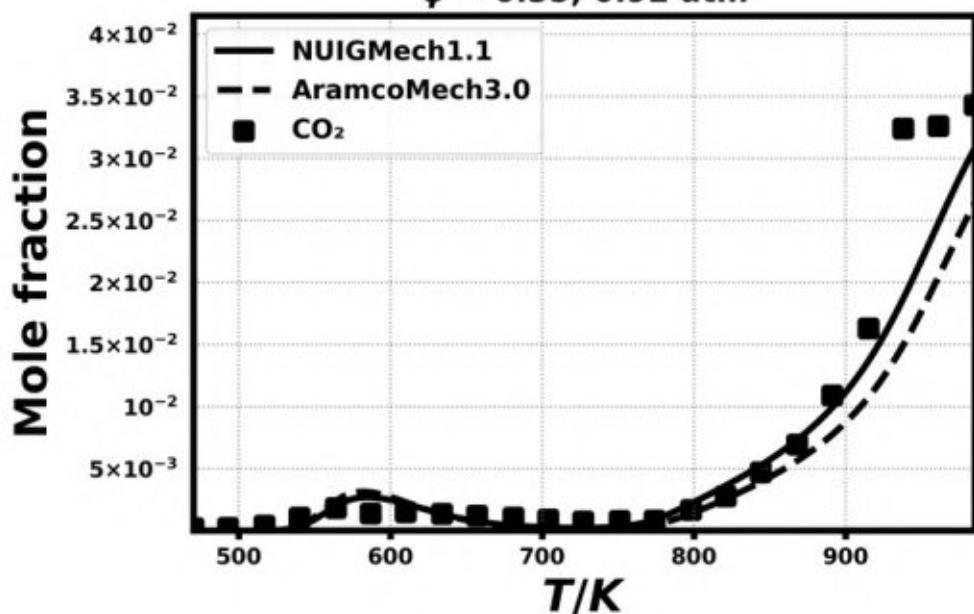
$2.35714\% \text{CH}_3\text{OCH}_3$
 $19.643\% \text{O}_2, 78.0\% \text{Ar}$
 $\phi = 0.35, 0.92 \text{ atm}$



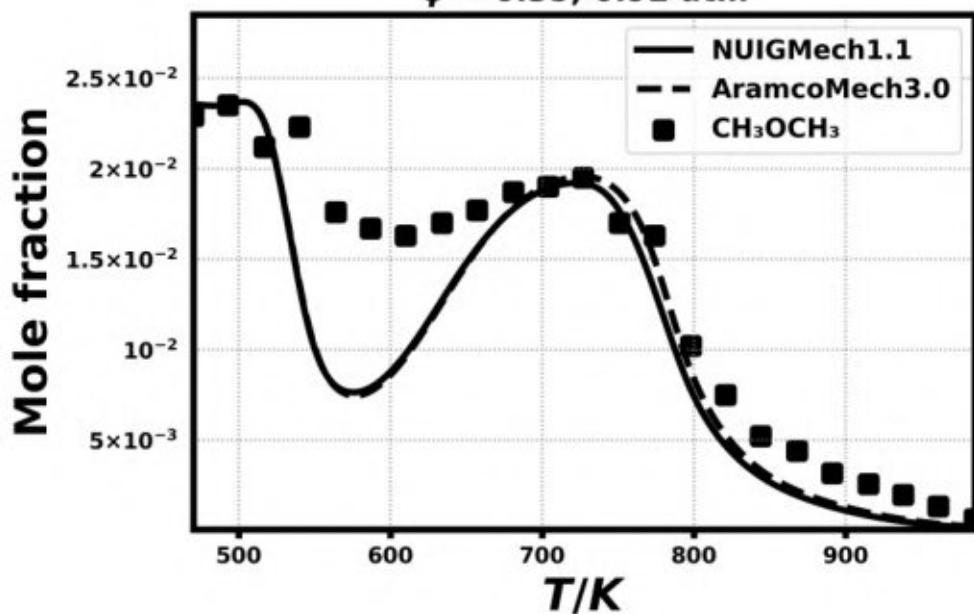
$2.35714\% \text{CH}_3\text{OCH}_3$
 $19.643\% \text{O}_2, 78.0\% \text{Ar}$
 $\phi = 0.35, 0.92 \text{ atm}$



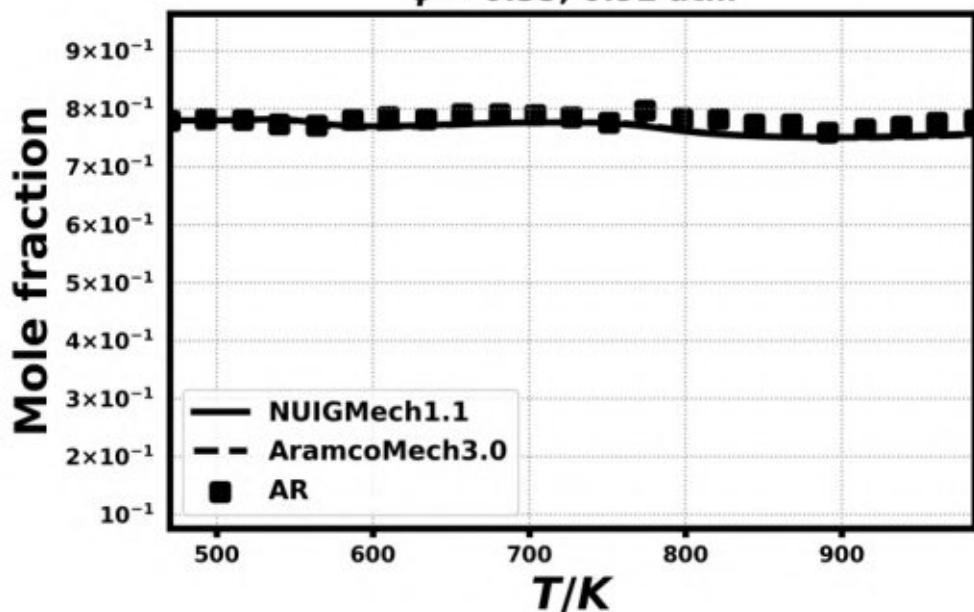
2.35714% CH_3OCH_3
19.643% O_2 , 78.0% Ar
 $\phi = 0.35, 0.92 \text{ atm}$



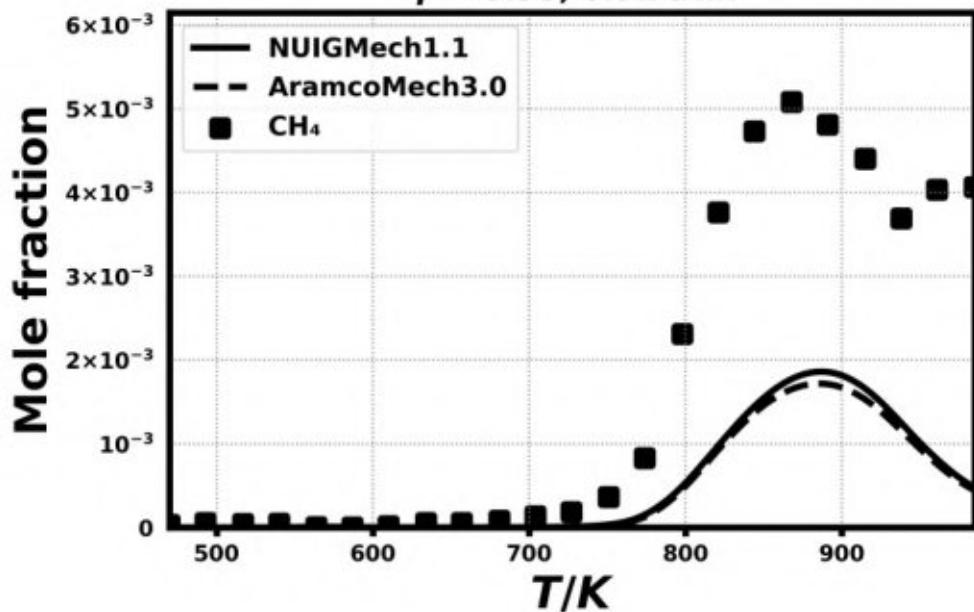
2.35714% CH_3OCH_3
19.643% O_2 , 78.0% Ar
 $\phi = 0.35, 0.92 \text{ atm}$



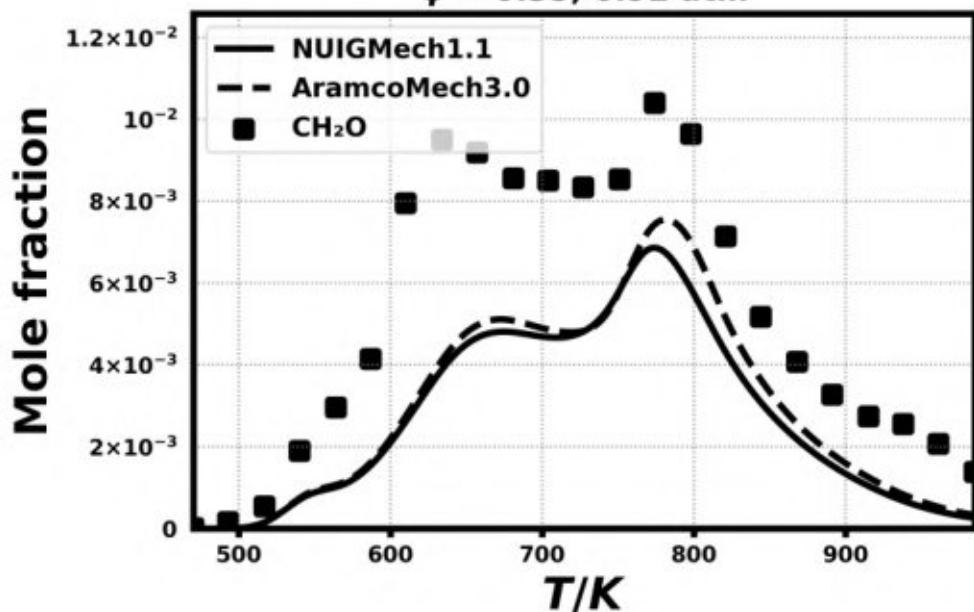
$2.35714\% \text{CH}_3\text{OCH}_3$
 $19.643\% \text{O}_2, 78.0\% \text{Ar}$
 $\phi = 0.35, 0.92 \text{ atm}$



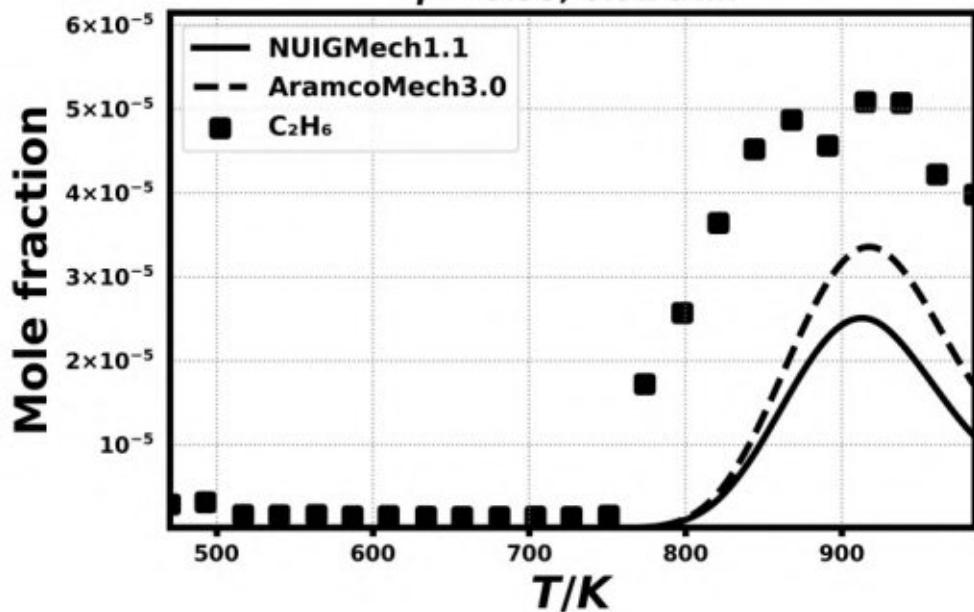
$2.35714\% \text{CH}_3\text{OCH}_3$
 $19.643\% \text{O}_2, 78.0\% \text{Ar}$
 $\phi = 0.35, 0.92 \text{ atm}$



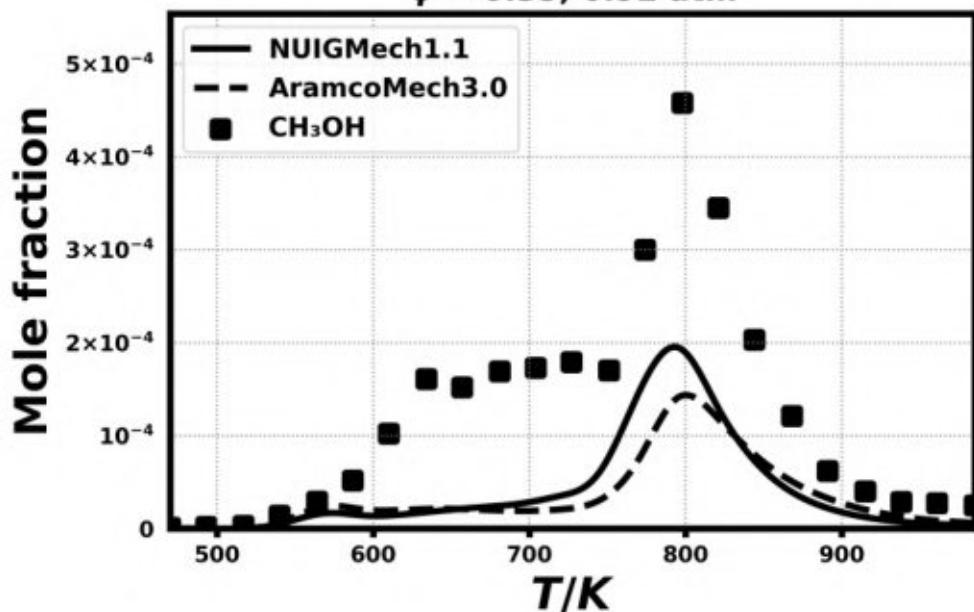
$2.35714\% \text{CH}_3\text{OCH}_3$
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 $\phi = 0.35, 0.92 \text{ atm}$



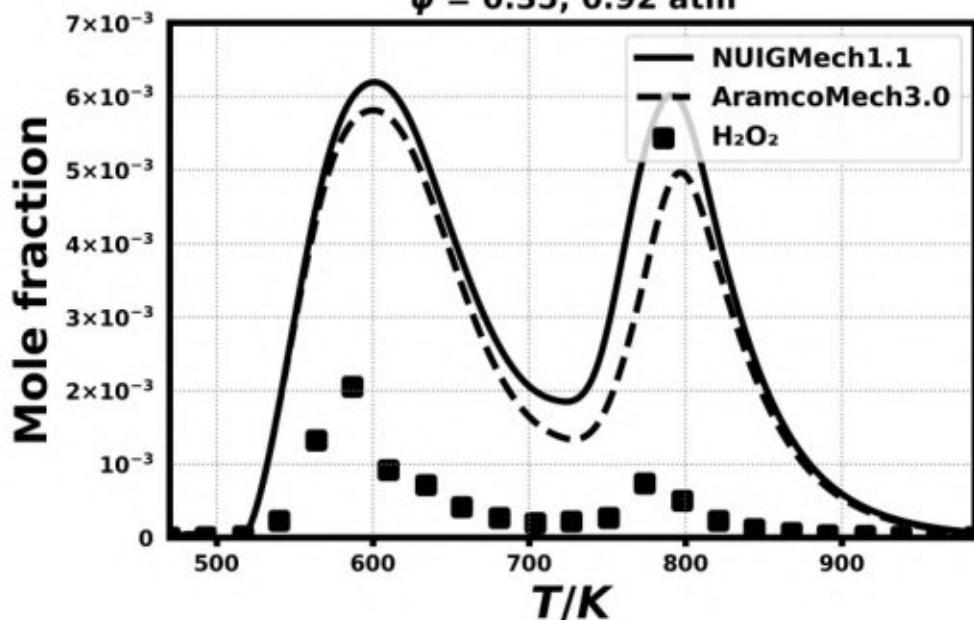
$2.35714\% \text{CH}_3\text{OCH}_3$
 $19.643\% \text{O}_2, 78.0\% \text{Ar}$
 $\phi = 0.35, 0.92 \text{ atm}$



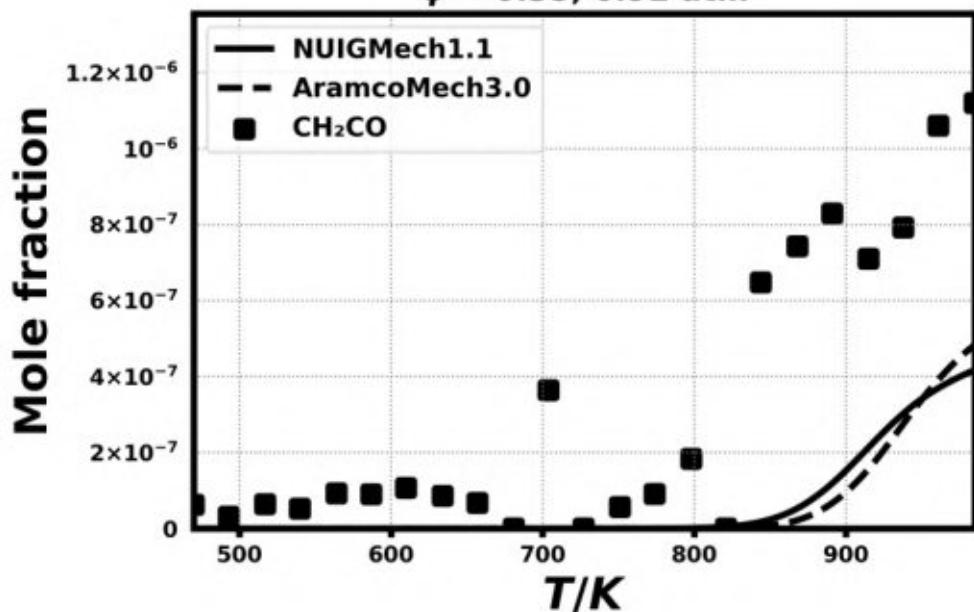
$2.35714\% \text{CH}_3\text{OCH}_3$
 $19.643\% \text{O}_2, 78.0\% \text{Ar}$
 $\phi = 0.35, 0.92 \text{ atm}$



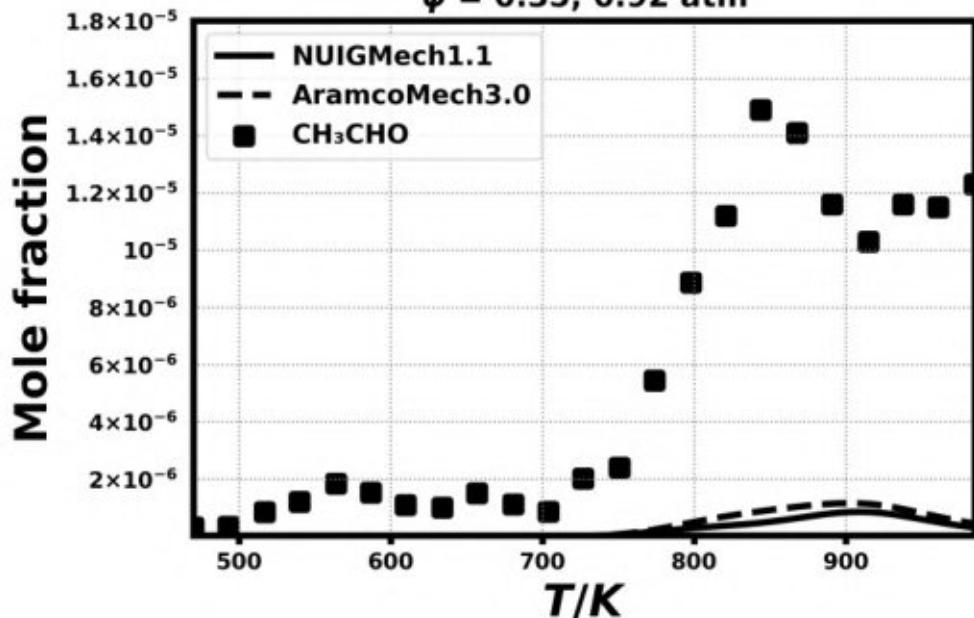
$2.35714\% \text{CH}_3\text{OCH}_3$
 $19.643\% \text{O}_2, 78.0\% \text{Ar}$
 $\phi = 0.35, 0.92 \text{ atm}$

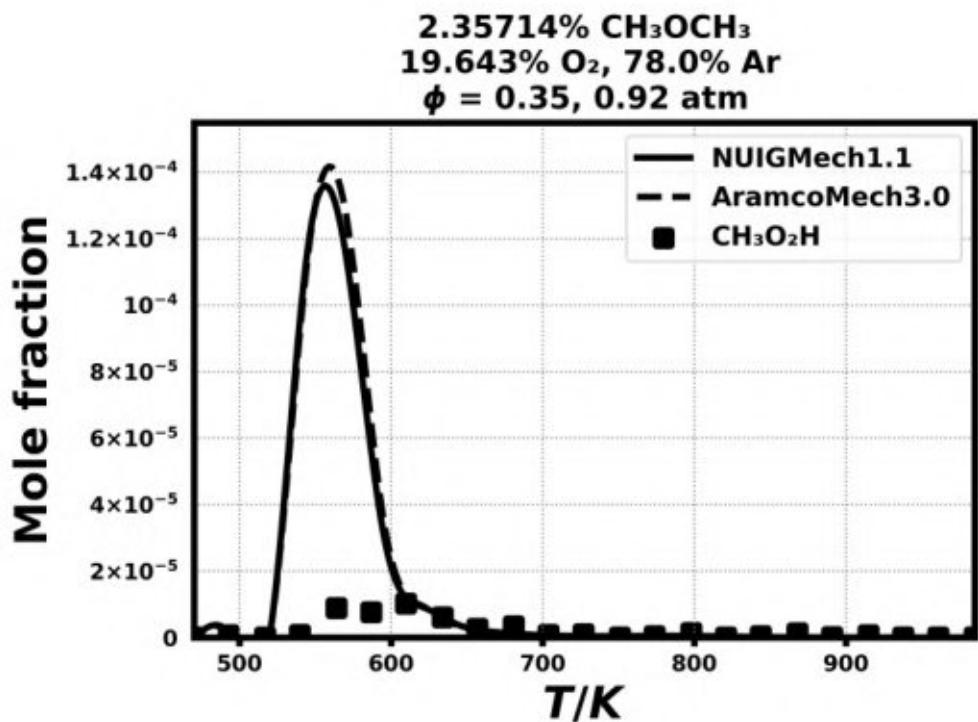
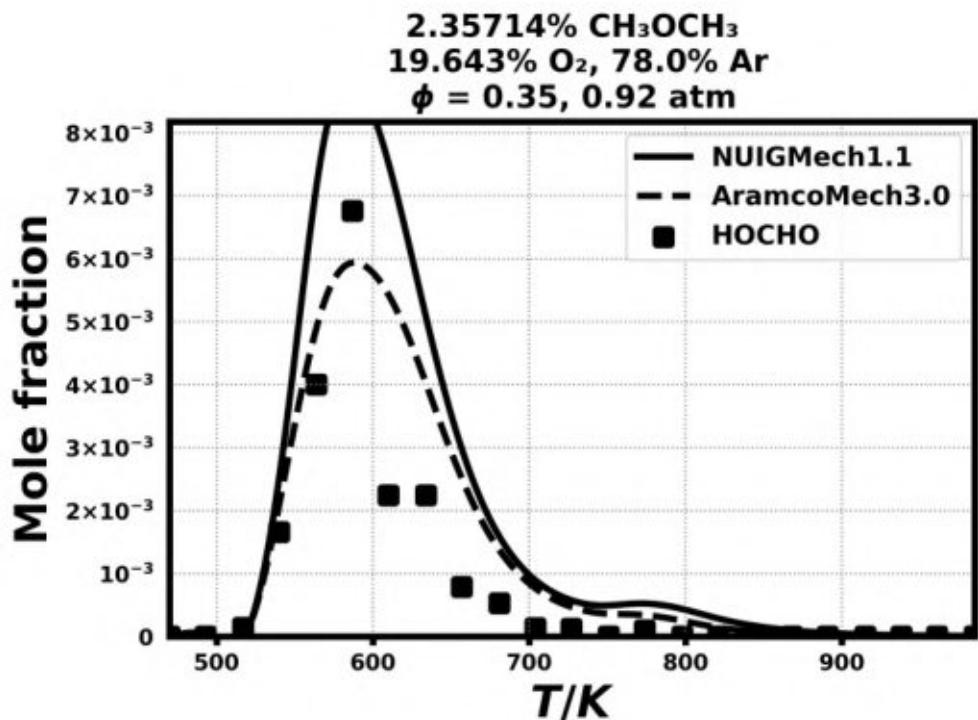


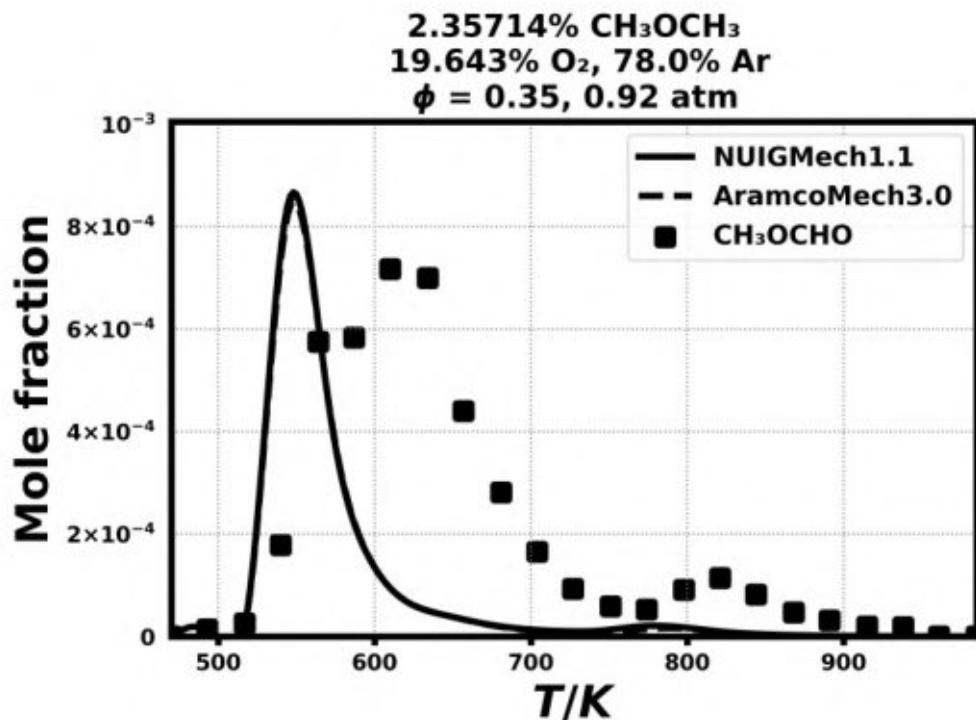
2.35714% CH_3OCH_3
19.643% O_2 , 78.0% Ar
 $\phi = 0.35, 0.92 \text{ atm}$



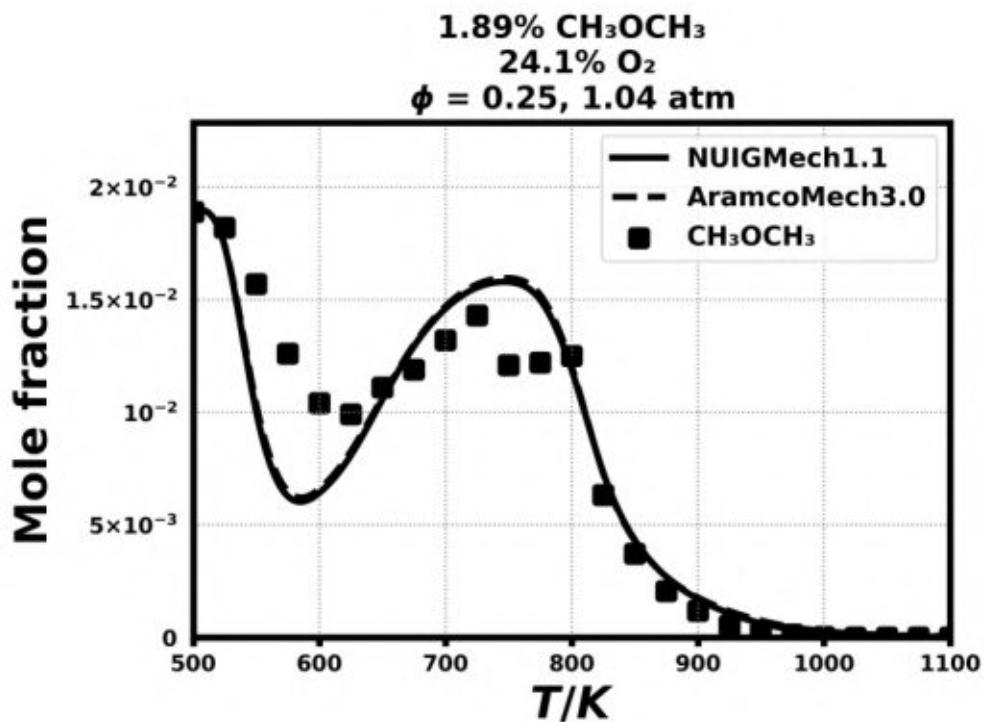
2.35714% CH_3OCH_3
19.643% O_2 , 78.0% Ar
 $\phi = 0.35, 0.92 \text{ atm}$

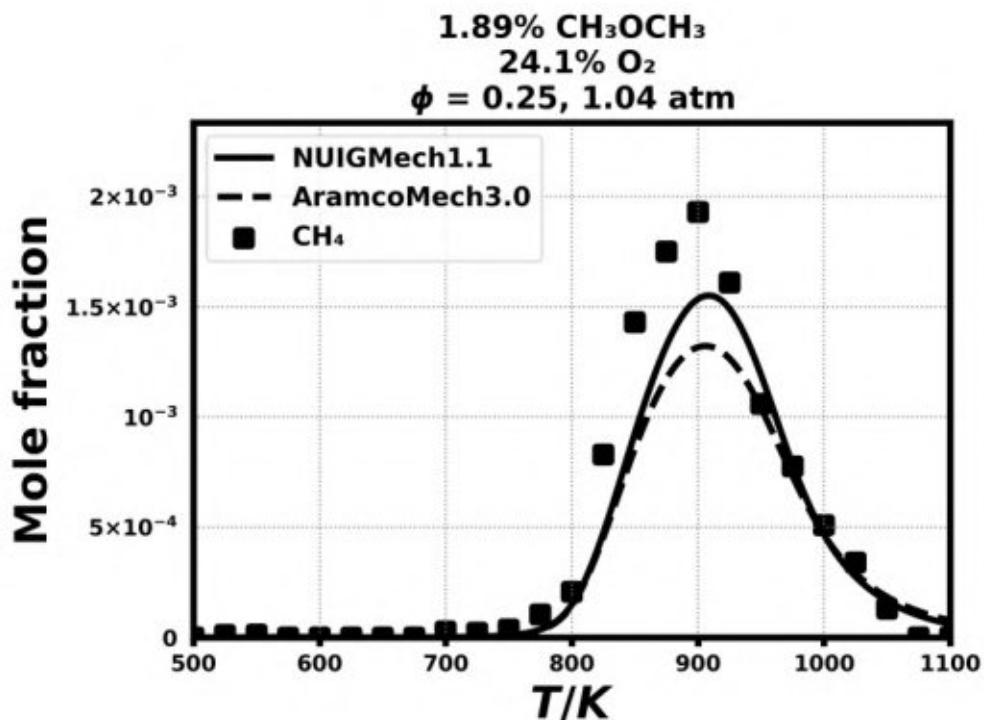
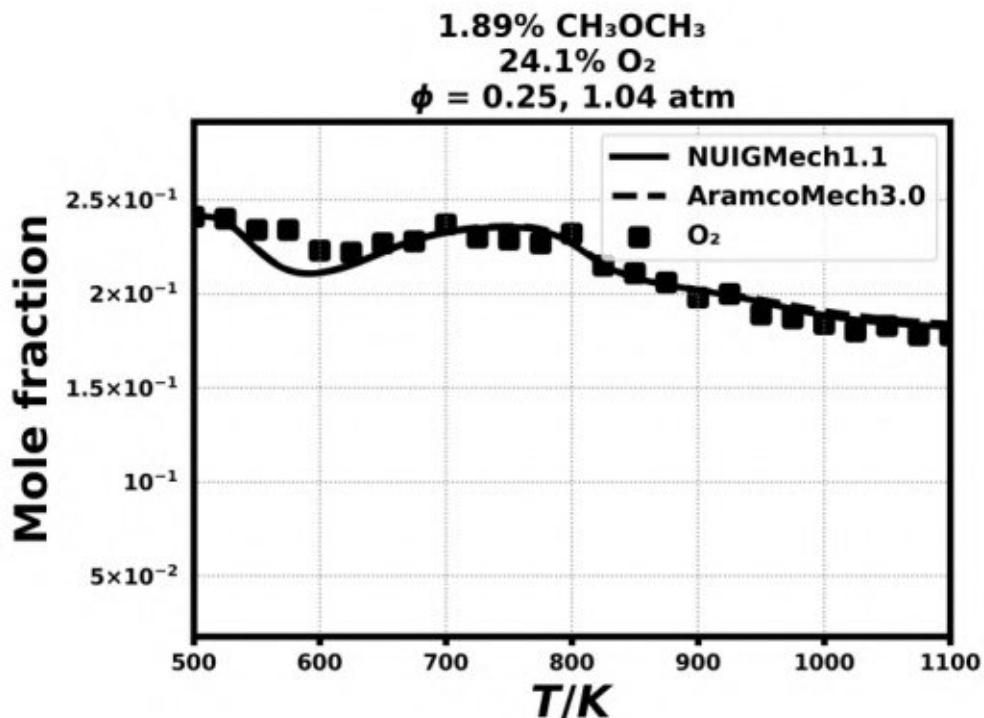




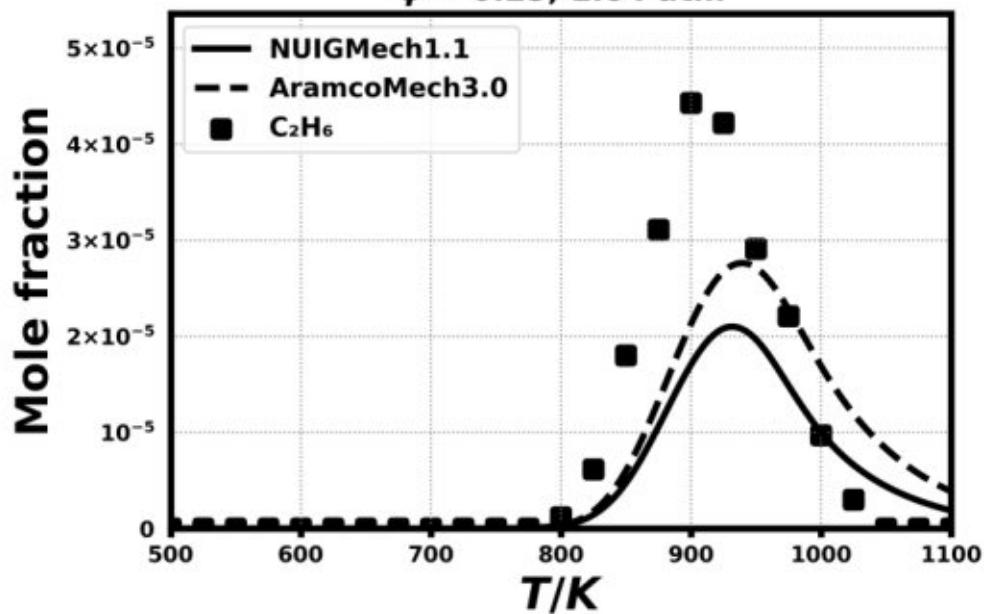


14.15) A. Rodrigues et al., The Journal of Physical Chemistry A, 2015, 119, 7605-7923.

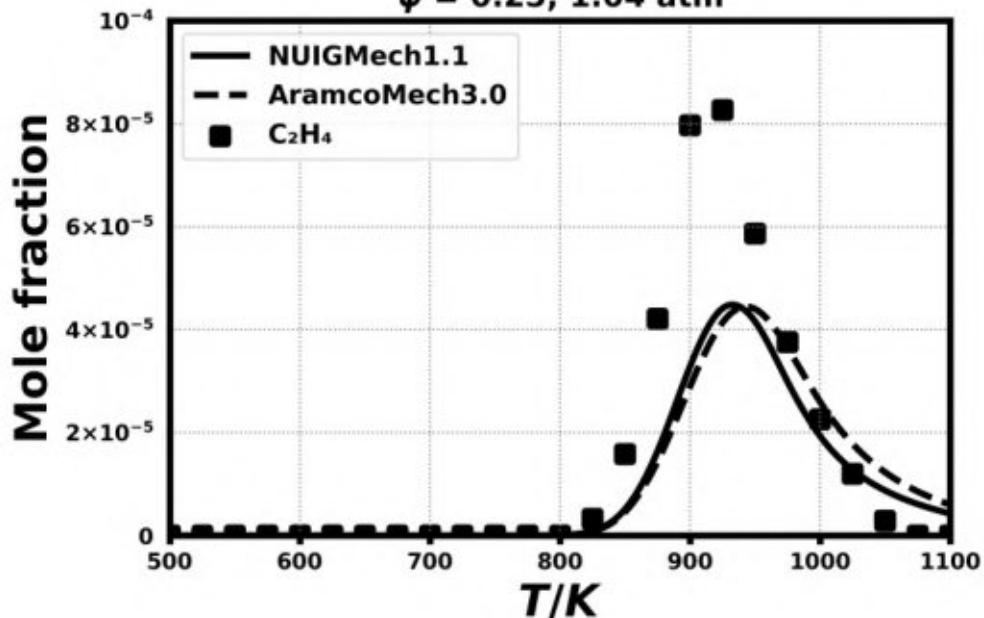




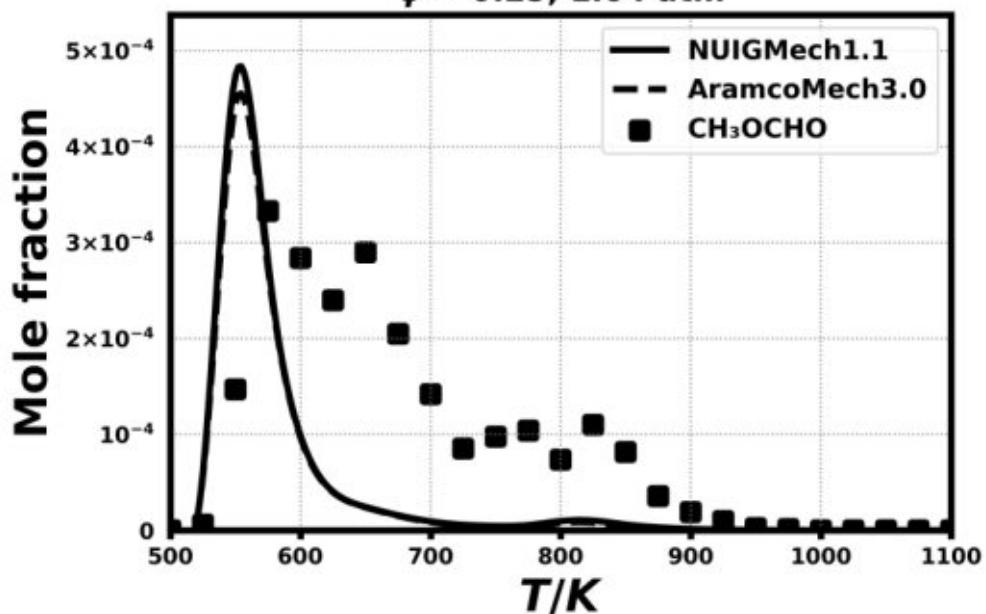
1.89% CH_3OCH_3
24.1% O_2
 $\phi = 0.25, 1.04 \text{ atm}$



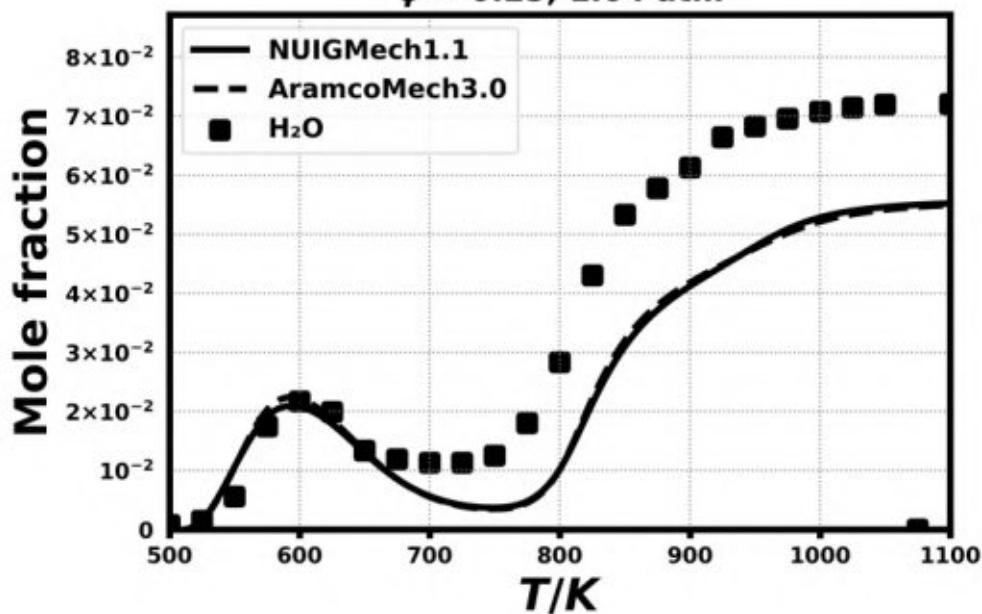
1.89% CH_3OCH_3
24.1% O_2
 $\phi = 0.25, 1.04 \text{ atm}$

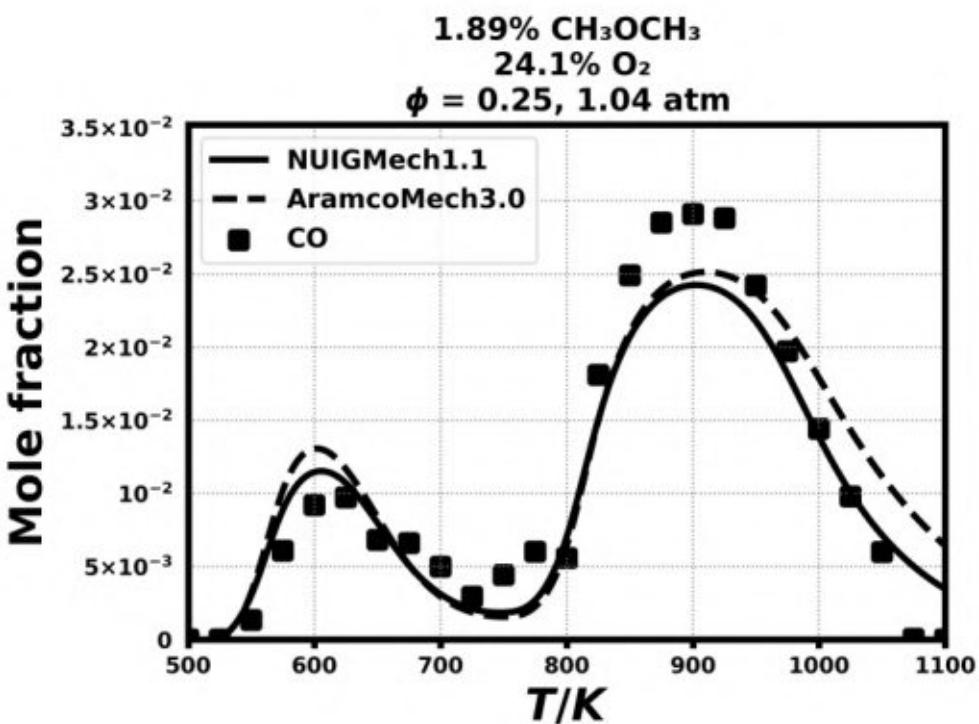
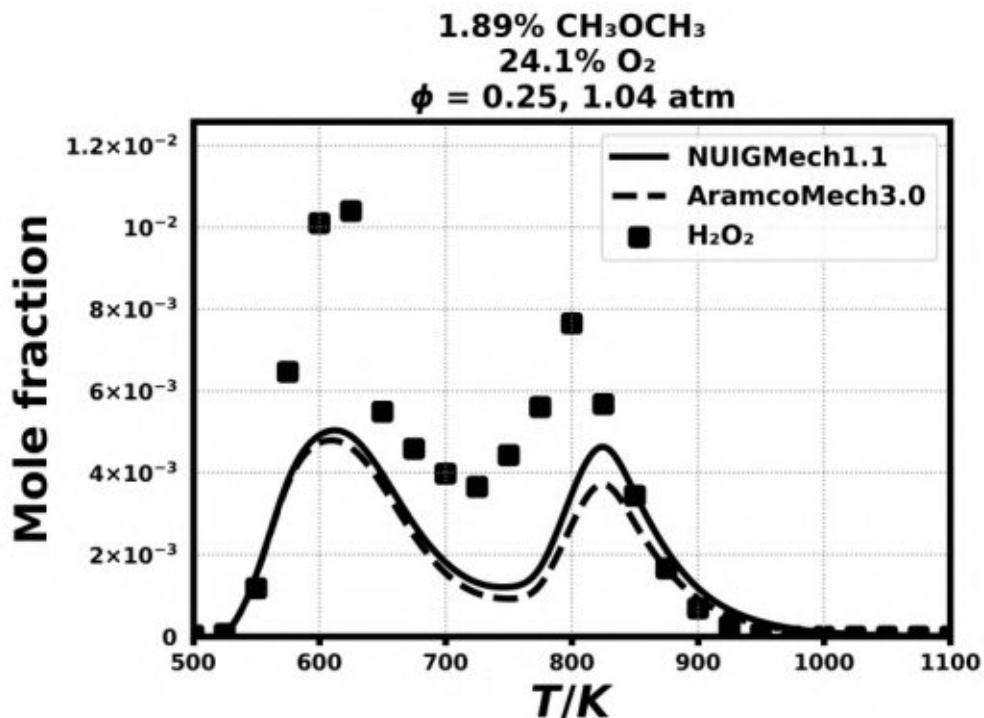


$1.89\% \text{CH}_3\text{OCH}_3$
 $24.1\% \text{O}_2$
 $\phi = 0.25, 1.04 \text{ atm}$

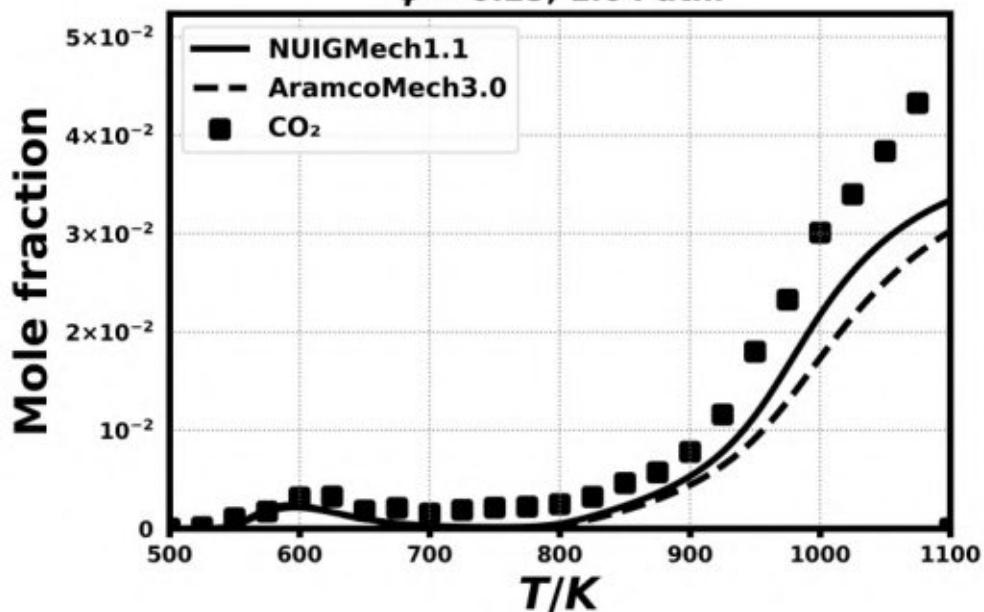


$1.89\% \text{CH}_3\text{OCH}_3$
 $24.1\% \text{O}_2$
 $\phi = 0.25, 1.04 \text{ atm}$

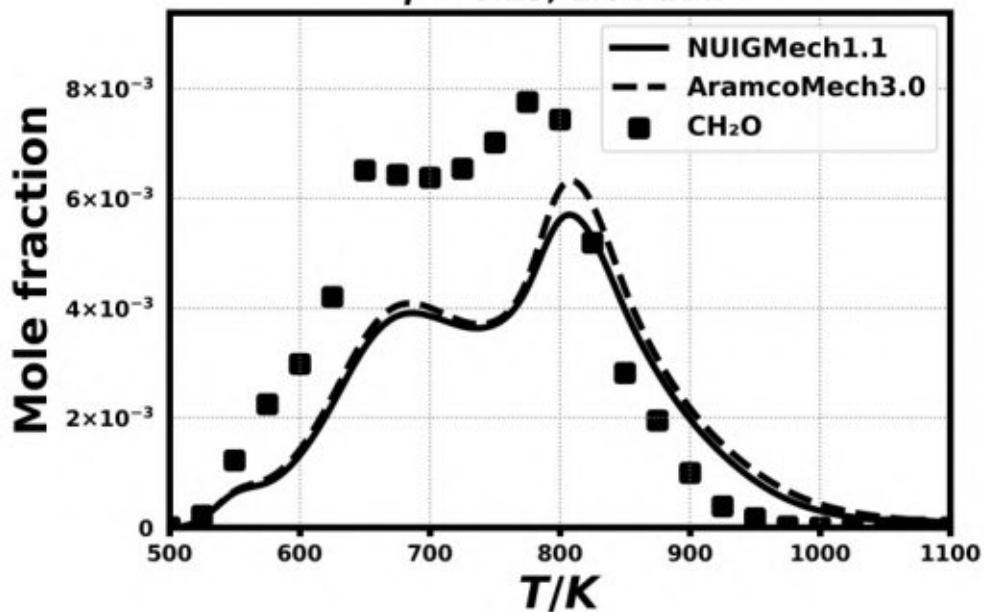




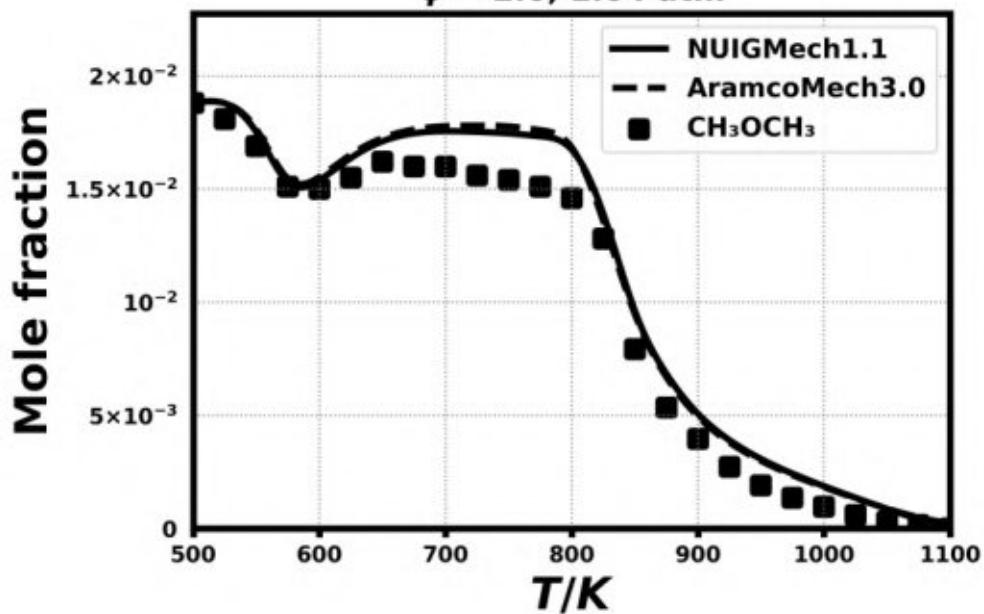
1.89% CH_3OCH_3
24.1% O_2
 $\phi = 0.25, 1.04 \text{ atm}$



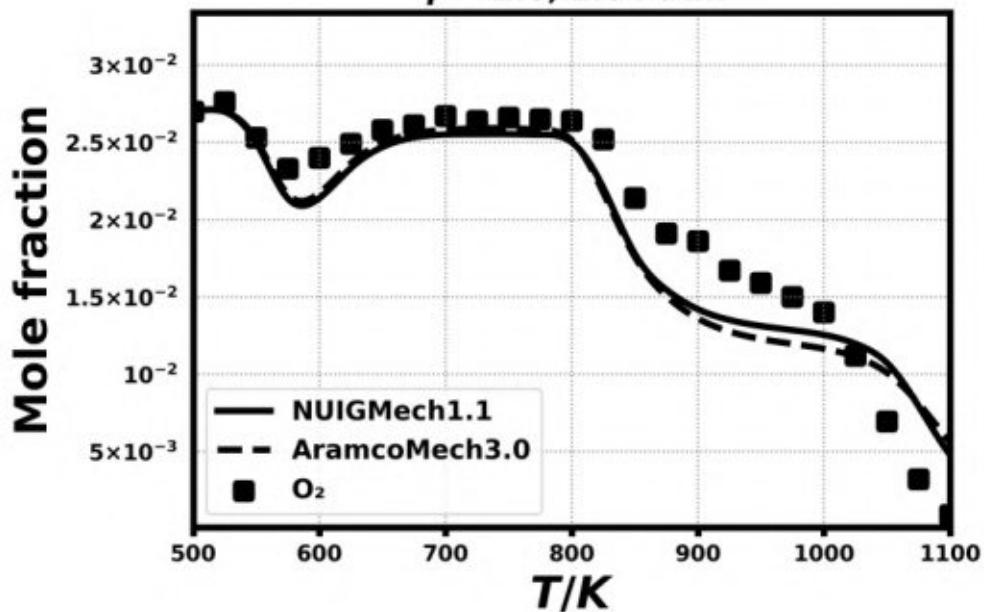
1.89% CH_3OCH_3
24.1% O_2
 $\phi = 0.25, 1.04 \text{ atm}$

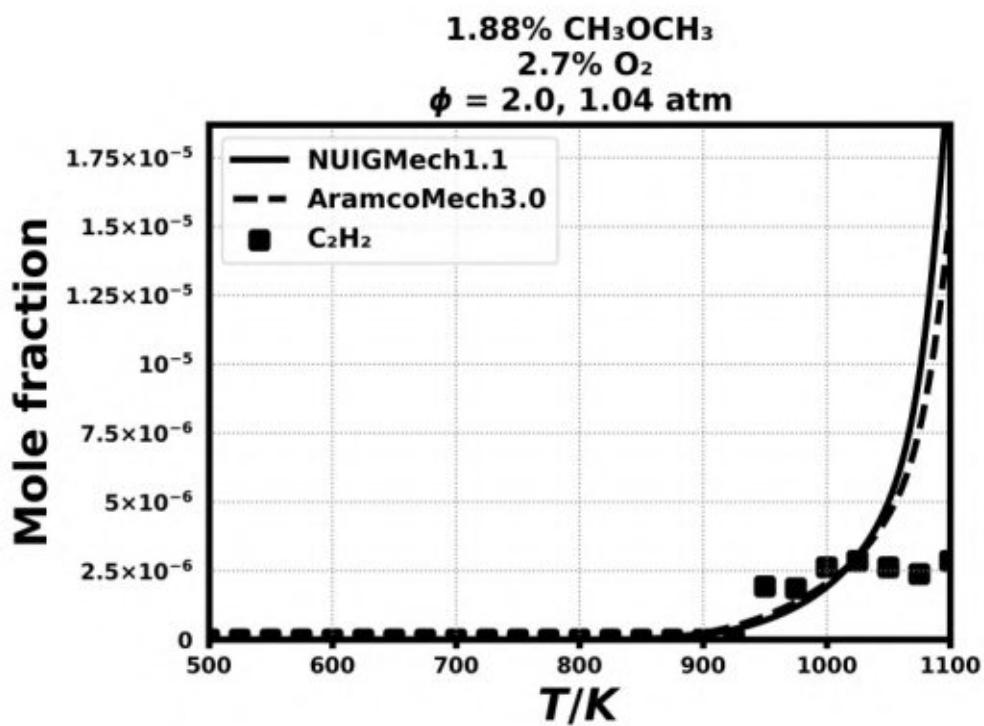
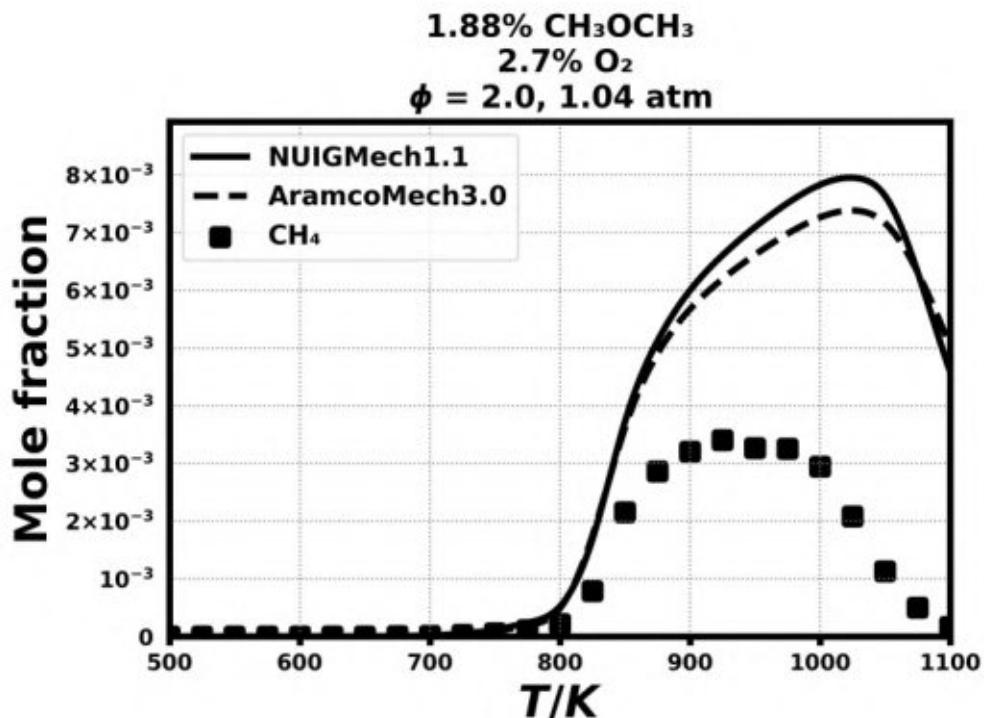


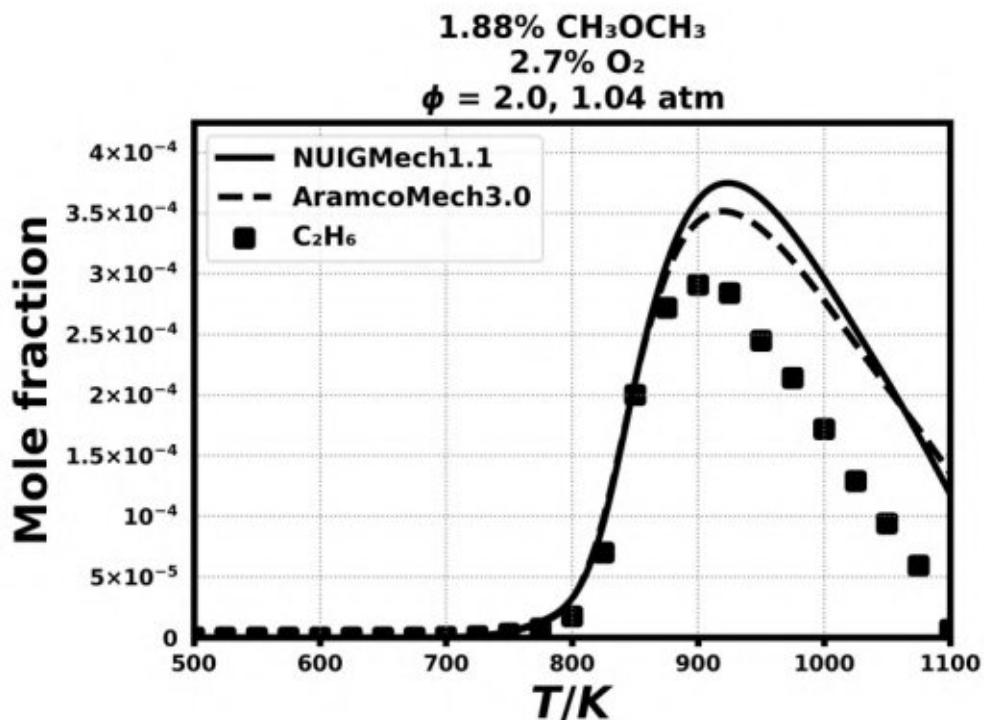
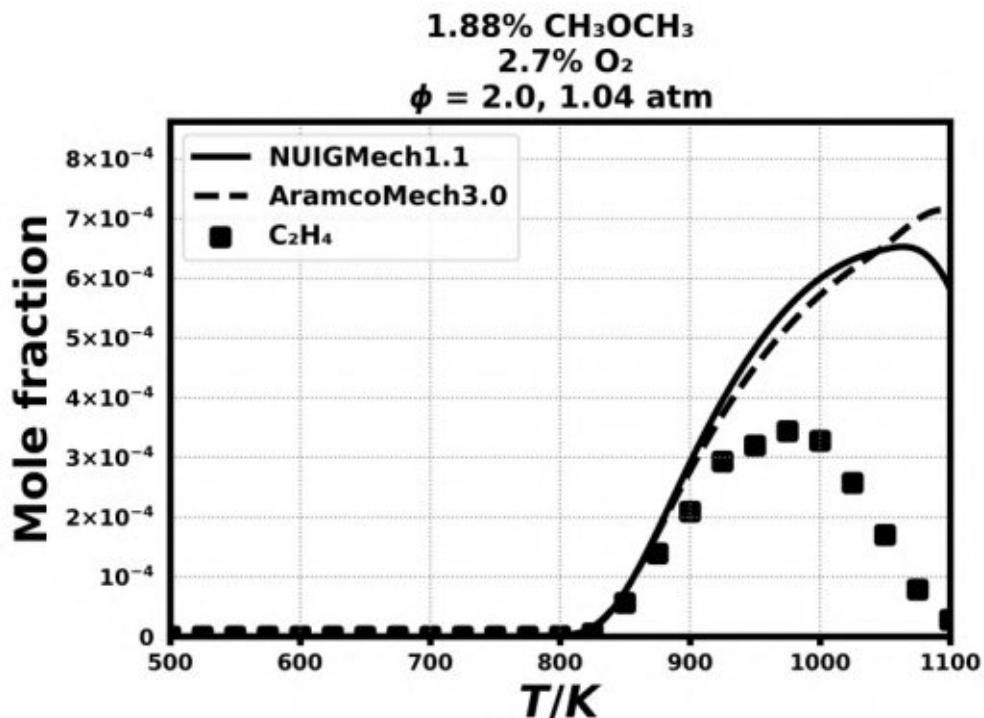
1.88% CH_3OCH_3
2.7% O_2
 $\phi = 2.0, 1.04 \text{ atm}$

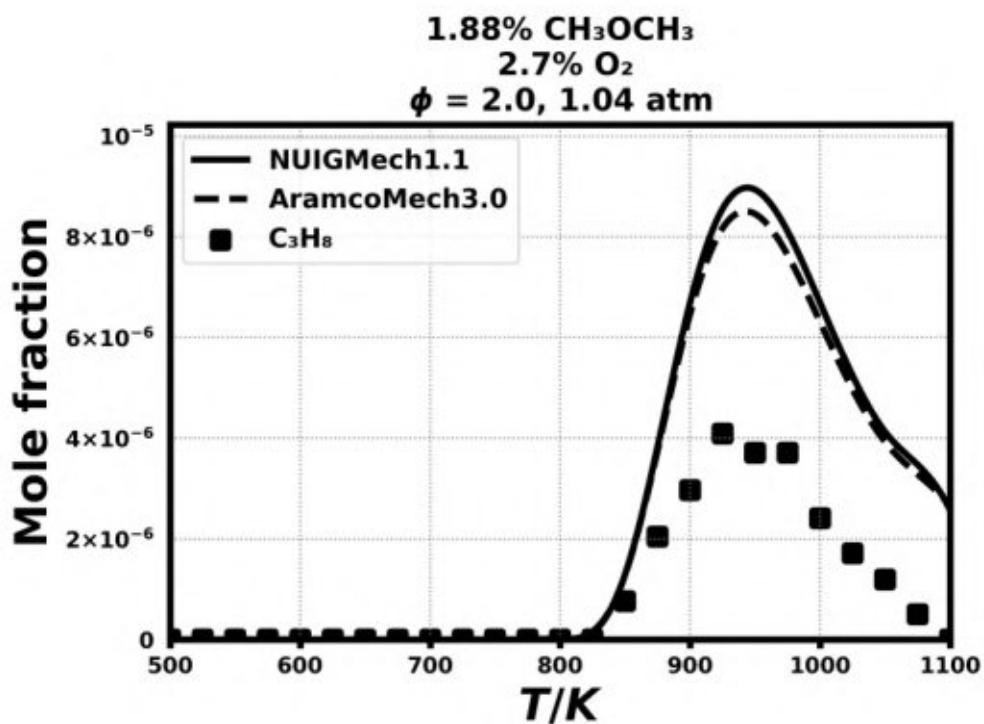
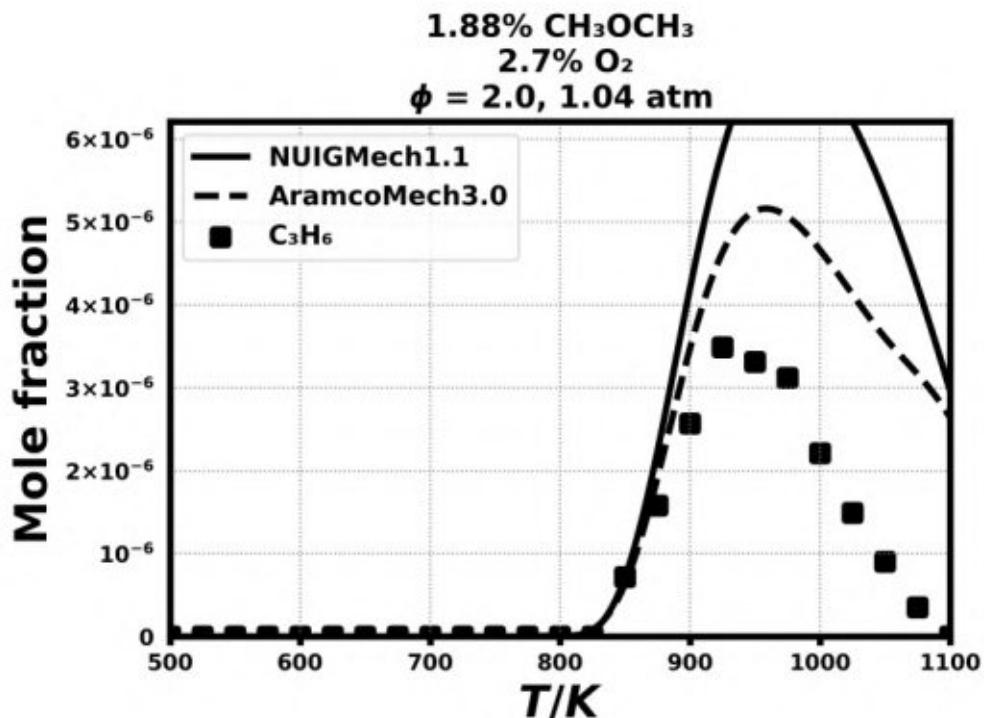


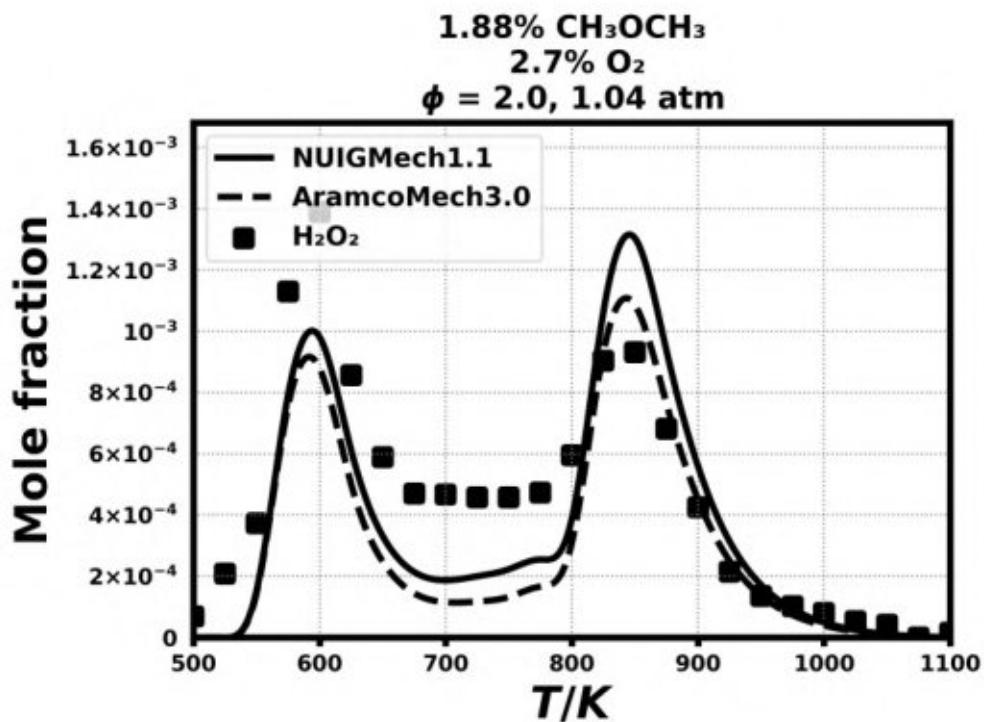
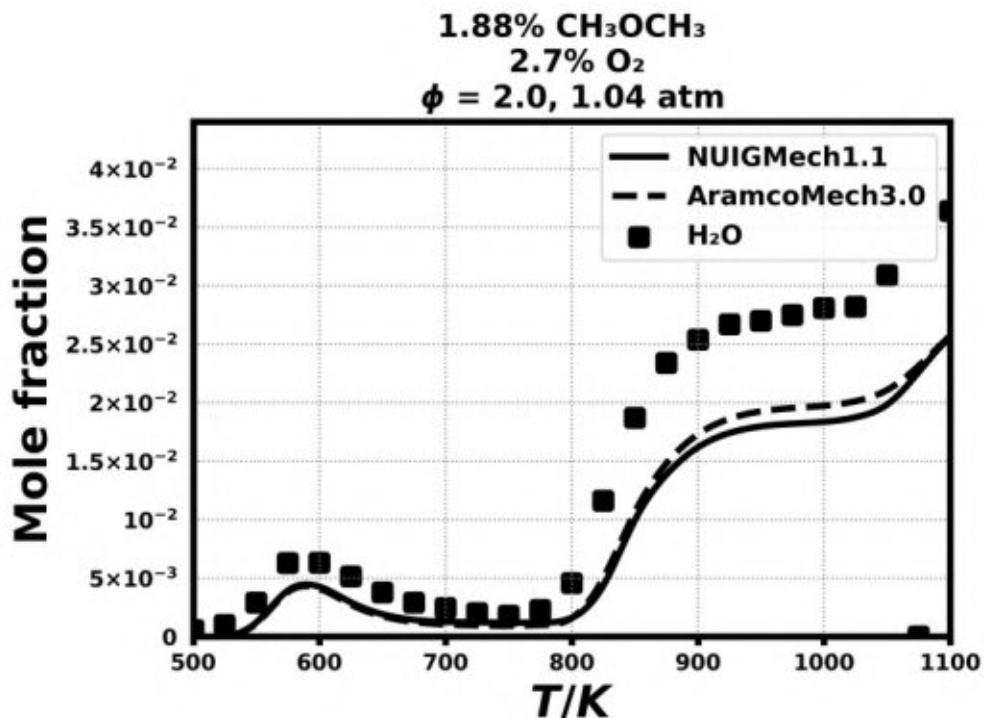
1.88% CH_3OCH_3
2.7% O_2
 $\phi = 2.0, 1.04 \text{ atm}$

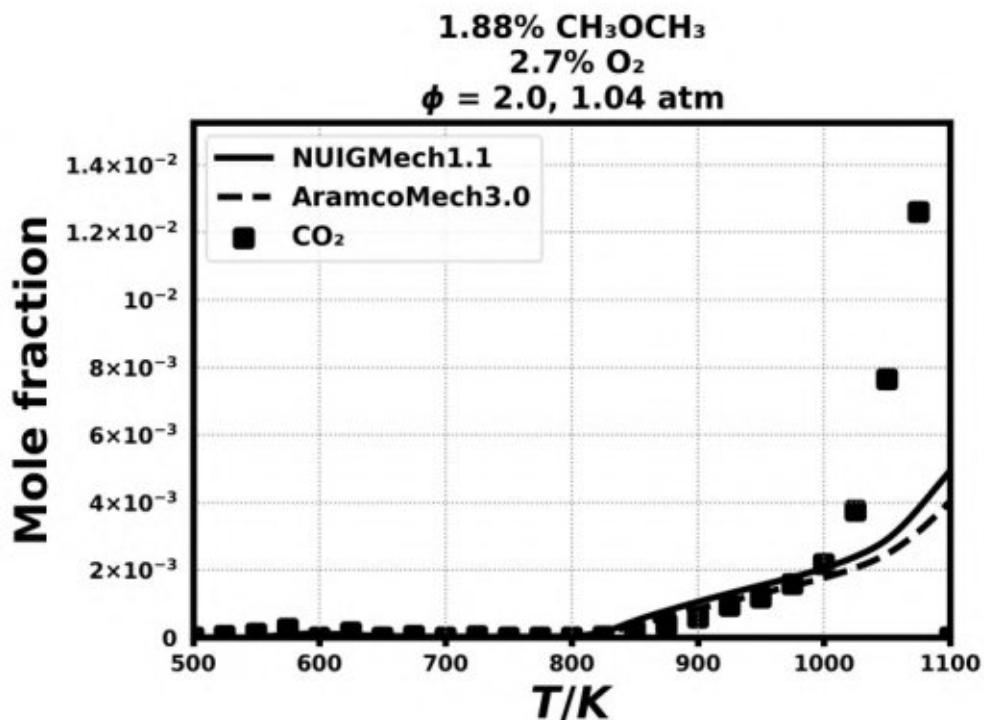
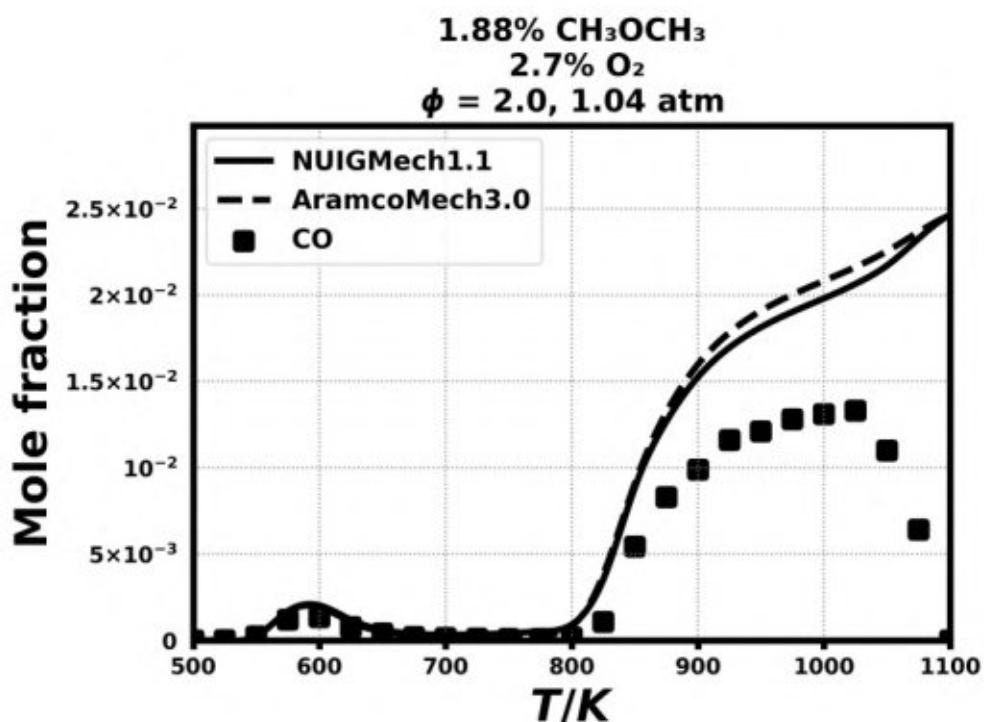


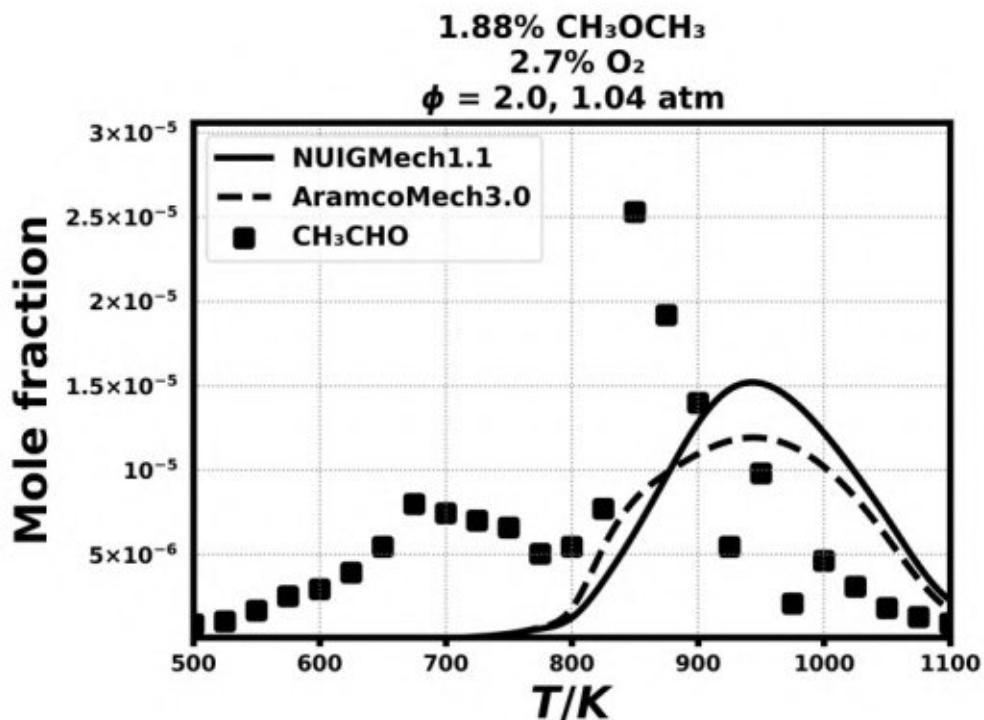
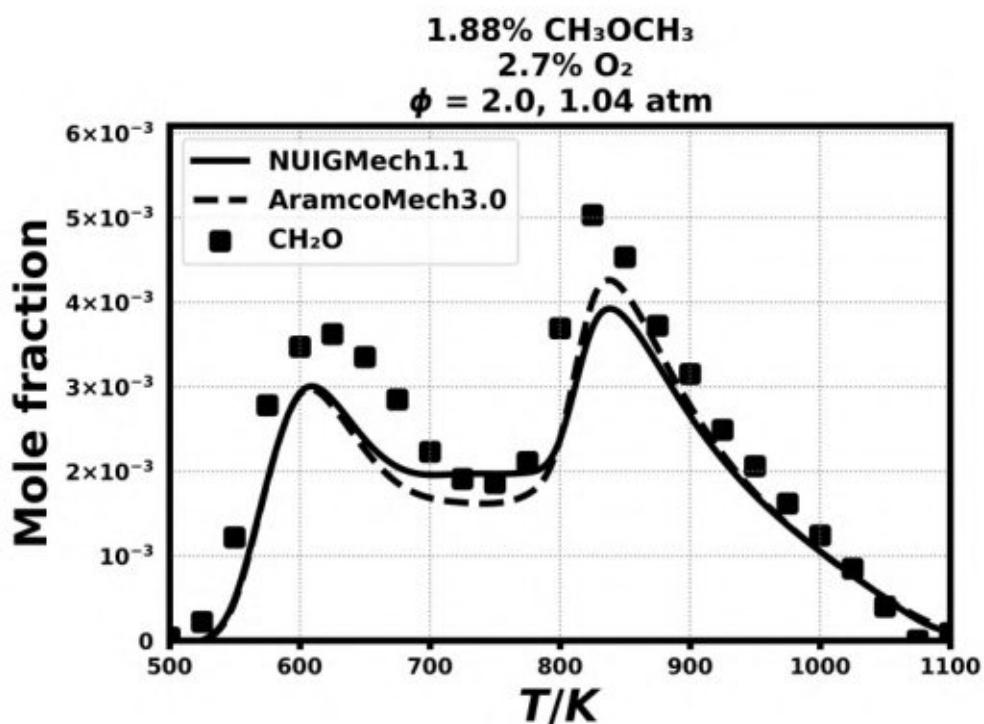


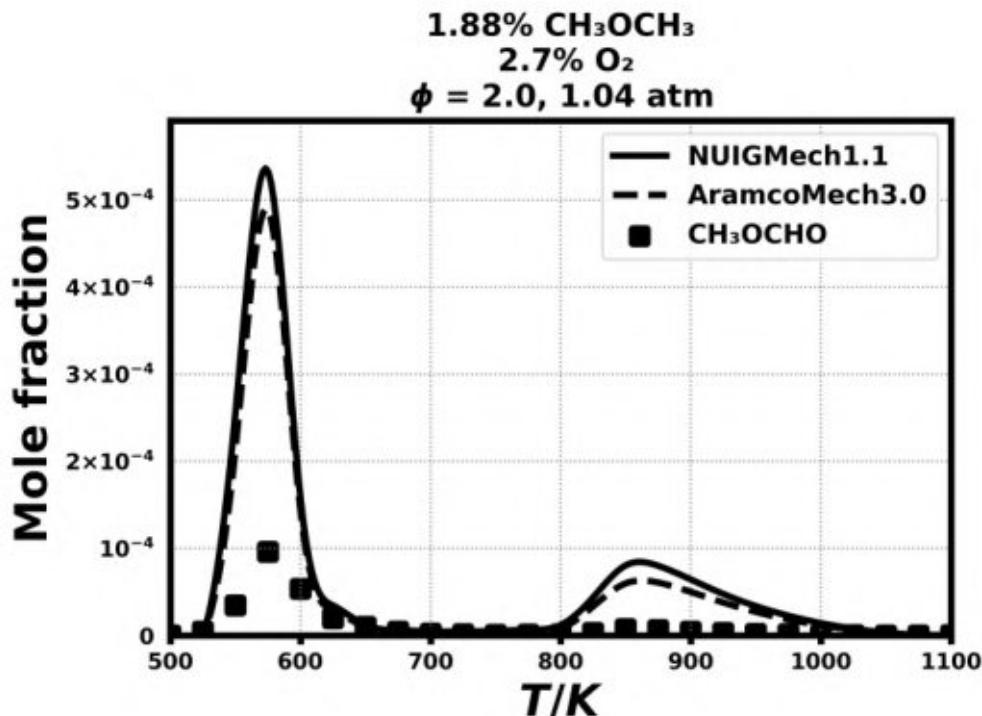






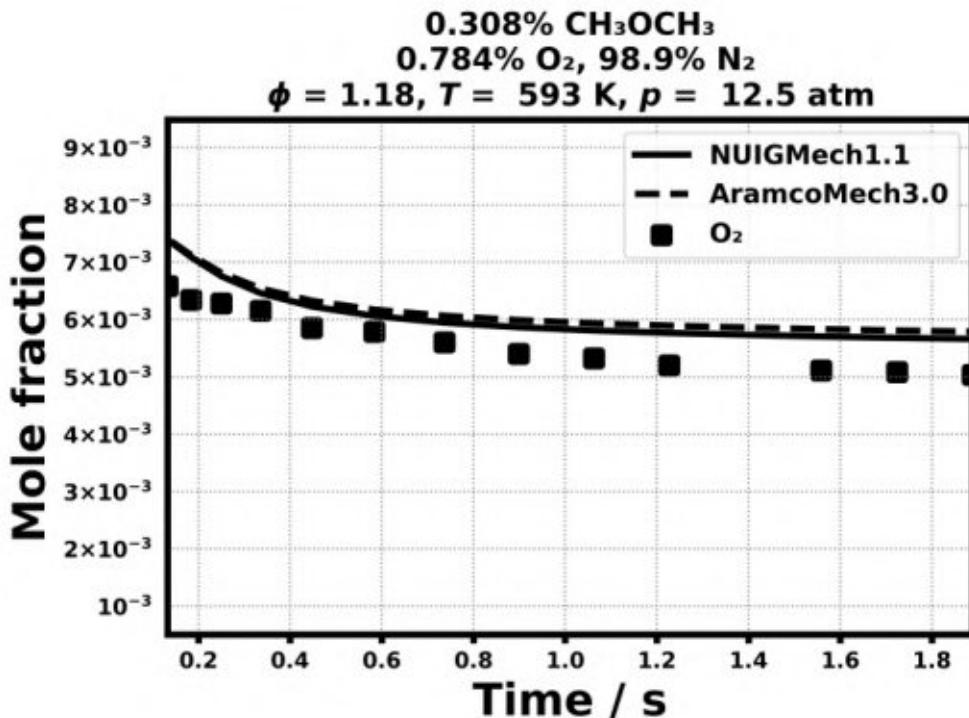




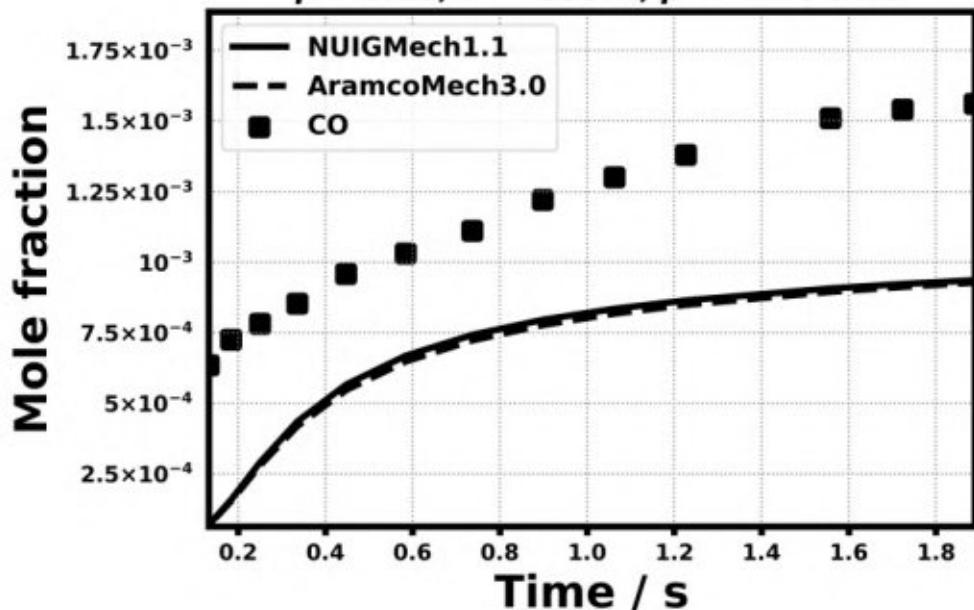


Speciation in Flow reactor

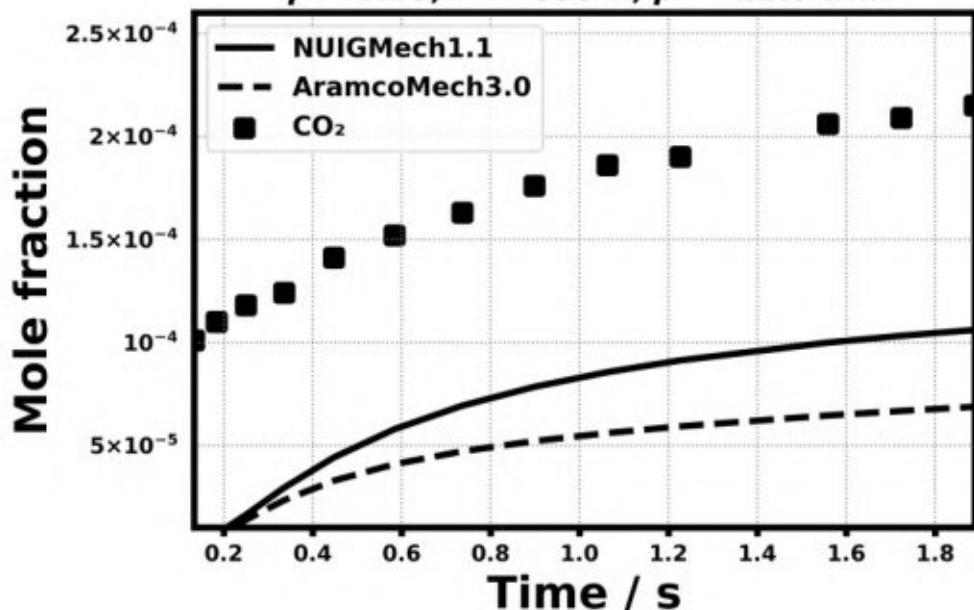
14.16) Curran, H. J., S. L. Fischer, and F. L. Dryer, International Journal of Chemical Kinetics 32, no. 12 (2000) 741-759.



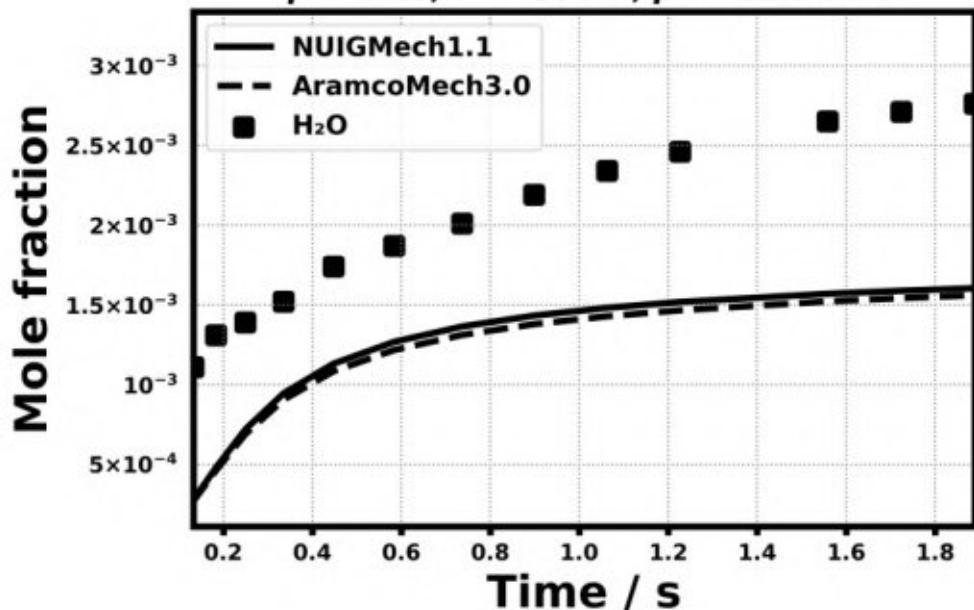
$0.308\% \text{CH}_3\text{OCH}_3$
 $0.784\% \text{O}_2, 98.9\% \text{N}_2$
 $\phi = 1.18, T = 593 \text{ K}, p = 12.5 \text{ atm}$



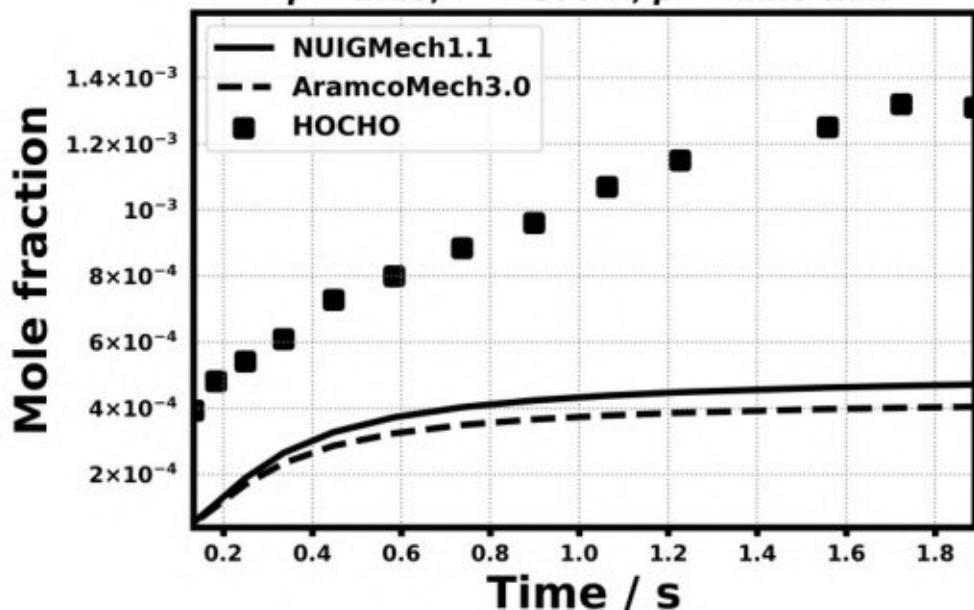
$0.308\% \text{CH}_3\text{OCH}_3$
 $0.784\% \text{O}_2, 98.9\% \text{N}_2$
 $\phi = 1.18, T = 593 \text{ K}, p = 12.5 \text{ atm}$



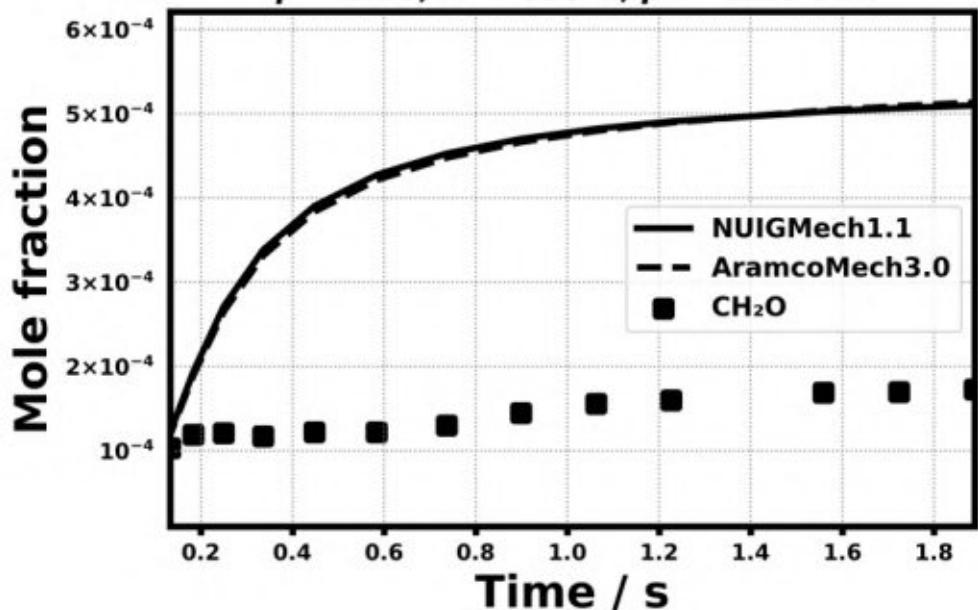
$0.308\% \text{CH}_3\text{OCH}_3$
 $0.784\% \text{O}_2, 98.9\% \text{N}_2$
 $\phi = 1.18, T = 593 \text{ K}, p = 12.5 \text{ atm}$



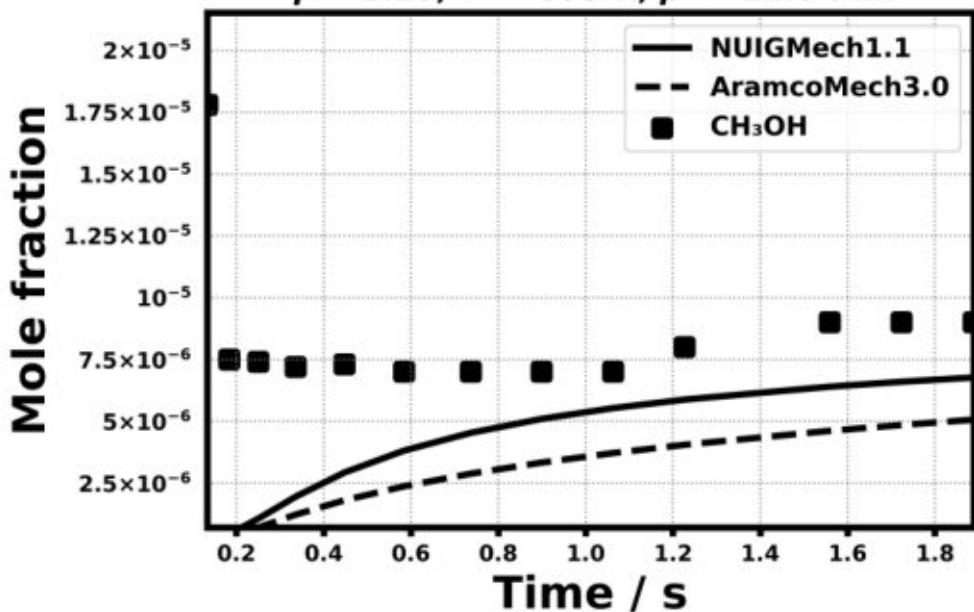
$0.308\% \text{CH}_3\text{OCH}_3$
 $0.784\% \text{O}_2, 98.9\% \text{N}_2$
 $\phi = 1.18, T = 593 \text{ K}, p = 12.5 \text{ atm}$



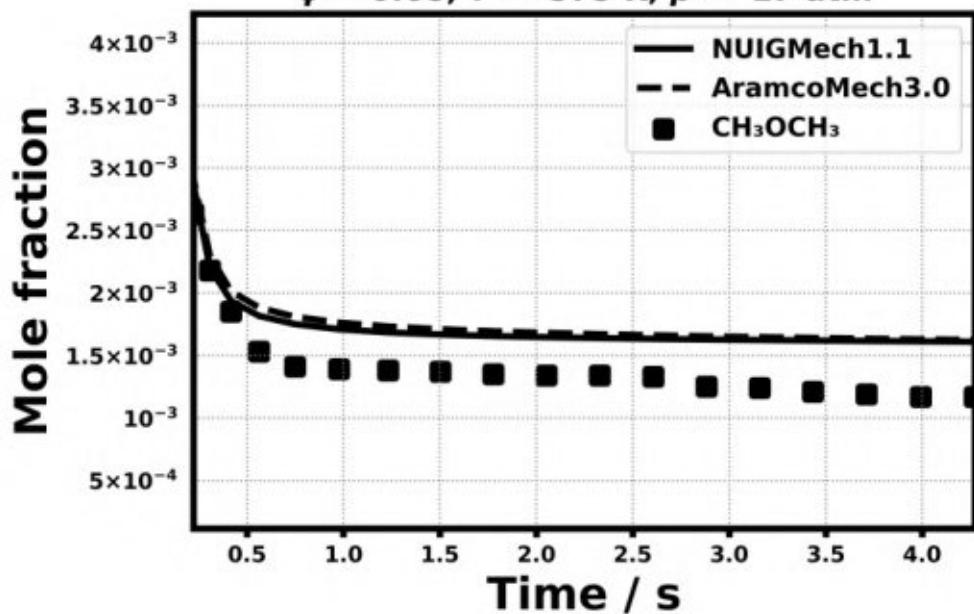
$0.308\% \text{CH}_3\text{OCH}_3$
 $0.784\% \text{O}_2, 98.9\% \text{N}_2$
 $\phi = 1.18, T = 593 \text{ K}, p = 12.5 \text{ atm}$



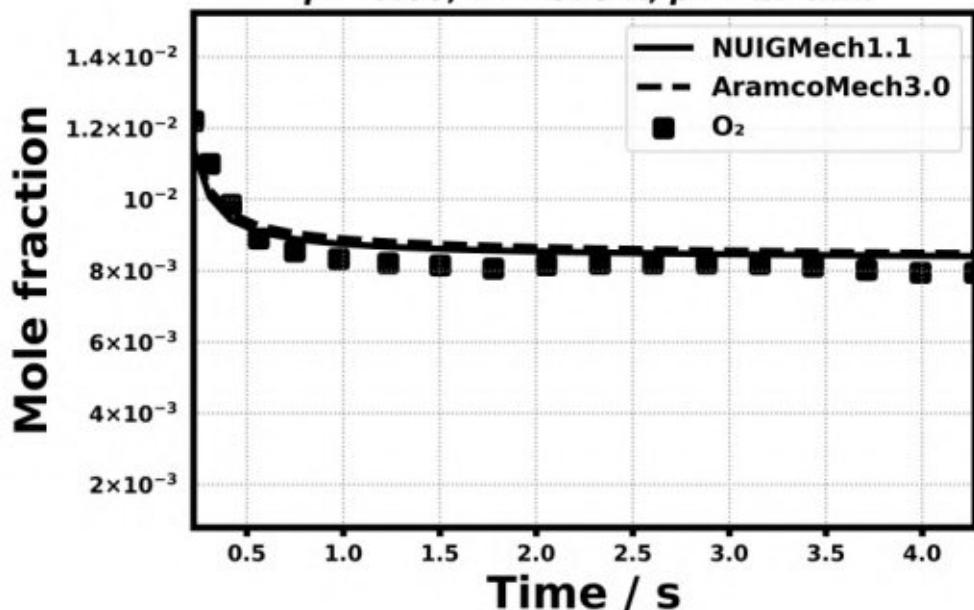
$0.308\% \text{CH}_3\text{OCH}_3$
 $0.784\% \text{O}_2, 98.9\% \text{N}_2$
 $\phi = 1.18, T = 593 \text{ K}, p = 12.5 \text{ atm}$



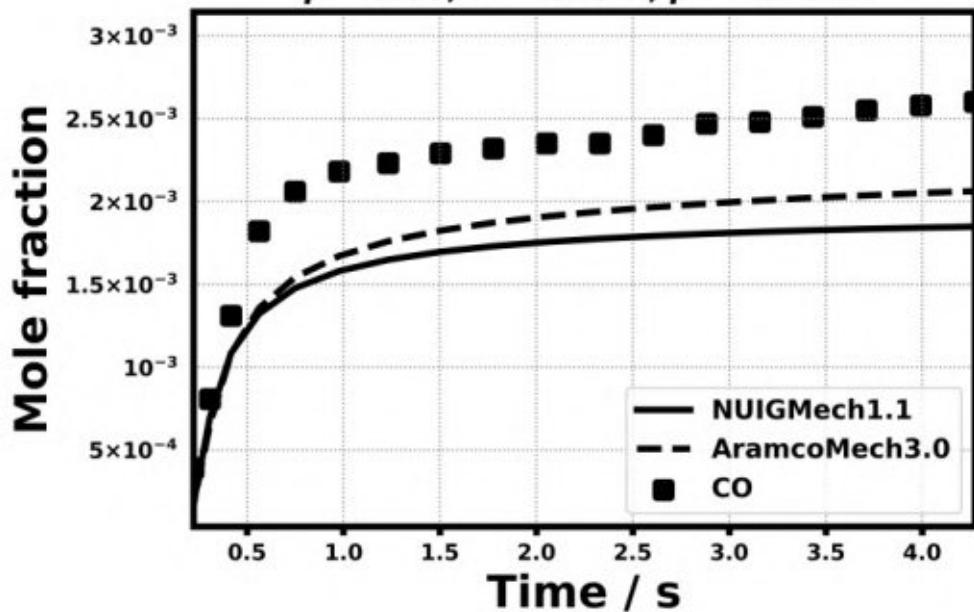
$0.35\% \text{CH}_3\text{OCH}_3$
 $1.26\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.68, T = 575 \text{ K}, p = 17 \text{ atm}$



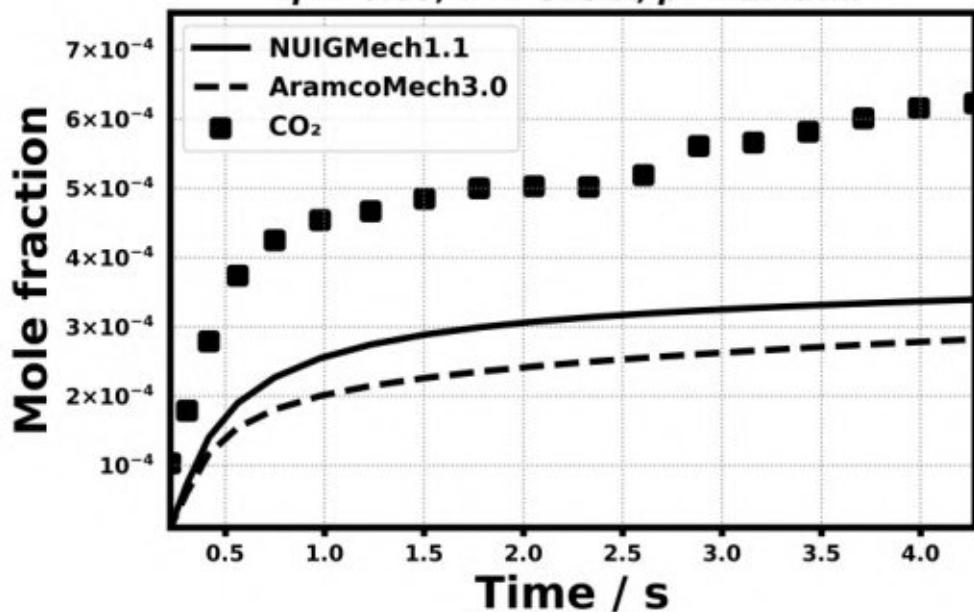
$0.35\% \text{CH}_3\text{OCH}_3$
 $1.26\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.68, T = 575 \text{ K}, p = 17 \text{ atm}$



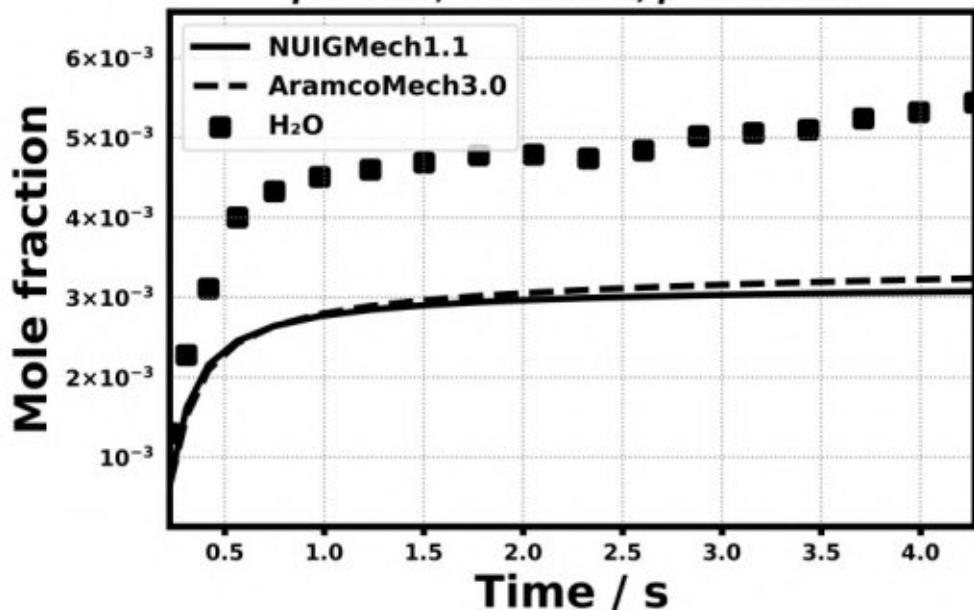
$0.35\% \text{CH}_3\text{OCH}_3$
 $1.26\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.68, T = 575 \text{ K}, p = 17 \text{ atm}$



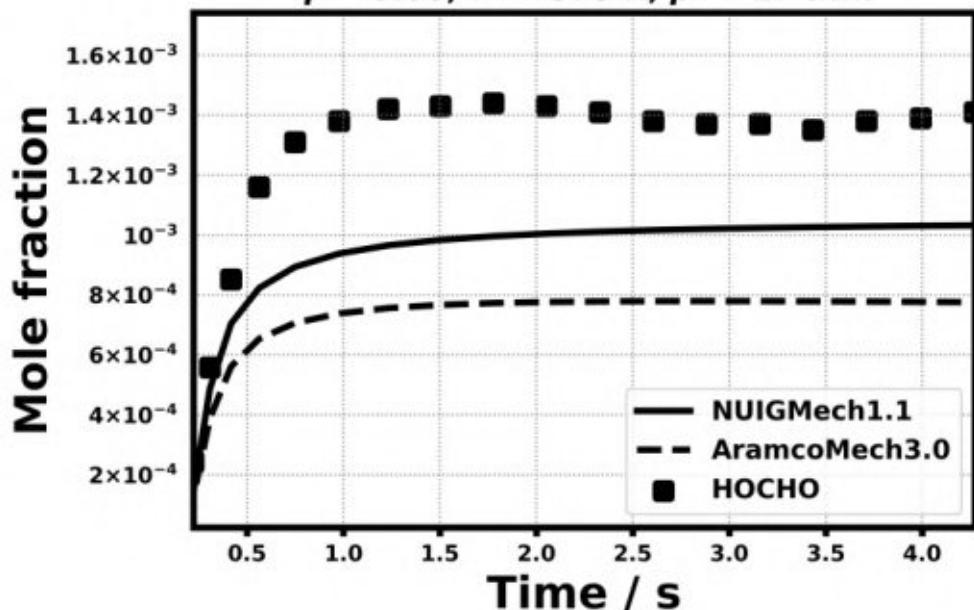
$0.35\% \text{CH}_3\text{OCH}_3$
 $1.26\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.68, T = 575 \text{ K}, p = 17 \text{ atm}$



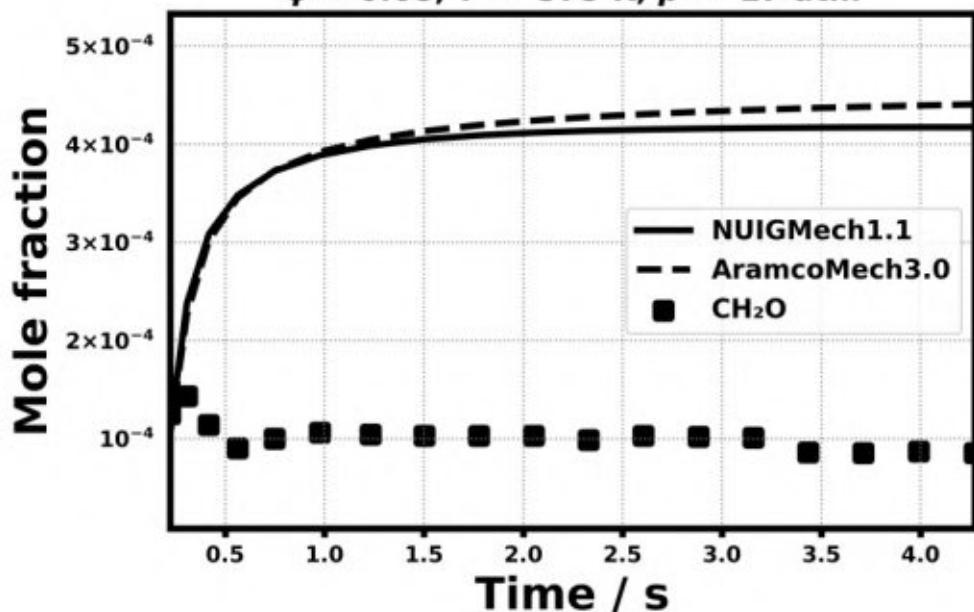
$0.35\% \text{CH}_3\text{OCH}_3$
 $1.26\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.68, T = 575 \text{ K}, p = 17 \text{ atm}$



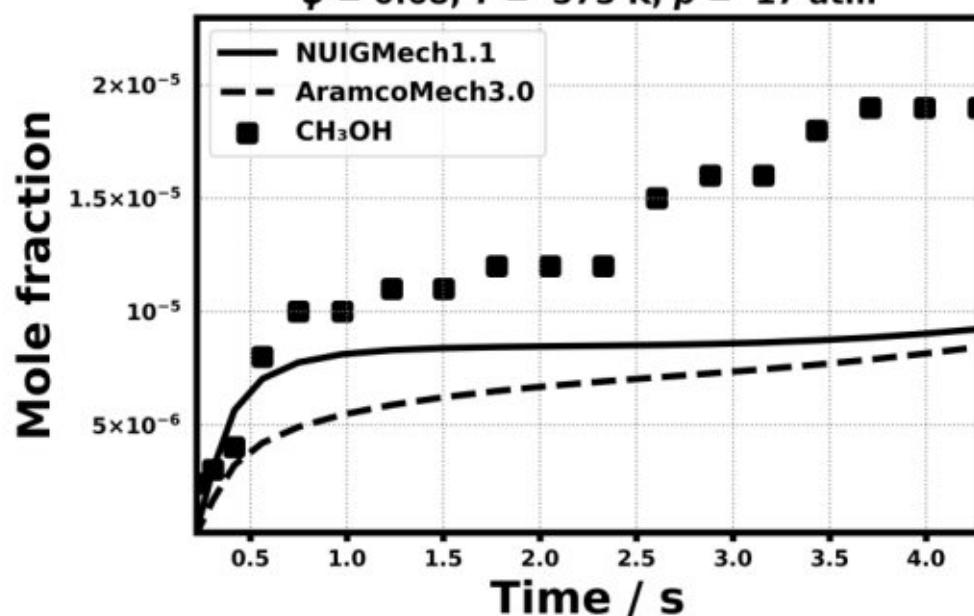
$0.35\% \text{CH}_3\text{OCH}_3$
 $1.26\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.68, T = 575 \text{ K}, p = 17 \text{ atm}$



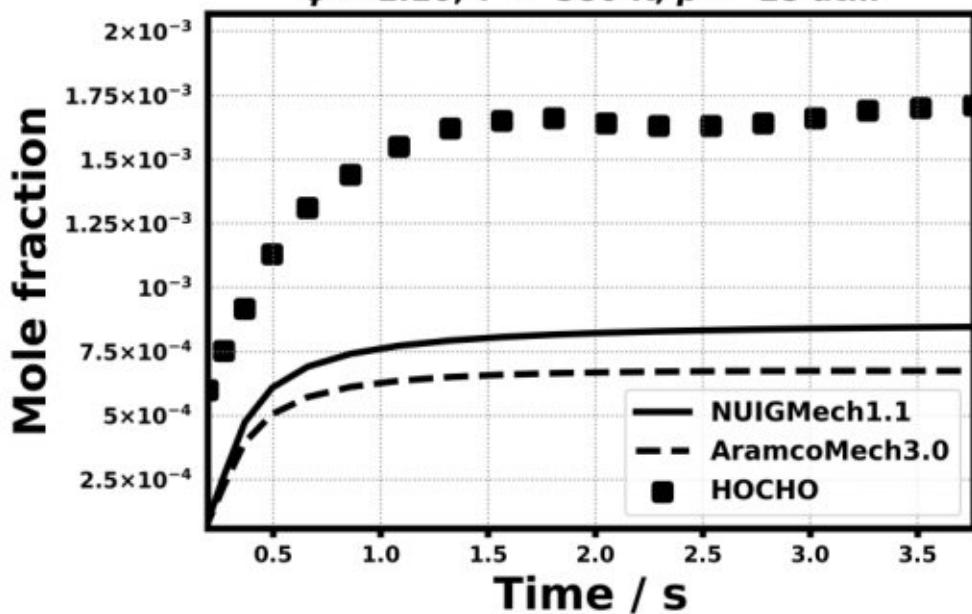
$0.35\% \text{CH}_3\text{OCH}_3$
 $1.26\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.68, T = 575 \text{ K}, p = 17 \text{ atm}$



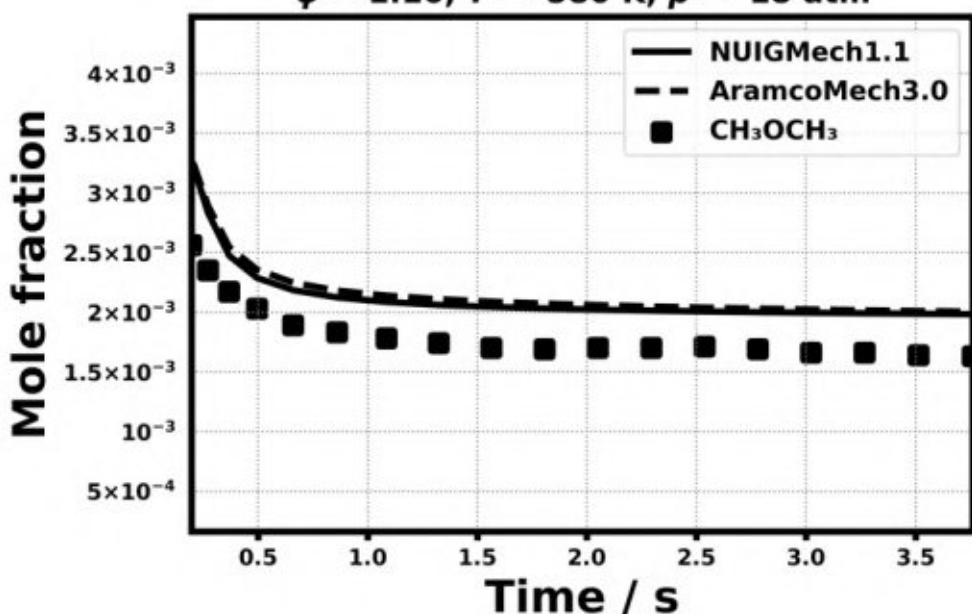
$0.35\% \text{CH}_3\text{OCH}_3$
 $1.26\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.68, T = 575 \text{ K}, p = 17 \text{ atm}$



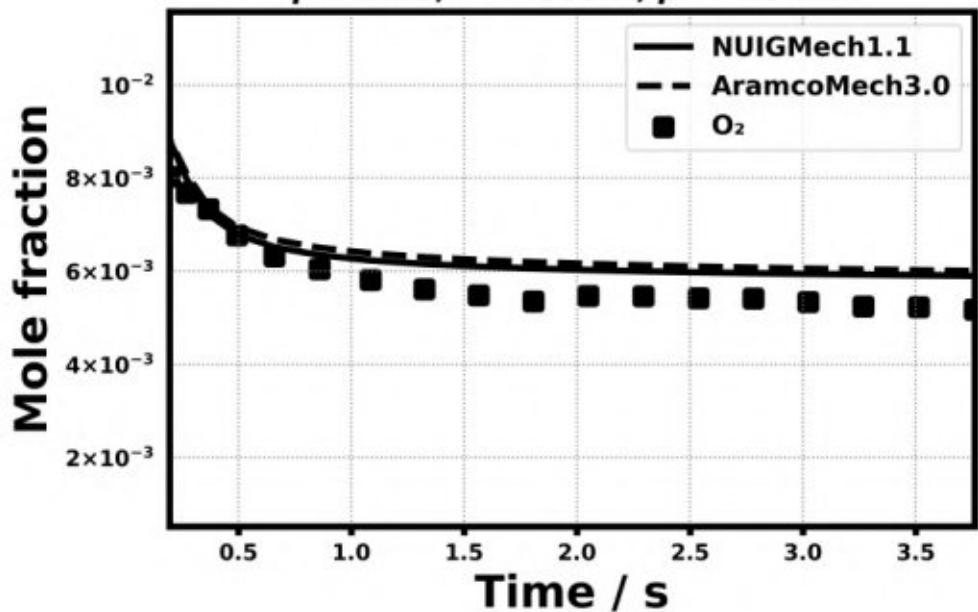
$0.37\% \text{CH}_3\text{OCH}_3$
 $0.957\% \text{O}_2, 98.7\% \text{N}_2$
 $\phi = 1.16, T = 580 \text{ K}, p = 18 \text{ atm}$



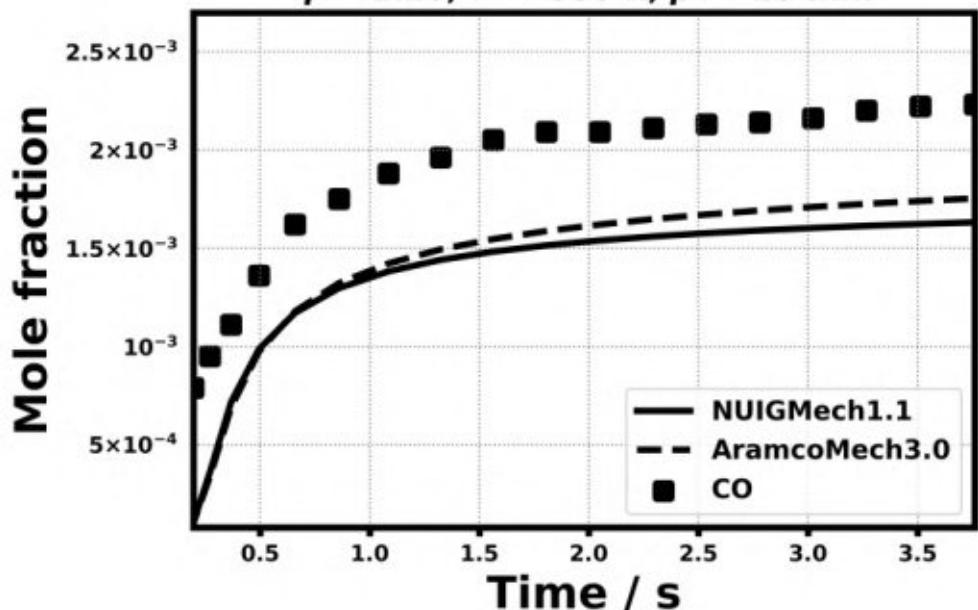
$0.37\% \text{CH}_3\text{OCH}_3$
 $0.957\% \text{O}_2, 98.7\% \text{N}_2$
 $\phi = 1.16, T = 580 \text{ K}, p = 18 \text{ atm}$



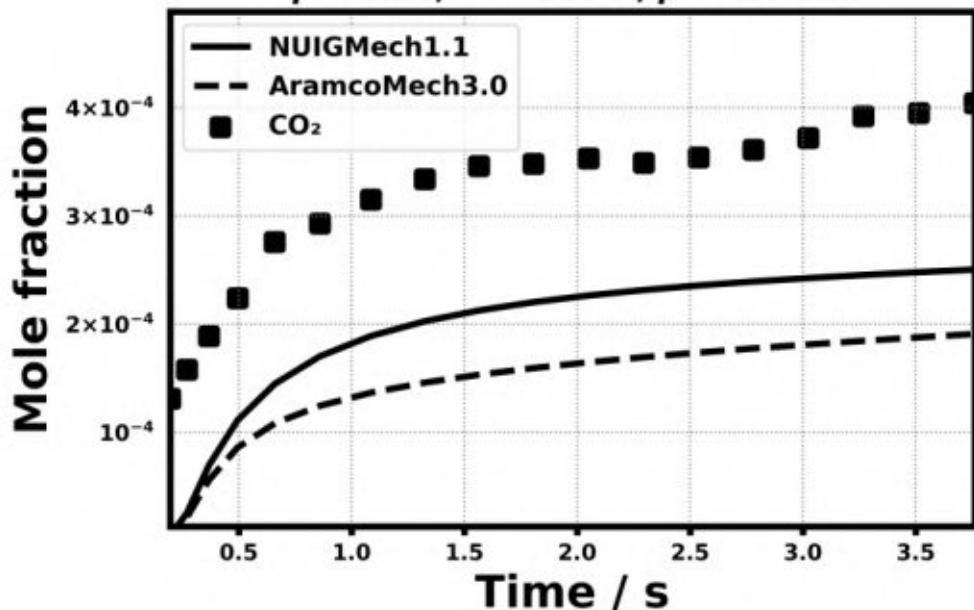
$0.37\% \text{CH}_3\text{OCH}_3$
 $0.957\% \text{O}_2, 98.7\% \text{N}_2$
 $\phi = 1.16, T = 580 \text{ K}, p = 18 \text{ atm}$



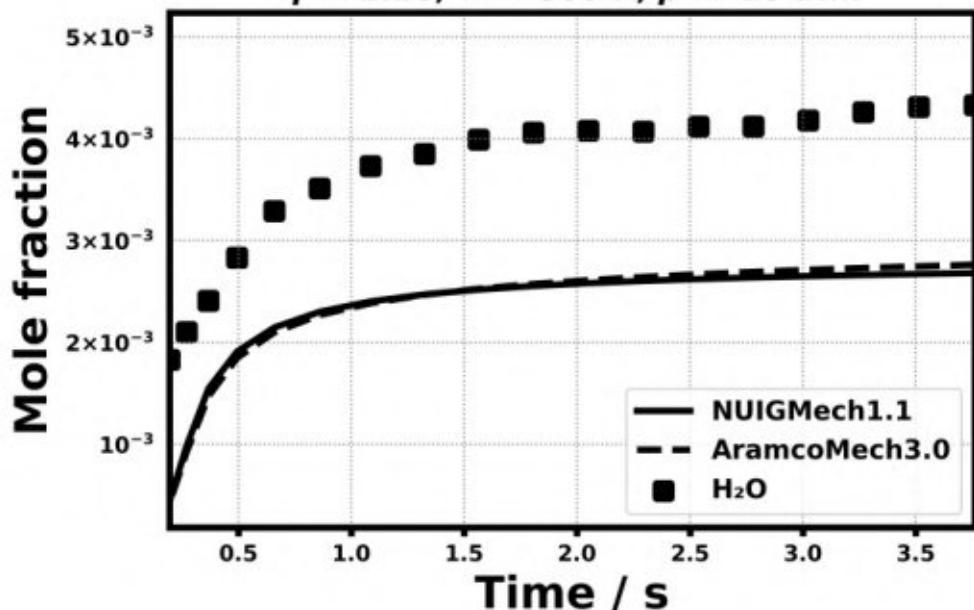
$0.37\% \text{CH}_3\text{OCH}_3$
 $0.957\% \text{O}_2, 98.7\% \text{N}_2$
 $\phi = 1.16, T = 580 \text{ K}, p = 18 \text{ atm}$

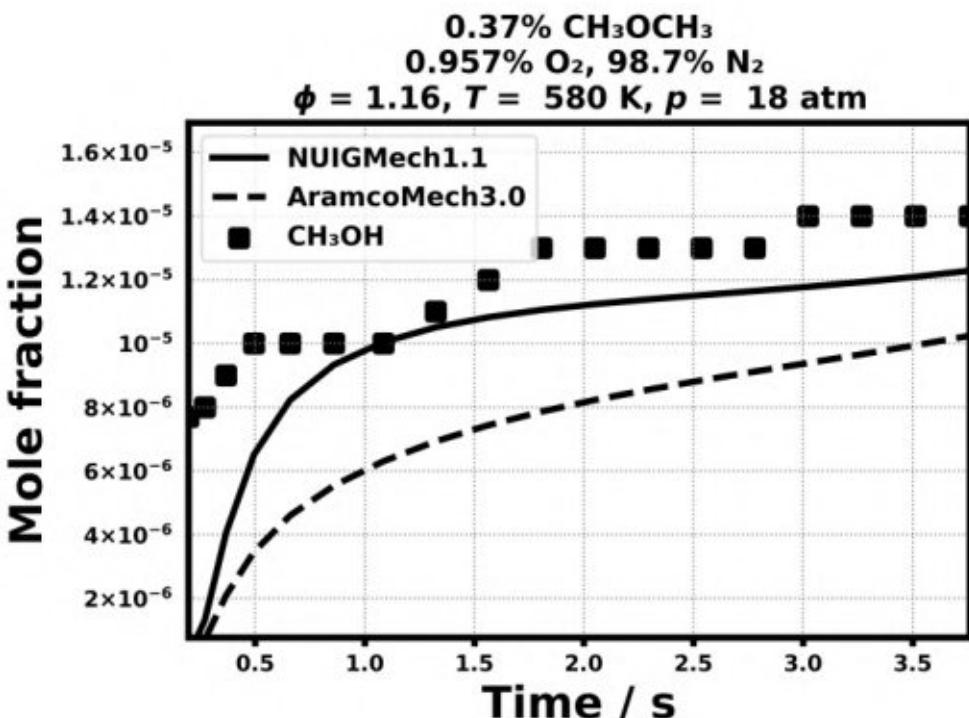
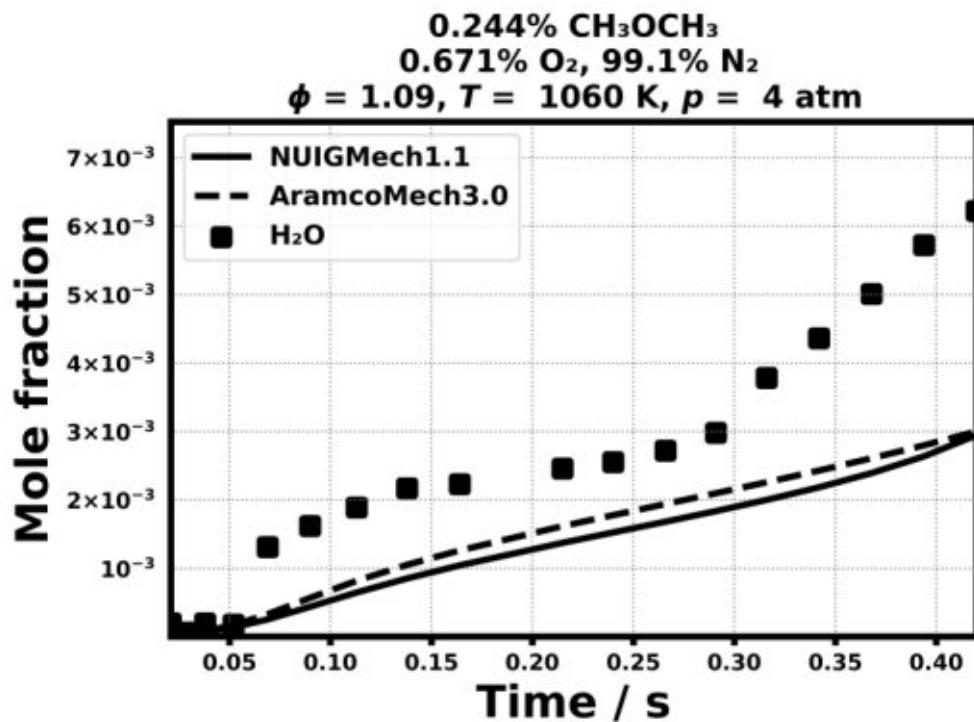


$0.37\% \text{CH}_3\text{OCH}_3$
 $0.957\% \text{O}_2, 98.7\% \text{N}_2$
 $\phi = 1.16, T = 580 \text{ K}, p = 18 \text{ atm}$

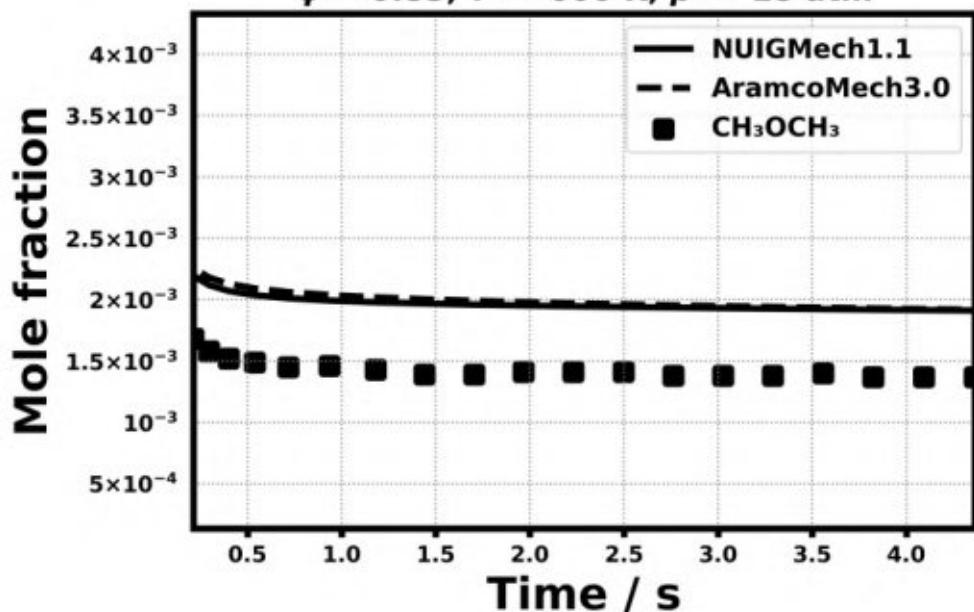


$0.37\% \text{CH}_3\text{OCH}_3$
 $0.957\% \text{O}_2, 98.7\% \text{N}_2$
 $\phi = 1.16, T = 580 \text{ K}, p = 18 \text{ atm}$

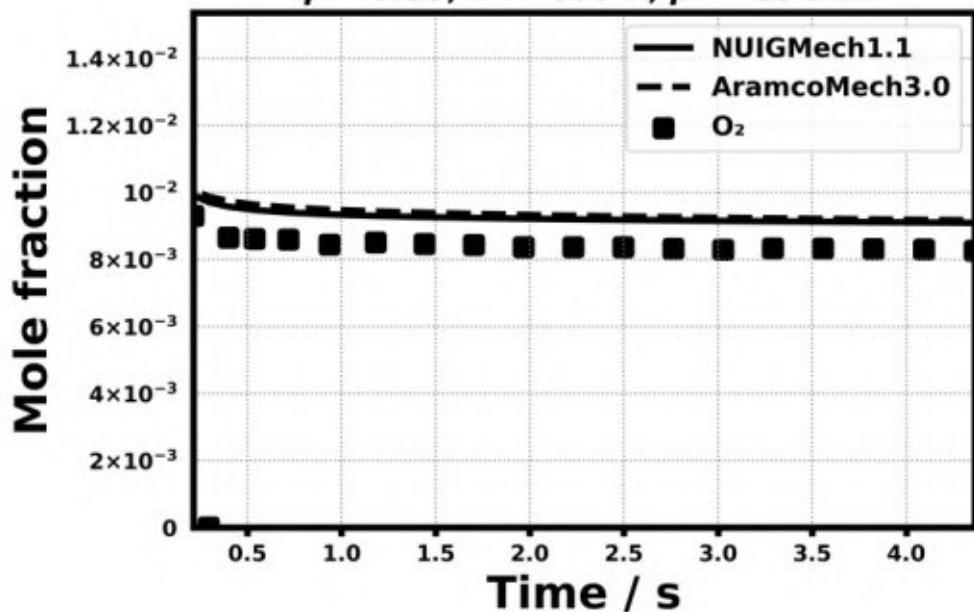




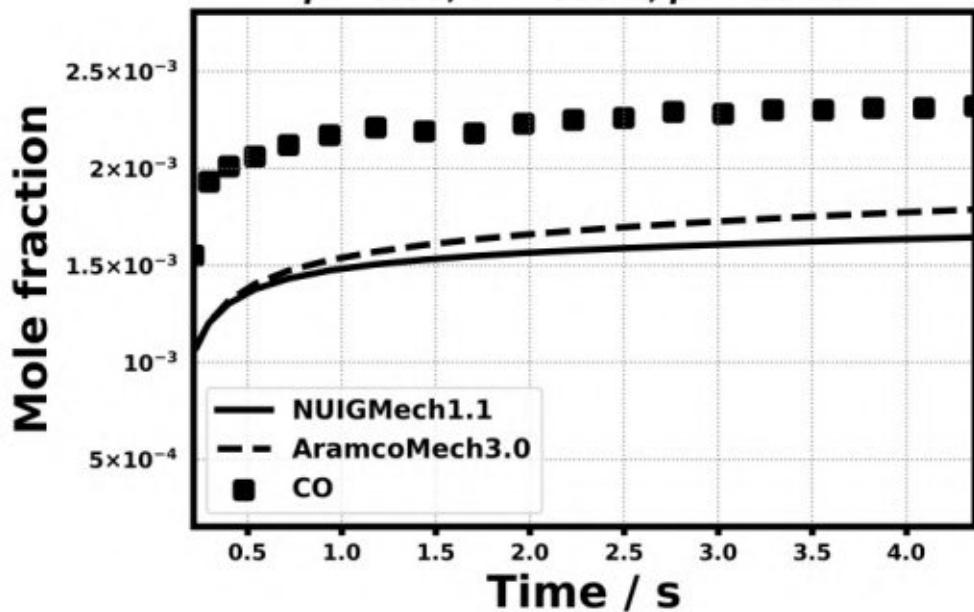
$0.358\% \text{CH}_3\text{OCH}_3$
 $1.27\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.85, T = 600 \text{ K}, p = 18 \text{ atm}$



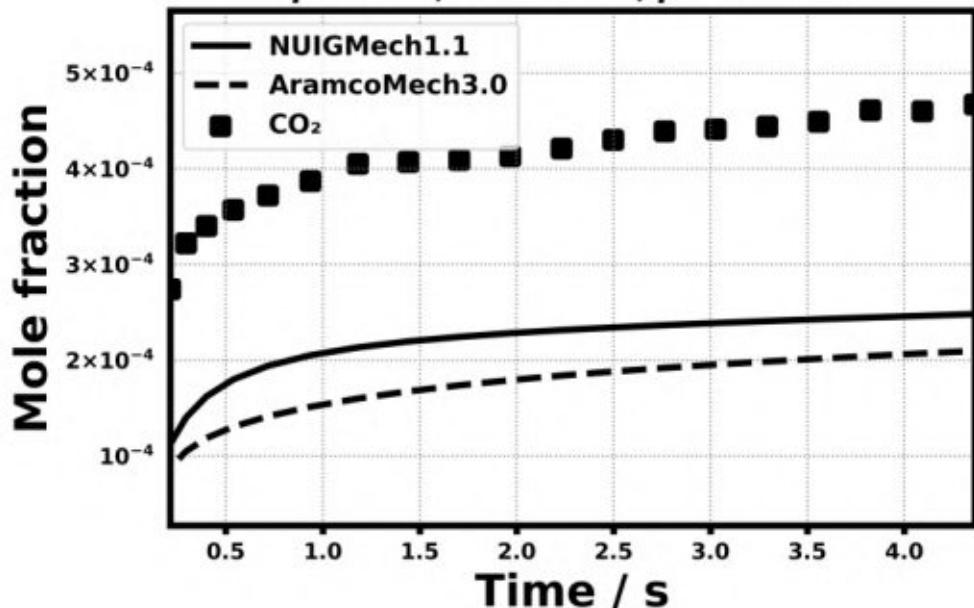
$0.358\% \text{CH}_3\text{OCH}_3$
 $1.27\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.85, T = 600 \text{ K}, p = 18 \text{ atm}$



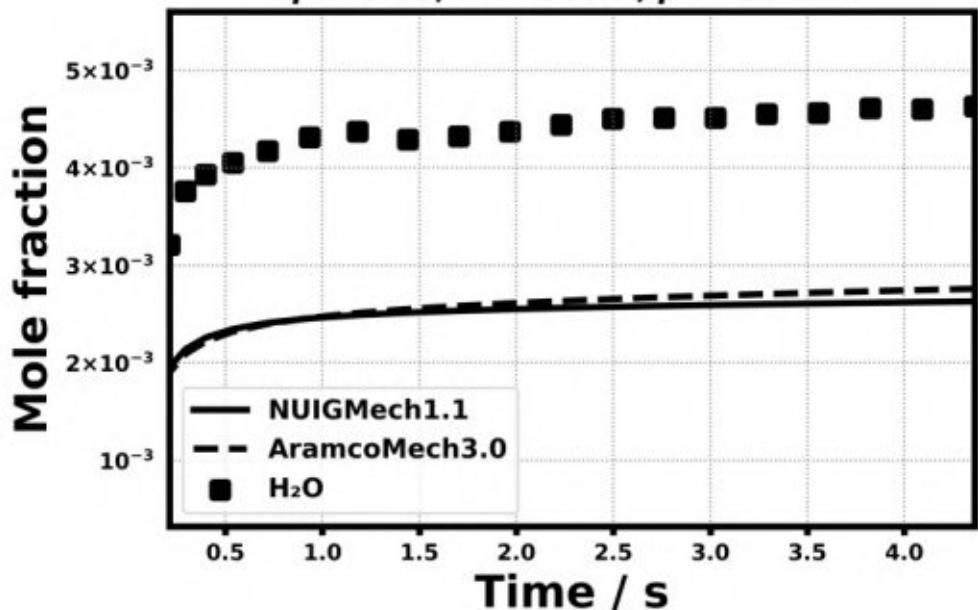
$0.358\% \text{CH}_3\text{OCH}_3$
 $1.27\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.85, T = 600 \text{ K}, p = 18 \text{ atm}$



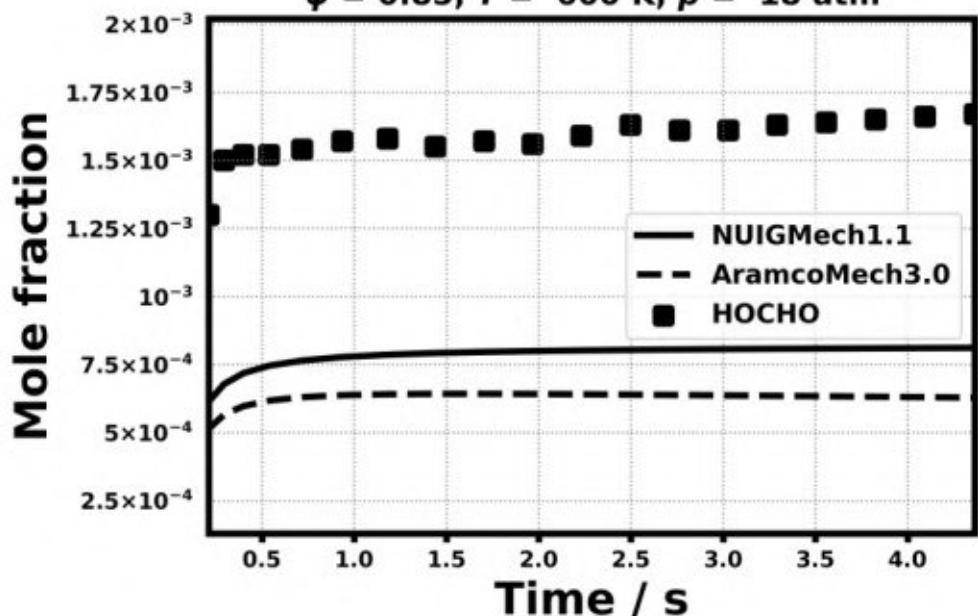
$0.358\% \text{CH}_3\text{OCH}_3$
 $1.27\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.85, T = 600 \text{ K}, p = 18 \text{ atm}$



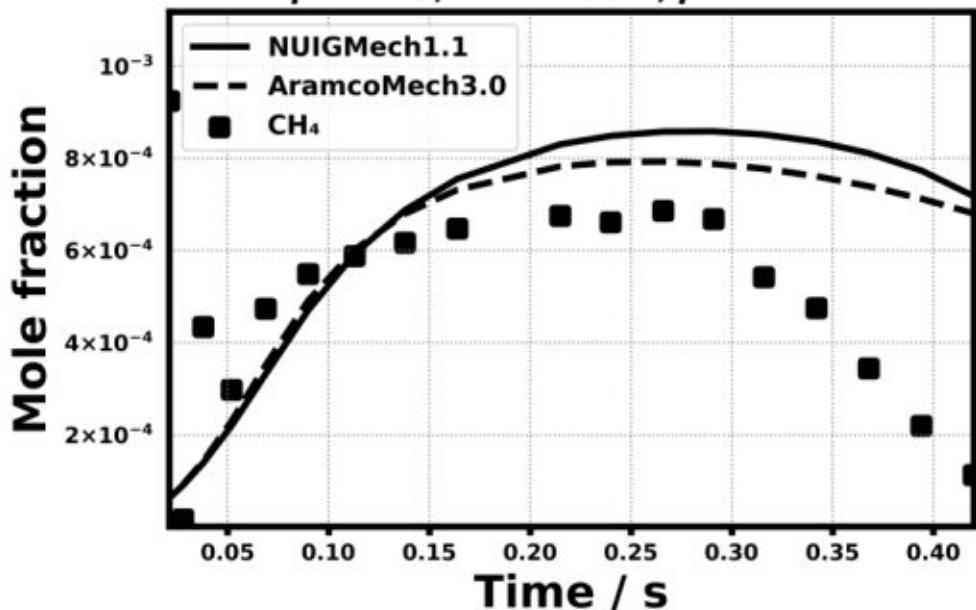
$0.358\% \text{CH}_3\text{OCH}_3$
 $1.27\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.85, T = 600 \text{ K}, p = 18 \text{ atm}$



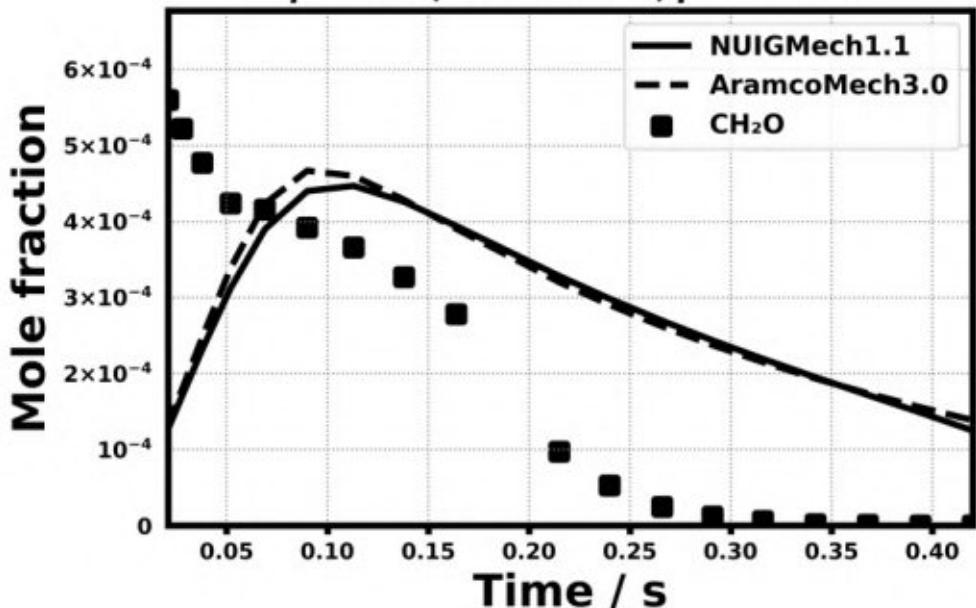
$0.358\% \text{CH}_3\text{OCH}_3$
 $1.27\% \text{O}_2, 98.4\% \text{N}_2$
 $\phi = 0.85, T = 600 \text{ K}, p = 18 \text{ atm}$



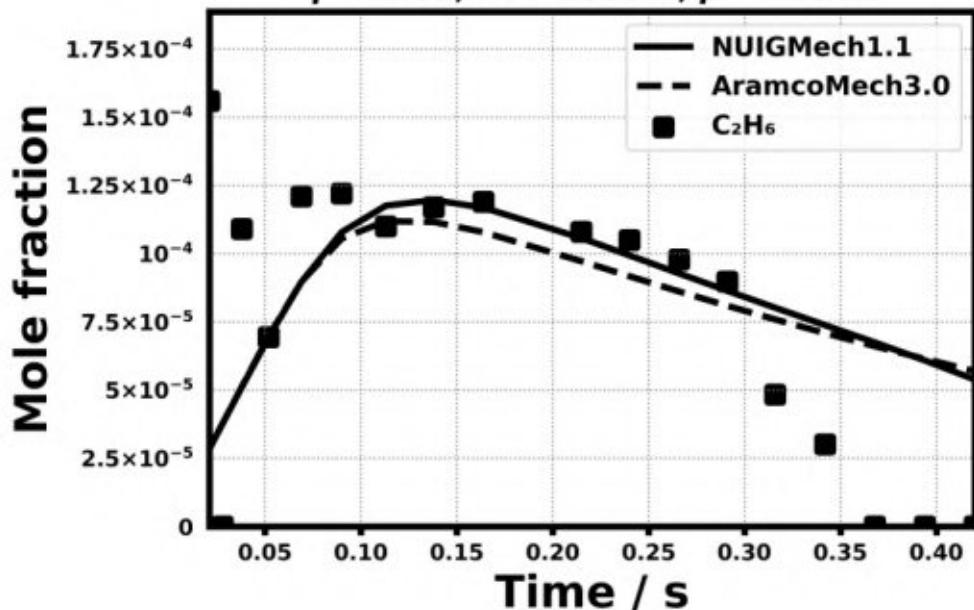
$0.244\% \text{CH}_3\text{OCH}_3$
 $0.671\% \text{O}_2, 99.1\% \text{N}_2$
 $\phi = 1.09, T = 1060 \text{ K}, p = 4 \text{ atm}$



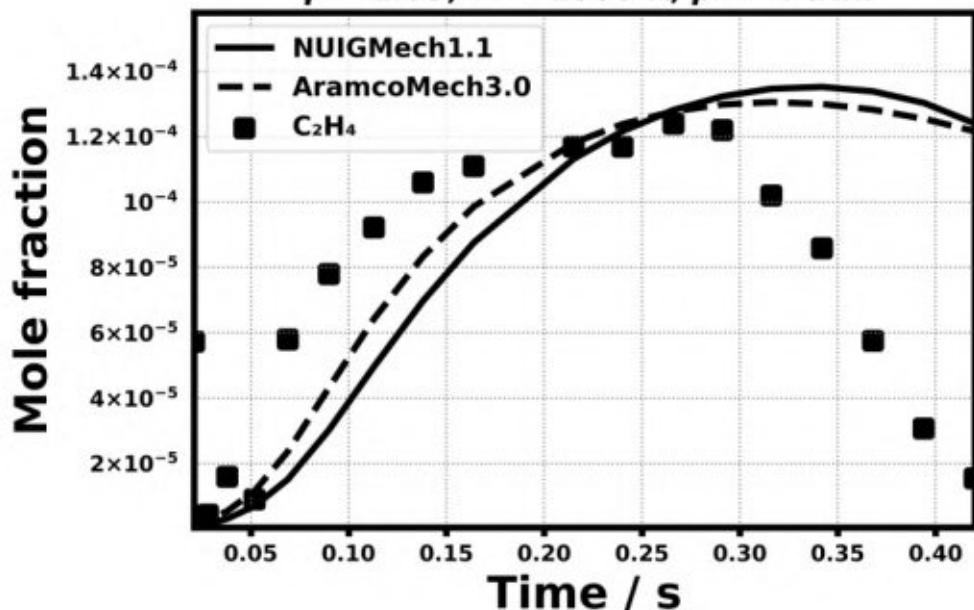
$0.244\% \text{CH}_3\text{OCH}_3$
 $0.671\% \text{O}_2, 99.1\% \text{N}_2$
 $\phi = 1.09, T = 1060 \text{ K}, p = 4 \text{ atm}$

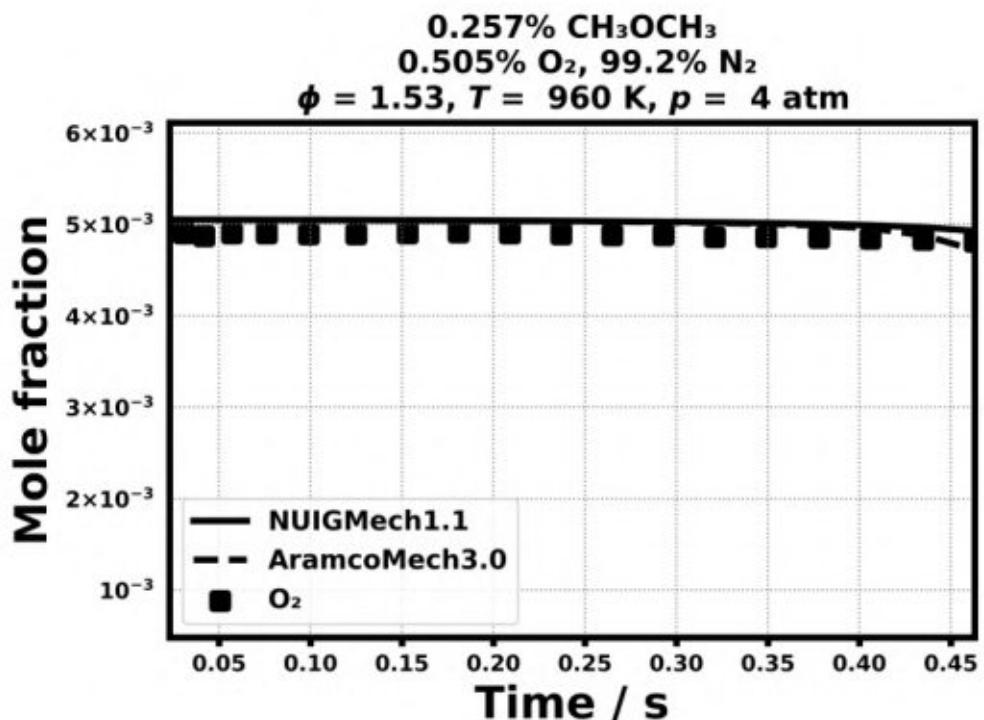
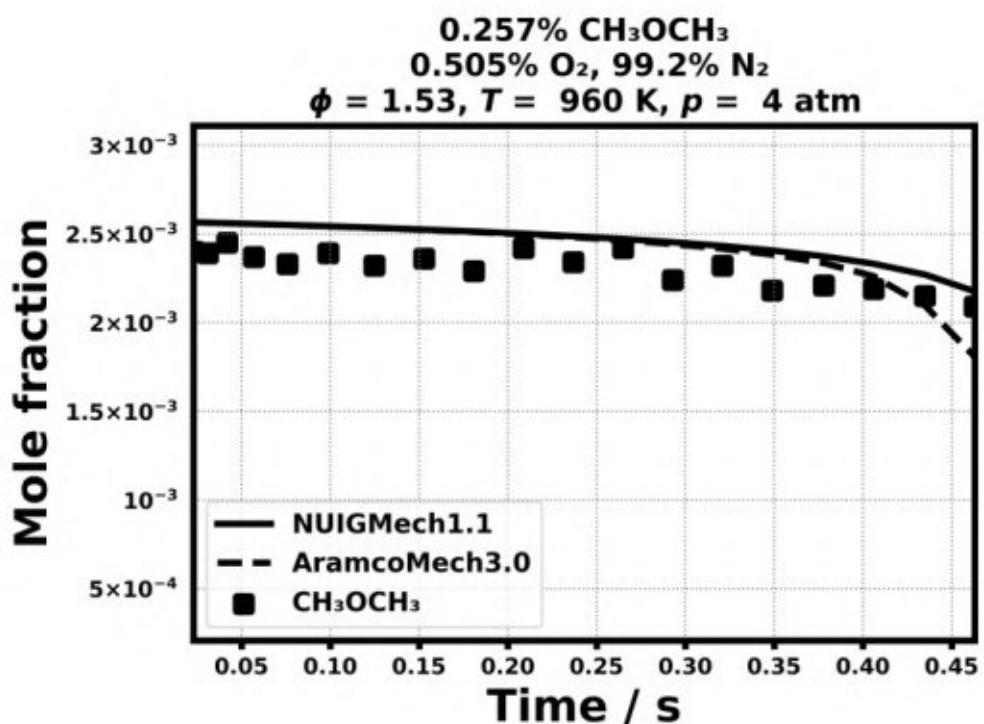


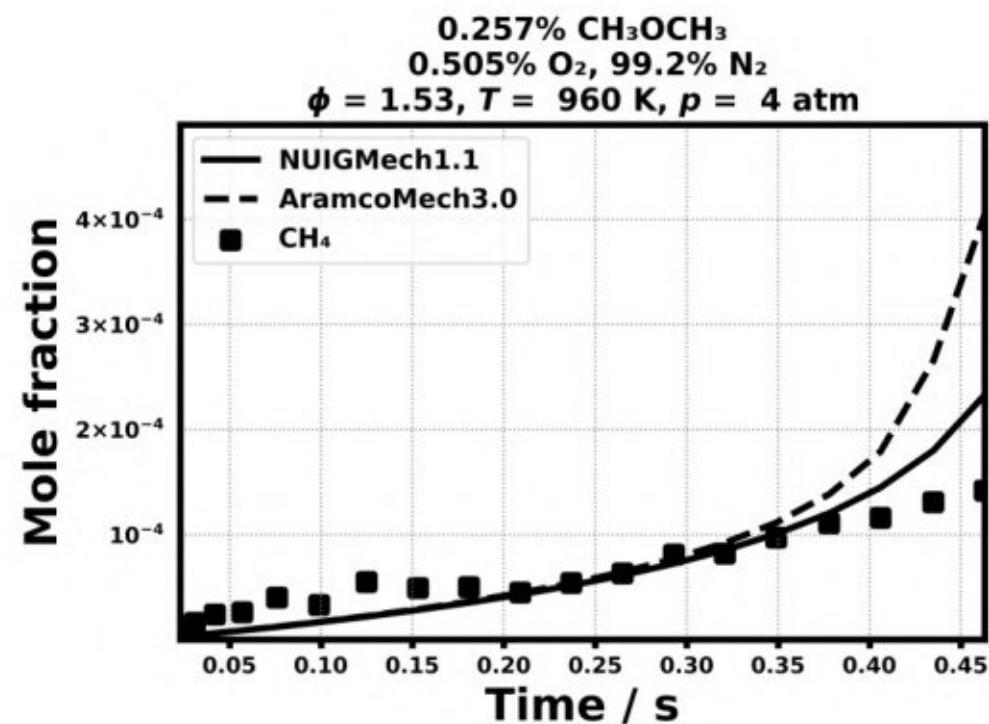
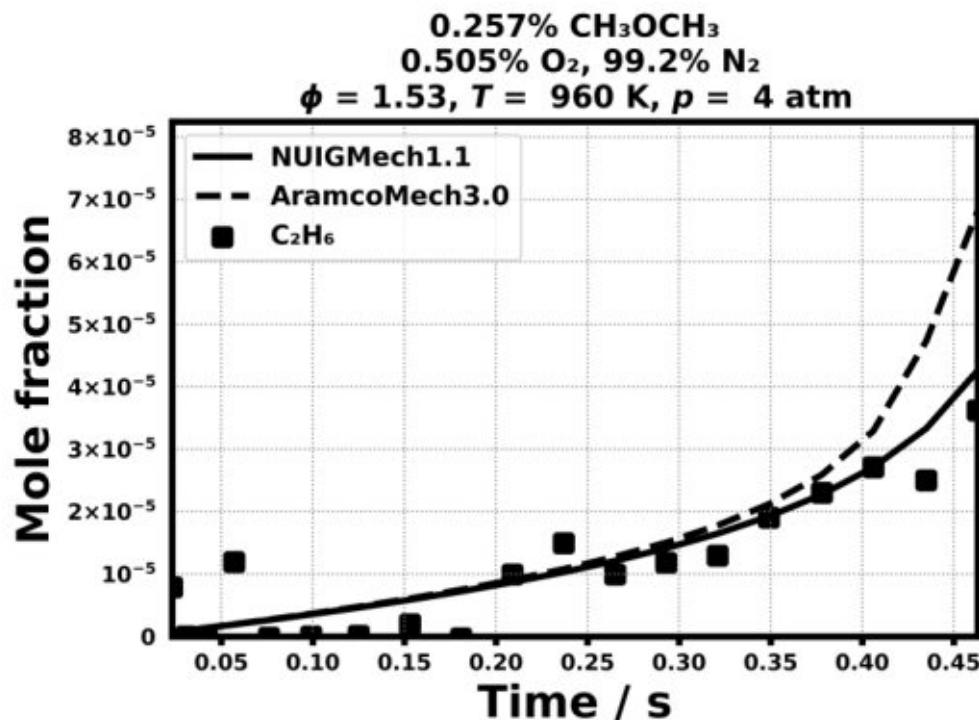
$0.244\% \text{CH}_3\text{OCH}_3$
 $0.671\% \text{O}_2, 99.1\% \text{N}_2$
 $\phi = 1.09, T = 1060 \text{ K}, p = 4 \text{ atm}$



$0.244\% \text{CH}_3\text{OCH}_3$
 $0.671\% \text{O}_2, 99.1\% \text{N}_2$
 $\phi = 1.09, T = 1060 \text{ K}, p = 4 \text{ atm}$







Laminar flame speed

- 14.17) X. Qin, and J. Yiguang., Proceedings of the Combustion Institute 30, no. 1 (2005) 233-240.
14.18) Z. Zhao, A. Kazakov, and F. L. Dryer., Combustion and Flame 139, no. 1-2 (2004) 52-60.
14.19) Wang, Y. L., A. T. Holley, C. Ji, F. N. Egolfopoulos, T. T. Tsotsis, and H. J. Curran, Proceedings of the Combustion Institute 32 (2009) 1035-1042.

