



## Degradation of Indigocarmine Dye by Oxidation using Chloramine-T in Acidic Buffer Medium Catalyzed by Vanadium(V) Ion: A Kinetic and Mechanistic Study

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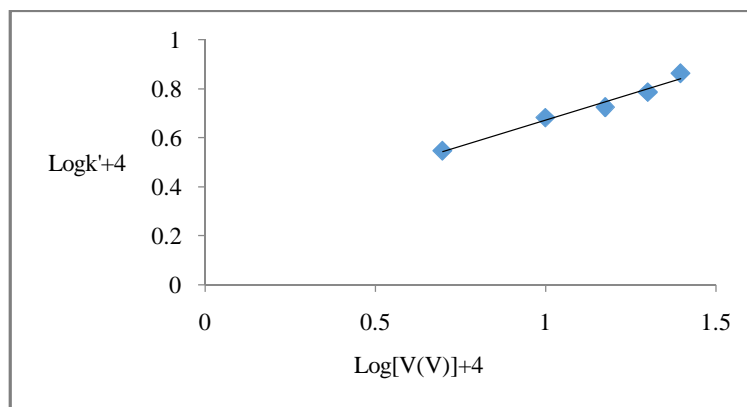
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### ABSTRACT

Today the advanced oxidation processes of treatment of industrial effluents and toxic organics has become a focus of attention among Material Scientists and Environmental Scientists. Several compounds have been reported as the potential candidates to resolve the environmental issues. In the present paper, the authors report the soft solution routes of advanced oxidation of dye material. Degradation of indigocarmine dye by oxidation process using chloramine-T as oxidant and V(V) as catalyst in acidic buffer media, pH 4.0 has been kinetically studied at 303K. Degradation of indigocarmine dye was followed by using spectrophotometric routes. Degradation and oxidation lead to a decrease in COD of the dye. V(V) catalyzed reaction shows first order dependence of the rate on chloramine-T and indigocarmine concentrations. It also shows fractional order dependence on [V(V)] and [H<sup>+</sup>]. Addition of halide ions, reduction product of chloramine-T i.e. toluenesulfonamide, variation of ionic strength and dielectric constant of the medium do not have any significant effect on the reaction rate. Thermodynamic parameters have been evaluated from the Arrhenius plot. A kinetic mechanism is proposed for the reaction.

### Graphical Abstract



Effect of catalyst [V(V)] on reaction rate.

**Keywords:** Degradation, Indigocarmine dye, Chloramine-T, Vanadium(V), Catalysis.

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