



ChemTech

International Journal of ChemTech Research

CODEN(USA): IJCRGG, ISSN: 0974-4290, ISSN(Online):2455-9555
Vol.10 No.10, pp658-665,2017

Kinetics and Mechanism of Oxidation of Benzyl Ethers by N-Chloroisonicotinamide in Aqueous Acetic Acid Medium

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Abstract : Kinetics of oxidation of five Benzyl ethers viz., Benzyl n-propyl ether, benzyl isobutyl ether, benzyl n-pentyl ether, benzyl t-butyl ether and dibenzyl ether by N-chloroisonicotinamide (NCIN) in aqueous acetic acid medium has been investigated. The observed rate of oxidation is first order in [oxidant] and [HCl], zero order in [substrate]. An increase in the dielectric constant of the medium decreases the rate. Variation in ionic strength of the medium has no significant effect on the rate and the addition of the reaction product, isonicotinamide has a slight retarding effect on the rate. The stoichiometry and product analysis have been carried out. From the effect of temperature on the reaction rate, the Arrhenius and thermodynamic activation parameters have been calculated. A suitable mechanism has been proposed and a rate law explaining the experimental results is obtained.

Keywords: Oxidation, Benzyl Ethers, N-Chloroisonicotinamide.

V.Priya *et al*/International Journal of ChemTech Research, 2017,10(10): 658-665.
