

Abstract Submitted
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DNS of Multicomponent Spray Combustion¹ PAVAN GOVINDARAJU, THOMAS JARAVEL, MATTHIAS IHME, Stanford University — To examine effects of multicomponent transportation fuels on the evaporation and combustion, direct numerical simulations of turbulent spray flames are performed under consideration of preferential evaporation and combustion of a multicomponent surrogate fuel. Model approximations for the description of the liquid and gas phase are discussed to make the problem computationally tractable. Simulations were performed to examine effects of droplet size, diffusion models, global equivalence ratio and turbulent intensity. These findings are compared against results from previous work on multicomponent combustion in homogeneous environments. Relevant combustion regimes for multicomponent spray-flames will be presented by introducing additional spatial and time-scales arising from the competition between evaporation, turbulence and reaction chemistry.

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