



Kinetics and Mechanism of Oxalic acid Inhibited and Heterogeneous Co_2O_3 Catalyzed Autoxidation of S(IV) in Atmospheric Water

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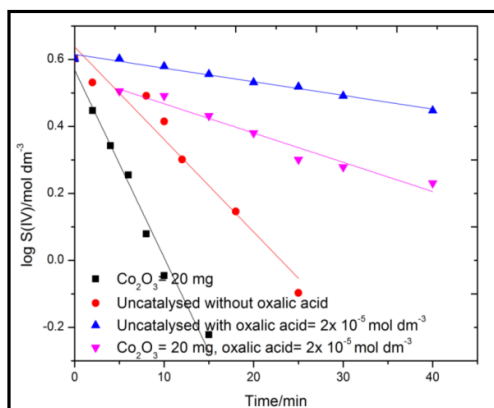
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ABSTRACT

The kinetics of the oxalic acid inhibited Co_2O_3 catalysed autoxidation of S(IV) in alkaline medium has been studied and based on the observed results following rate law and a free radical mechanism has been proposed. Rate constants and the order of reaction were calculated and the reaction was found to be pseudo-first order in all cases. The effect of pH and temperature are also discussed. The value of apparent activation (E_a) energy was determined to be $59.33 \text{ kJ mol}^{-1}$. The activation of energy was calculated by Arrhenius equation $-d[\text{S(IV)}]/dt = (k_1 + k_2 [\text{Co}_2\text{O}_3])[\text{S(IV)}]/1 + B [\text{Oxalic acid}]$.

Graphical Abstract



The disappearance of [S(IV)] with time in air - saturated suspensions at $[\text{S(IV)}] = 2 \times 10^{-3} \text{ mol L}^{-1}$, at 30°C and $\text{pH} = 7.80$.

Keywords: Kinetics, Autoxidation; SO_2 , Co_2O_3 , Catalysis, Inhibition, Oxalic acid.