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The kinetics and mechanism of alcohol oxidation in alkaline 12-tungstocobaltate (III)

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The kinetics of the oxidation of alcohol by 12-tungstocobaltate (III) in alkaline medium as a function of oxidant, alcohol, OH^-, ionic strength and temperature were studied spectrophotometrically at λ_{max} 624 nm under pseudo first order conditions. The kinetic study showed first order dependence on $[Co^{III}W_{12}]$, [Alcohol] and $[OH^-]$. Ionic strength effect on the reaction showed that the charges on the ions at the rate determining step are opposite and the reaction between alcohols and 12-tungstocobaltate (III) in alkaline medium exhibits 1:1 stoichiometry. The oxidative products were identified by FTIR spectroscopy. Salt effect was investigated by using $NaNO_3$ and KCl. Michaelis-Menten plot showed the presence of an intermediate complex. Thermodynamic parameters were evaluated and a mechanism related to this reaction is proposed.

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