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Heat release characteristics of ammonia/hydrogen flames in MILD conditions[1] RUSLAN KHAMEDOV, WONSIK SONG, FRANCISCO E.HERNANDEZ PEREZ, HONG IM, King Abdullah Univ of Sci Tech (KAUST) — The utilization of ammonia as a fuel is a pragmatic approach to pave the way towards a low-carbon economy. Ammonia contains almost 18% of hydrogen by mass and is accepted as one of the hydrogen combustion enablers with existing infrastructure for transportation and storage. To provide fundamental insights into the heat release characteristics of ammonia and ammonia-hydrogen flames at various conditions, different levels of hydrogen addition in moderate or intense low oxygen dilution (MILD) conditions were investigated numerically. In particular, the heat release characteristics and dominant reaction pathways were analyzed in one-dimensional laminar premixed configurations. The analysis reveals that the peak of heat release for the ammonia flame occurs near the burned gas. The dominant heat release reactions and significance of NH_2 and OH, which serve as precursors for characterization of the reaction zone, are highlighted. With increasing hydrogen in the mixture, the heat release is enhanced and the peak shifts toward the unburned gas, which is due to dominance of the reaction H_2 + OH <=> H + H_2O at higher hydrogen levels.

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