عنوان مقاله:

Experimental investigation of the effect of axial flow blockages geometry on combustion parameters of low-swirl natural gas-air premixed flames in laboratory scale burners

محل انتشار:

هشتمین کنفرانس سوخت و احتراق ایران (سال: 1398)

تعداد صفحات اصل مقاله: 9

نویسندگان:

mohammad mahdi Parsafar - *Graduate Student, Department of Mechanical Engineering, Tarbiat Modares University, Tehran, Iran*

kiamars Mazaher - *Professor, Department of Mechanical Engineering, Tarbiat Modares University, Tehran, Iran*

Morteza Nahvi - *Graduate Student, Department of Mechanical Engineering, Tarbiat Modares University, Tehran, Iran*

خلاصه مقاله:

Considering the importance of reducing pollutants,especially NOx in low swirl burners (LSBs) in leancombustion, in this paper, combustion parameters ofdifferent geometries of perforated plates of axial path ofthe LSBs are analyzed. For this purpose, 3 perforatedplates with similar area blockages and differentgeometries were placed in axial path of LSB. Theinvestigated combustion parameters are temperaturedistribution, OH*and H2O* radicals chemiluminescencequalitatively comparison, flame edge detection usingCanny edge detection algorithm and exhaust majorspecies analysis including NOx and CO using a gasanalyzer. According to the chemiluminescence intensityratios of OH*in different geometries of the perforatedplate at the same area blockage, the heat release rate ofthe LSB with the larger diameter holes in the center ofthe perforated plate is higher because in this pattern mostof the axial flow is away from wall of the inner axial pathwhich causes a better mixture. But in terms of stabilitylimit and combustion zone temperature uniformity, theplate with larger diameter holes in the outer circle of it,performs better than other geometries due to the widercombustion zone, also 14 percent reduction in NOxemissions is observed in .this case

کلمات کلیدی:

Low-swirl burner, Perforated planes, Chemiluminescence, Exhaust Gas Analysis