



OPTIMIZATION OF COMBUSTION PROCESS BY CHARACTERIZATION OF THE FLAME PARAMETERS USING CHEMILUMINESCENCE PHENOMENON

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ABSTRACT

Combustion is one of the most important energy and industrial processes. Currently all combustion devices must fit main requirements: they must be cost-effective and environmentally friendly. In process of improving the construction of combustion facilities, it is imperative that they operate environmentally, economically and reliably under different modes of operation and use of fuels with different chemical composition and physical properties. Most suitable for achieving these goals are combustion devices that can automatically adapt to the operating mode. Such devices have a integrated active control system, consisting of a flame diagnostic equipment, signal processing, parameter selection and management system, which, according to measured parameters of the combustion process sets the operation mode for a burner.

Most of the currently used burners have a diagnostic combustion system which uses flue gas composition analysis. In this manner, the data does not adequately describe the ongoing process. A more accurate way is to directly measure the flame parameters using chemiluminescence phenomenon.

This article presents the recent achievements in the field of chemiluminescence and the preliminary results obtained in the investigation of flame radicals chemiluminescent radiation patterns, depending on the combustion conditions, and how it can be used to measure the emission intensity levels of excited radicals, assessing the potential combustion process control limits

Keywords: Chemiluminescence, combustion process, flame monitoring, combustion management, spectroscopy