On-line control of the air/fuel ratio for a reheating furnace burning mixed gas

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This study has been carried out to control the air/fuel ratio of a reheating furnace to meet composition fluctuation of the fuel gas. A gas analysis station composed of sampling and pre-treatment systems, a mass spectrometer and auxiliary accessories was designed and installed. A data transmission and control system to adjust the air/fuel ratio in the process computer of the furnace was prepared also. On the basis of the measured composition of the fuel gas, the air/fuel ratio was calculated to control air flowrate adequately. The calorific value and the air/fuel ratio of the mixed gas vary in the range of 2,800 ~ 3,200 kcal/Nm^3 and 2.8 ~ 3.2 Nm^3/Nm^3, respectively. The automatic control of the air/fuel ratio according to the gas composition lowered fluctuation of oxygen concentration in the furnace. It was concluded that the suggested control method can be applied to reheating furnace operation for optimal combustion control to resolve composition fluctuation problem of the fuel gas.