

The effect of H₂O on the activation of potassium based dry sorbents for SO₂ removal at low temperature

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Sulfur oxides(SO_x) can be formed by oxidation of sulfur in fossil fuel and emitted from the industrial processes. In this study, the K₂CO₃-based dry sorbents were prepared by impregnation of potassium carbonate on the alumina supports. The SO₂ absorption was tested in a fixed-bed at low temperature conditions(30°C in the presence of 5000 ppm of the SO₂). Their abilities of SO₂ absorption were investigated under the various the H₂O concentrations (1 vol%~9 vol%). The SO₂ removing capacities of potassium based sorbents increased with the H₂O concentration in our experimental range. It was found that the H₂O played an important role in transforming the K₂CO₃ phase into K₂CO₃•1.5H₂O(activation species) which could be easily absorbed SO₂. Moreover, the formation of active species in potassium based sorbents is directly related to the SO₂ removing capacity. Characterization of sorbents by the results of XRD, FT-IR and BET were carried out and the results were discussed.