Conversion of sulfur and nitrogen to gaseous components from sewage sludge combustion under oxy-firing conditions

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ABSTRACT

The article presents the results of sulfur and nitrogen conversion to flue gas components during the oxy-combustion of municipal sewage sludge. In Poland, some dynamic changes in the implementation of thermal treatment methods in sewage sludge management have been observed over recent years. A few new installations have been commissioned with a fluidized bed technology under air-firing conditions. Until 30th December 2012, there were in Poland, 11 municipal sewage sludge incineration plants that had jointly a total capacity amounting to 160,000 Mg/y. Since the oxy-combustion technology has been researched widely mainly in coal combustion, the experiments carried out at 0.1 MWth CFB combustor have focused on sewage sludge combustion and sulfur, nitrogen conversion to flue gas components in the conditions of increased oxygen concentration and different process temperatures. The oxygen concentration in a feed gas was increased from 21 to 35% per volume. An increase in sulfur and nitrogen conversion ratios was found under the oxy-combustion conditions.

Keywords: Sewage sludge; Oxy-firing; Conversion ratios; Sulfur dioxide; Nitrogen dioxide

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