

Supplementary Material

Figures A1 and A2 compare the neutral profiles measured using MBMS with simulated profiles obtained using two different temperature profiles for the lean and stoichiometric premixed flames, respectively. When unperturbed temperature profiles were used to constrain the simulations, the simulated neutral profiles were shifted by 0.8 mm and 1.53 mm to match the position of the H_3O^+ peak for lean and stoichiometric flames, respectively. However, no axial shifting was implemented for simulations utilizing the stretched temperature profile.

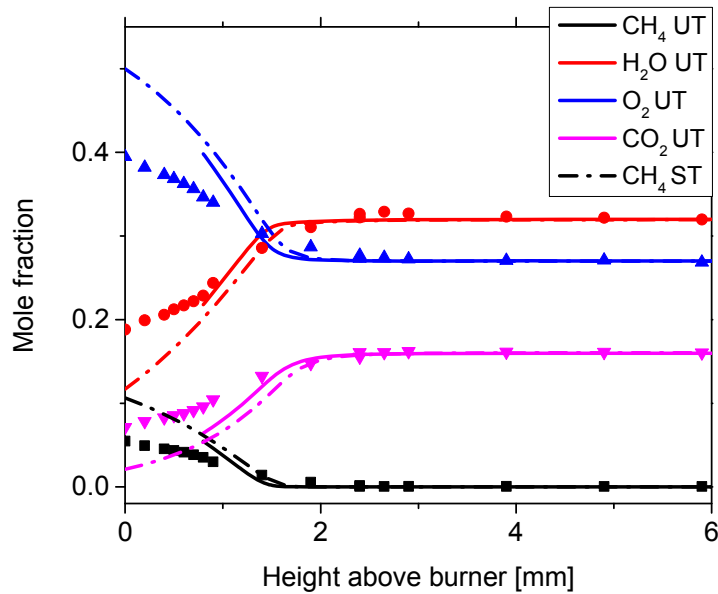


Figure A1. Comparison of experimental data (symbols) with simulated neutral profiles obtained using unperturbed temperature profile (UT) and stretched temperature profile (ST) for the lean premixed flame ($\phi = 0.54$).

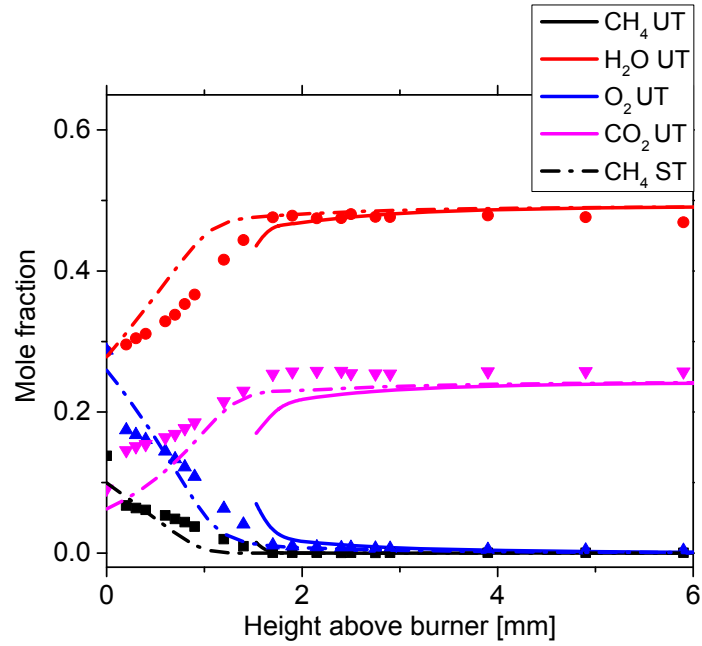


Figure A2. Comparison of experimental data (symbols) with simulated neutral profiles obtained using unperturbed temperature profile (UT) and stretched temperature profile (ST) for the stoichiometric premixed flame ($\phi = 1.01$).