

# Characteristics of Laminar premixed CH<sub>4</sub>/CO/Air Opposed-Jet Flames

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## Abstract

The characteristics of laminar premixed CH<sub>4</sub>/CO/air opposed-jet flames are experimentally and numerically investigated. The premixed flames are operated at a fixed stoichiometric condition with various fuel mixtures of CH<sub>4</sub> and CO. The flame front positions of the opposed-jet flames are measured using direct photographs and CH\* chemiluminescence images. The flame structures are calculated using the OPPDIF code coupled with multicomponent transport model and GRI-Mech 3.0 chemical kinetic mechanisms, while the PREMIX code is employed to investigate the laminar burning velocity. Results show that the measured and calculated flame front positions are in excellent agreement. The calculated flame structures suggest that the premixed CH<sub>4</sub>/CO/air flames can be categorized into CH<sub>4</sub>-like or CO-like flames, according to the spatial distribution of CO concentration. In addition, the calculated maximum laminar burning velocity of the premixed CH<sub>4</sub>/CO/air flames is found when the volumetric CH<sub>4</sub> concentration is about 10% in fuel mixtures which also results in lowest CO<sub>2</sub> production for the blended fuels studied.

Keyword : CH<sub>4</sub>/CO/Air Opposed-jet Flames