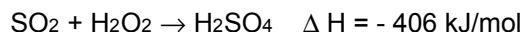


## Applications of Hydrogen Peroxide

### Hydrogen Peroxide for Off-gas Desulfurization Process

The emission of sulfur dioxide is a well-known environmental problem. SO<sub>2</sub> is not only under discussion due to the corrosion and health risks, but above all because of its contribution to “acid rain”. Off-gas containing SO<sub>2</sub> occurs in many industrial production processes like metal smelting, chemical and pharmaceutical synthesis, production of graphite, titanium dioxide, sulfuric acid as well as in combustion plants. SO<sub>2</sub> can be removed from off-gas by treatment with hydrogen peroxide according to the following equation:



The oxidation of SO<sub>2</sub> is exothermic, very fast and leads directly to sulfuric acid, which can be re-used as a raw material. SO<sub>2</sub> is removed by treating the off-gas in a two-stage countercurrent scrubber with diluted sulfuric acid, which contains a small amount of hydrogen peroxide. The SO<sub>2</sub> is absorbed and immediately converted into sulfuric acid. The acid concentrates in the scrubber liquor and it is drawn off continuously or batchwise. According to the SO<sub>2</sub> content of the gas and the scrubbing temperature the scrubber circuit is automatically fed with water and hydrogen peroxide. This process yields sulfuric acid with concentrations between 30 and 70 % (w/w). The acid is very pure as long as no contamination is introduced from the waste gas. With hydrogen peroxide SO<sub>2</sub> can be removed completely from off-gas regardless of whether the gas contains a low concentration or an extremely high concentration. The process can successfully be used for the desulfurization of process gas (copper smelter, TiO<sub>2</sub> production), flue gas (incinerators, power plants) or as a polishing step (after limestone desulfurization, tail-gas treatment of sulfuric acid plants). Several references are available.

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