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KINETICS OF ACIDIC MN(VII) OXIDATION OF ACETALDEHYDE IN AQUEOUS AND 5% ETHANOL-WATER SOLVENTS

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Kinetics of acidic Mn(VII) oxidation of acetaldehyde in aqueous and 5% ethanol-water solvents were studied via pseudo-first order condition at λ_{max} 525 nm. The reaction showed a first order dependence with respect to acetaldehyde concentration, [Mn(VII)], fractional order to [H^+] and independent on the ionic strength of the solution. Michaelis-Menten plot showed the existence of an intermediate complex and dependence on hydrogen ion is in the form k_{obs}=a+b[H+]. However, oxidation reaction is generally faster in non-aqueous solvent than in aqueous solvent. Product analysis revealed the presence of carboxylic acid and stiochiometric study suggests the consumption of 2 moles of MnO_4- by 3 moles of acetaldehyde in both solvents. Thermodynamic parameters of activation were obtained from Arrhenius and Erying's equations. A plausible associative mechanism in agreement with kinetic and spectroscopic results was proposed.

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