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Kinetics and Mechanism of Oxidation of Some Hydroxy Butyric Acid Salts by Ditelluratocuprate (III) in Alkaline Medium

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Abstract: The kinetics of oxidation of 2-hydroxy butyric acid salt (2-HBAS) and 3-hydroxy butyric acid salt (3-HBAS) by ditelluratocuprate(III) (DTC) were studied spectrophotometrically between 298.2 K and 313.2 K in alkaline medium. The reaction rate showed first order dependence in DTC and a fractional order in HBAS. It was found that the pseudo-first order rate constant k_{obs} increased with an increase in the concentration of OH^- and a decrease in the concentration of TeO_4^{2-} . The reaction rate changed with the position of the hydroxyl group. There was a negative salt effect. A plausible mechanism involving a pre-equilibrium of adduct formation between the complex and HBAS was proposed. The rate equations derived from the mechanism can explain all experimental observations. The activation parameters along with the rate constants of the rate-determining step were calculated.

Key Words: Ditelluratocuprate(III), 2-hydroxy butyric acid salt, 3-hydroxy butyric acid salt, Redox reaction, Kinetics and mechanism

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