

EFFECT OF THERMAL RADIATION ON H₂-AIR FLAMES DILUTED WITH STEAM

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ABSTRACT. This study explores the effect of thermal radiation on 1D H₂-Air flames diluted with steam. To this end, a reactive fluid solver is coupled with a semi-analytical thermal radiation code. In all configurations studied, three thermal radiation effects are found: a preheating of the fresh gases, an increase in the laminar flame speed, and a decrease in temperature in the burnt gases. It is shown that domain length significantly affects this preheating and the laminar flame speed. The grey gas approximation is compared to more realistic radiative properties using a CK model. It is found that taking thermal radiation into account leads to a significant increase in the laminar flame speed that reaches 320% at 5 atm.

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