

# Effect of surface area on the rate of photocatalytic water oxidation as promoted by different manganese oxides

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## Description

Commercial  $\text{Mn}_2\text{O}_3$ ,  $\text{Mn}_3\text{O}_4$  and  $\text{MnO}_2$  and the same after thermal or ball-milling treatments have been examined as catalysts for the photocatalytic water oxidation reaction, using  $[\text{Ru}(\text{bpy})_3]^{2+}$  as photosensitizer and  $\text{S}_2\text{O}_8^{2-}$  as sacrificial electron acceptor. Tests were performed in a bubbling reactor, allowing the calculation of the actual rate of  $\text{O}_2$  evolution as a function of time from raw data (oxygen flow, concentration of dissolved oxygen, DO) through a model able to take into account mass transfer phenomena Hernández et al. [19]. A few parameters are proposed for measuring activity, and comparison among them is made. The activity per unit mass of commercial samples is  $\text{Mn}_2\text{O}_3 > \text{MnO}_2 > \text{Mn}_3\text{O}_4$ , in agreement with the literature. Increase in the surface area brought about by milling correspond, as expected, to a steady increase in activity in the case of  $\text{Mn}_3\text{O}_4$ , whereas had no effect with  $\text{Mn}_2\text{O}_3$ . The ...