SO_2 adsorption characteristics on paper sludge ash

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Paper sludge ash is produced from paper sludge combustors. In the paper mill sludge, the large amounts of the coating filler, limestone ($CaCO_3$) were added in the pulp tank during the paper manufacturing process. Therefore, CaO content in paper sludge is commonly up to around 30%. The major objectives of the present study are to determine the kinetics of desulfurization of paper sludge ash in a thermobalance reactor (0.055 m i.d. × 1.0 m high). The effects of sulfation temperature (750℃ - 900℃) and partial pressure of SO_3 (3000ppm - 10000ppm) on sulfation reaction rate have been determined in a thermobalance reactor. From the Arrhenius plot, the activation energy and the pre-exponential factor are determined based on the volumetric reaction and shirinking core model. The activation energy and pre-exponential factor are found to be 51.80 kJ/mol and 5.91 l/min, respectively.