

A Computational Analysis Study on the Direct Desulfurization of Limestone in 0.1 MW Oxy-fuel CFB

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Climate change is directly related to the increase in greenhouse gas emissions due to increased energy consumption. Thus, environmental regulations intensify, economic and eco-friendly technology research using low-grade fuels is actively being conducted. Particularly, Oxy-fuel combustion is the most economical among CCS (carbon capture and storage) technologies. Unlike the conventional PC boilers, nitrogen is removed and only oxygen is injected into the boiler. The Oxy-fuel combustion technology is combined with the circulating fluidized bed combustion to enable the use of low-grade coal. It also reduces CO<sub>2</sub> and enables in-situ desulfurization in the furnace. However, depending on the temperature and the CO<sub>2</sub> partial pressure, the desulfurization mechanism changes. Therefore, this study investigated the behavior of limestone particles for optimal desulfurization efficiency under 0.1 MW Oxy-fuel CFB conditions and the direct desulfurization reaction was computational analyzed.