

per hour. Therefore, surface reactions are probably not not important except in sources prior to or immediately after emission.

The most comprehensive study to date on SO<sub>2</sub> removal by pure solids was made by Judeikis (1974) and Judeikis et al. (1978), who used a tubular flow reactor in which solids were supported on an axial cylinder to measure reactivities of MgO, Fe<sub>2</sub>O<sub>3</sub>, Al<sub>2</sub>O<sub>3</sub>, MnO<sub>2</sub>, PbO, NaCl, charcoal, and fly ash. They found that the rates of SO<sub>2</sub> removal diminished with exposure until the solids completely lost ability to react with SO<sub>2</sub>. The relative humidity was important in determining the total capacity for SO<sub>2</sub> removal, but not the initial rate of uptake; total capacity increased as relative humidity increased. The capacity for SO<sub>2</sub> could be extended by exposure to NH<sub>3</sub>. This type of behavior is consistent with the formation of H<sub>2</sub>SO<sub>4</sub> on the surfaces.

Because of the ubiquitous nature of carbonaceous matter in ambient air particulate samples, various workers have studied the SO<sub>2</sub> removal rate by carbon. A comparison of the results is rather difficult because of the varieties of carbon available for study, such as activated charcoal, graphite, acetylene flame products, and combustion products of diesel oil and heating oil. We cite here a few investigations that deal with the gas-solid reaction of SO<sub>2</sub> with carbon.

Novakov et al. (1974) performed laboratory experiments that showed that graphite and soot particles oxidize SO<sub>2</sub> in air.