

# Sooting Limits of Nonpremixed $n$ -Heptane, $n$ -Butanol, and Methyl Butanoate Flames: Experimental Determination and Mechanistic Analysis

## Authors

Sili Deng, Jeremy A. Koch, Michael E. Mueller, Chung K. Law

Department of Mechanical and Aerospace Engineering, Princeton University, Princeton, NJ 08544, USA

## Highlights

- Measured sooting limits of nonpremixed flames in a stagnation-flow configuration.
- Comparison with simulations using detailed chemistry and soot models.
- Examined soot response to strain, chemical pathways for PAH, and rate-limiting steps.
- Methyl butanoate found significantly less sooting compared to  $n$ -heptane and  $n$ -butanol.
- Fuel breakdown processes to soot precursors account for sooting tendency differences.