

Controlling Emissions, Intensity, and Stability of Turbulent Premixed Combustion

Robert K. Cheng
Combustion Technologies Group
Lawrence Berkeley National Laboratory
Berkeley, California, USA

Abstract

This goal of this paper is to give a general introduction to the fluid mechanics aspects of premixed turbulent combustion and their relevance to controlling the emissions of pollutants, the combustion intensity and flame stability. The topics include an abbreviated description of flame/turbulence interactions, and an explanation on why lean premixed flames emit low levels of NO_x . The impact of turbulence on flame dynamics and premixed combustion intensity will also be described. A discussion of flame stabilization methods and their role on flame stability, and a brief summary of passive and active control methods being developed in laboratory experiments will follow. Finally, new research needs for development of smart combustion systems will be discussed.