

||||| 特集：燃焼～単純化して探る複雑現象 |||||
(原著論文)

一様電界中におけるエタノール液滴燃焼の 促進に関する数値計算

山下 清孝・今村 宰・大坂 淳・津江 光洋・河野 通方

A Numerical Simulation on Enhancement of Ethanol Droplet Combustion in Uniform Electric Fields

Kiyotaka YAMASHITA, Osamu IMAMURA, Jun OSAKA,
Mitsuhiro TSUE and Michikata KONO

Abstract

This paper deals with the numerical study of the enhancement of droplet combustion of ethanol fuel under a uniform electric field. The predicted burning rate constant is compared with experimental results and a good qualitative agreement is obtained. The increase in the rate of vaporization depends on the amount of droplet heat absorption. The vaporization rate might change with distance from the flame and a combustion enhancement will occur due to flame deformation using a uniform electric field. Flame deformation, electric field and charge density are investigated in order to reveal the mechanism of combustion enhancement. The results show that a change in the local electric field via a charge density profile causes the flame deformation and increases the rate of vaporization.