Photocatalytic Dechlorination of Chloroalkanes in Hydrocarbon Mixtures

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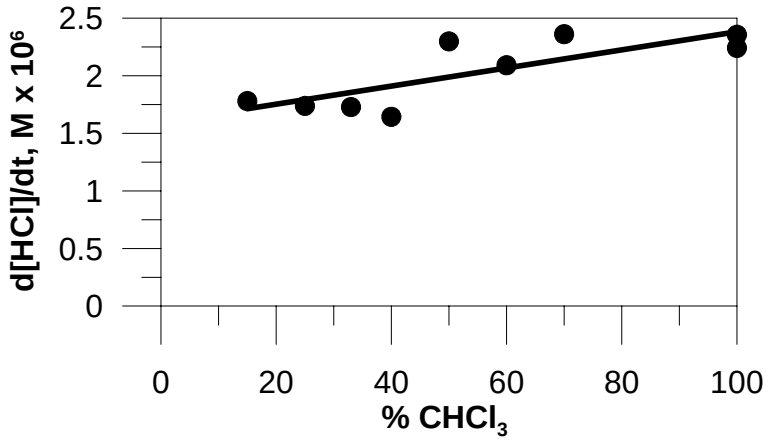

We have proposed that chloroalkane pollutants in hydrocarbon streams may be removable photocatalytically, potentially with sunlight. In order for this to work photocatalysis must occur at a reasonable rate even at low concentrations of the chloroalkane. This was tested with $FeCl_4^{2-}$ as a homogeneous photocatalyst.

The graph shows the rate of formation of HCl (from the decomposition of chloroform) in mixtures of $CHCl_3$ and C_6H_{12} containing 3 x 10^{-5} M $(Bu_4N)_2FeCl_4$, under broadband ($\lambda > 380$ nm) irradiation. It would be highly desirable to see the linear relationship continue to much lower concentrations of $CHCl_3$; however, the tetrachloroferrate catalyst was not soluble below 15% $CHCl_3$. This work will be followed up by studies using heterogeneous photocatalysis.