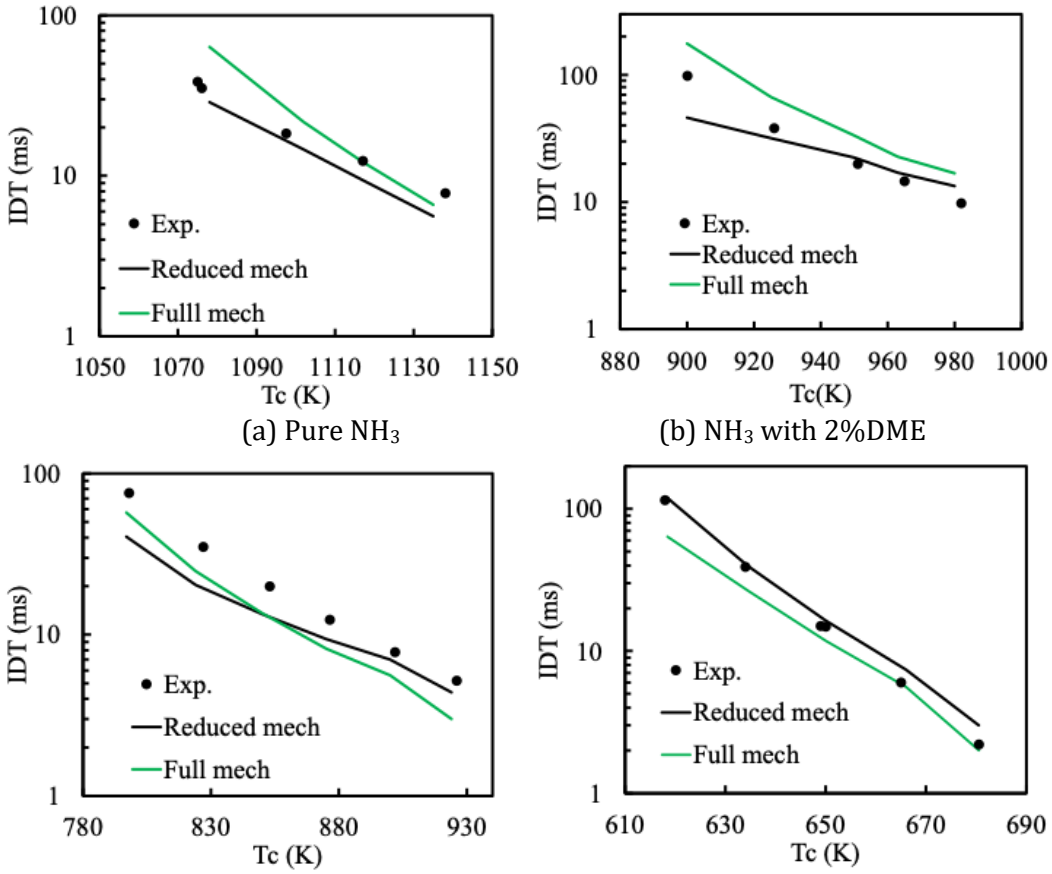
Supplementary material

Part 1: The reduced mechanism validation against measured IDTs from Dai et al. [1]



(a) Pure NH_3 (b) NH_3 with 2%DME

(c) NH_3 with 5%DME (d) Pure DME

Fig. S1. Measured (from Dai et al. [1]) and calculated IDTs using the full mechanism [2] (dashed lines)from and reduced mechanism (solid lines) from this study at φ=0.5, P_c=60 bar for pure NH_3 (a), NH_3 with 2%DME (b), NH_3 with 5% DME (c) and pure DME (d).

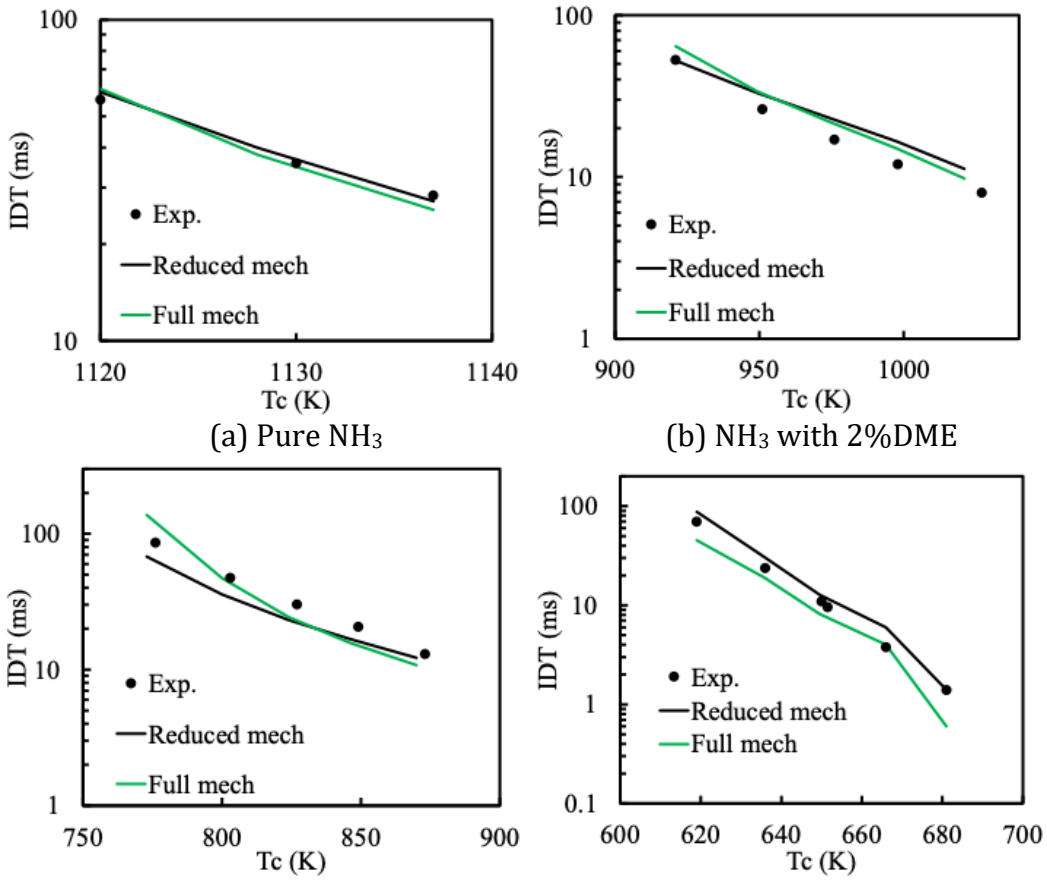
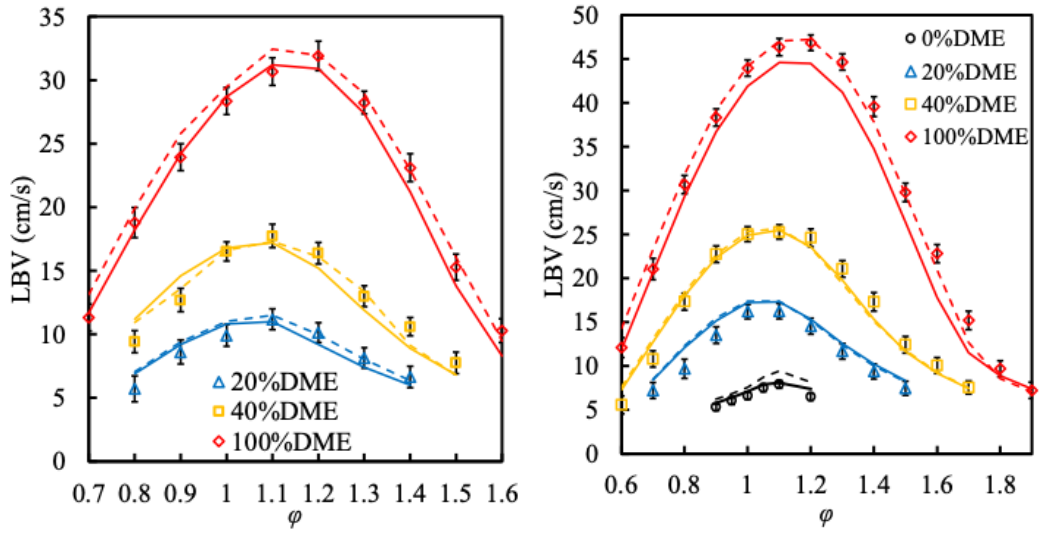


Fig. S2. Measured (from Dai et al. [1]) and calculated IDTs using the full mechanism [2] (dashed lines)from and reduced mechanism (solid lines) from this study at φ=2.0, P_c=60 bar for pure NH_3 (a), NH_3 with 2%DME (b), NH_3 with 5% DME (c) and pure DME (d).

Part 2: The reduced mechanism validation against measured LBVs from Dai et al. [1]



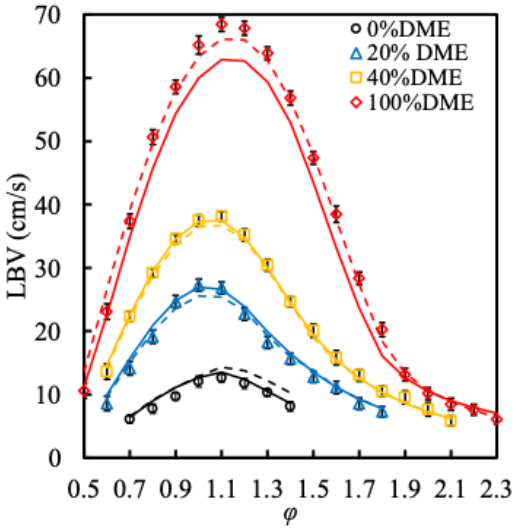


Fig. S3. Measured LBVs and calculated LBVs of NH3 with 20% DME at 298K/1bar with varying O2 content, O2 = 18% (a), O2 = 21% (b) and O2 = 25% (c) using the full mechanism [2](dashed lines)from and reduced mechanism (solid lines) from this study.

References

[1] L. Dai, H. Hashemi, P. Glarborg, S. Gersen, P. Marshall, A. Mokhov, H. Levinsky, Ignition delay times of NH3 /DME blends at high pressure and low DME fraction: RCM experiments and simulations, Combustion and Flame 227 (2021) 120–134. https://doi.org/10.1016/j.combustflame.2020.12.048.

[2] C. Zhang, L. Dai, Y. Wang, X. Qu, X. Chen, Q. Wang, Experimental and kinetic study on O2 reduced and enriched premixed ammonia/DME flames, Journal of the Energy Institute 123 (2025) 102276. https://doi.org/10.1016/j.joei.2025.102276.