

## **A KINETIC STUDY OF THE DEGRADATION OF TRICHLOROETHYLENE BY METAL IONS**

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Heavy use of environmental contaminants over the past century has led to accumulation of large quantities of pollutants in soil and water supplies. Trichloroethylene, a non-flammable colorless industrial solvent, has been found to be among the most difficult to remove from the environment. It has been found in no less than 852 of 1430 National Priorities Sites identified in a report by the United States Environmental Protection Agency. Some data has suggested that TCE's half-life in soil can be as long as 8460 hours (approximately 1 year's time) or as long as 39,672 hours (4.5 year's time) if not treated.

Health professionals have long noticed the side effect of short-term inhalation of TCE includes dizziness, headaches, slowed reaction time, sleepiness and facial numbness. Along with these health concerns many current reports have suggested a relationship between the use of TCE and cancer formation. Several studies have suggested that metallic ion degrade chlorinated solvents by chemical oxidation, one such study was performed by Doong and Wu of National Taiwan University result showed an 84% drop in aqueous carbon tetrachloride content in 33 days. This project test four metals at several concentrations to determine which individual metals is most effective as a catalyst in the degradation of TCE. The metals used were  $\text{Cr}^{3+}$ ,  $\text{Zn}^{3+}$ ,  $\text{Mn}^{2+}$  and  $\text{Fe}^{3+}$ . The results suggested that Iron and Manganese were not effective catalyst in the degradation of TCE, however Chromium and Zinc did appear to be effective catalysts for degradation of TCE under the experimental parameters.