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Experimental Study on NO_x Reduction Using Reburning System Accompanied by Acoustic Wave

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Abstract: In this study we investigated the effects of acoustic frequency accompanied by reburn on NO_x emissions from a premixed and partially premixed gas combustor system. Reburn was achieved by injecting natural gas at low and high temperature zoned downstream of the primary combustion zone followed by secondary air. A significant reduction in NO_x emission was observed in the presence of acoustic oscillation in a partially premixed flame. In a fully premixed flame, acoustic affects the flame stability and no significant change in NO_x was observed. The NO_x reduction rate strongly influenced by the frequency of the acoustic field and the amount of entrained air in partially premixed combustor. While NO_x decreased, the local air/fuel ratio is shifted from the lean side to the rich side and CO emission significantly increased. Using secondary air is important to recover the increase of CO emission. It is shown that acoustic effect alone without reburn can be consider as a possible alternative means to reduce NO_x emission in partially premixed flames as well as the reburn alone. Reburn with acoustic does not show a significant extra reduction. Acoustic is much less expensive technology and give the same effect as the reburn technology which is much more expensive.

***Key Words**: NO_x, Acoustic, Pulse combustion, premixed flame.*

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