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Laminar Flame Speed of Primary Reference Fuels and Gasoline Surrogates at Elevated Temperatures Measured with the Flat Flame Method[1] YING-HAO LIAO, WILLIAM ROBERTS, King Abdullah University of Science and Technology — The laminar flame speed is a key target data for validating relevant kinetic mechanisms of the combustion of future fuel formulations since this fundamental parameter contains information for the reactivity, diffusivity, and exothermicity of the fuel mixture. The current work presents the flat flame method, which produces a one-dimensional flat flame free of stretch, to measure laminar flame speeds of the Primary Reference Fuels (PRFs), PRF blends, and gasoline surrogates at elevated temperatures. The flat flame is produced by a McKenna porous plug burner. The laminar flame speed was measured experimentally at atmospheric pressure over a range of equivalence ratios and a range of unburned gas temperatures up to 470 K. To determine the laminar flame speed, a technique with heat extraction through the cooling water, similar to that described by Botha and Spalding (1954), was employed and the adiabatic laminar flame speed was obtained by extrapolation. In addition, the experimental data is compared to simulations using kinetic mechanisms available in the literature. Preliminary results of laminar flame speeds for methane/air and n-heptane/air mixtures at room temperature show good agreement with both of experimental and numerical data available in the literature.

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