

Kinetics of Catalytic Fenton Oxidation Process
Ahmad Mashal^{a*}

^aCentACat, Queen's University Belfast, Belfast, BT9 5AG, Northern Ireland, UK.

*Corresponding author

Ahmad Mashal

E-mail: amashal01@qub.ac.uk

Abstract: Kinetics of the reaction for Many types of advanced oxidation processes (AOPs), including multi-dose Fenton ($\text{Fe}^{2+}/\text{H}_2\text{O}_2$), Fenton-like ($\text{UV}/\text{Fe}^{2+}/\text{H}_2\text{O}_2$), photo-Fenton ($\text{Fe}^{2+}/\text{H}_2\text{O}_2/\text{TiO}_2$), and liquid phase plasma technology have been investigated for the destruction of organic matter (COD content) from landfill leachate. The oxidation using batch treatment was performed on different synthetic leachate concentrations and different doses (single, triple and high) of Fenton's reagents. As expected the single Fenton's reagent COD removal efficiency was less than higher dosages for all tested leachates under similar operating conditions where up to 90% could be removed at the higher doses. The COD reduction of modelled landfill leachate and a glucose based-synthetic one as a function of the operating variables led to results that ranged between 30% and 90% while the removal efficiencies decreased in the order: Fenton (high dose) > Plasma > Fenton (triple dose) > Fenton (ingle dose) > photo-Fenton > Fenton-like > $\text{UV}/\text{Fe}^{2+}/\text{H}_2\text{O}_2$.

Keywords: *Batch Reactor, Landfill Leachate, Fenton kinetics, Modelling, Oxidation reaction.*