

عنوان مقاله:

Heat Recirculation Effect on the Structure of Wood Dust Flame Propagation

محل انتشار:

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خلاصه مقاله:

A model for heat-recirculating micro combustor is developed. It investigates the structure of laminar, one-dimensional and steady state flame propagation in uniformly premixed wood particles with considering the effects of heat recirculation caused by configuration of micro combustor. The flame structure is divided into three regions: a preheat-devolatilization zone where the rate of the gas-phase chemical reaction is small; a narrow reaction zone where convection and the rate of devolatilization of the fuel particles are small; and finally a convection zone where diffusive terms in the conservation equation are small. In this model, it is assumed that the fuel particles vaporize first to yield a gaseous fuel of known chemical structure. The analysis is investigated in the asymptotic limit. The overall investigation of this study leads to a novel non-linear burning velocity correlation that heat recirculation term is considered to calculate it. The results shows that heat recirculation affect the flame structure by different parameters. Burning velocity and flame temperature are the most important of these parameters. Furthermore, as the equivalence ratio increases and the wood particle size decreases, the combustion process in micro combustor can be more stable

کلمات کلیدی:

Analytical Model, Micro Combustor, Heat Recirculation, Flame Temperature, Burning Velocity

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