NUMERICAL PREDICTIONS OF SOOT FORMATION IN KEROSENE/AIR JET DIFFUSION FLAME

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Abstract

Soot volume fraction in a turbulent diffusion flame burning kerosene/air is simulated using steady flamelet approach. The soot inception model based on the formation rate of three and two ring aromatics is used, which further accounts for inception, coagulation, surface growth, and oxidation processes. The Favre-averaged governing equations of mass, momentum, and energy are solved in conjunction with k-? turbulence model in ANSYS-FLUENT. The fairly detailed reaction mechanism for kerosene/air is coupled to the turbulent flow field by steady laminar flamelet approach, while the soot is calculated using Moss-Brookes model. The predictions are found to match well with the measurements where no significant effects are observed with the inclusion of higher order hydrocarbon as precursors and surface growth.