Sulfur dioxide sorption properties of potassium-based sorbents at low temperatures

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FGD (flue gas desulfurization) is one of the typical SO_2 removal processes used to control emissions of SO_2 from the combustion of fossil fuels. However, FGD processes require large amounts of water, and further treatment of the resultant wastewater is also needed. One of the improved techniques for the removal of SO_2 is chemical sorption with a dry sorbents. Although the dry sorption technology has many advantages, unfortunately, it requires high temperatures, ranging from about 250°C to 475°C, meaning it requires large amounts of energy to function effectively. Additionally, total SO_2 sorption capacities of these dry sorbents are less than 100 mg SO_2/ g sorbent. In this study, the SO_2 sorption properties of dry potassium-based sorbents were investigated at the various water vapor concentrations at a level of 5000 ppm of SO_2 at temperatures between 30°C and 60 °C. The structural characteristics of the sorbents before and after the reaction were studied with the aid of X-ray diffraction (XRD).