Effectiveness of Catalysis in Ozonation for the Removal of Herbizide 2,4 Dichlorophenoxyacetic Acid from Contaminated Water

Authors : S. Shanthi

Abstract : Catalyzed oxidation processes show extraordinary guarantee for application in numerous wastewater treatment ranges. Advanced oxidation processes are emerging innovation that might be utilized for particular objectives in wastewater treatment. This research work provides a solution for removal a refractory organic compound 2,4-dichlorophenoxyaceticacid a common water pollutant. All studies were done in batch mode in a constantly stirred reactor. Alternative ozonation processes catalysed by transition metals or granular activated carbon have been investigated for degradation of organics. Catalytic ozonation under study are homogeneous catalytic ozonation, which is based on ozone activation by transition metal ions present in aqueous solution, and secondly as heterogeneous catalytic ozonation in the presence of Granular Activated Carbon (GAC). The present studies reveal that heterogeneous catalytic ozonation using GAC favour the ozonation of 2,4-dichlorophenoxyaceticacid by increasing the rate of ozonation and a much higher degradation of substrates were obtained in a given time. Be that it may, Fe2+and Fe3+ ions decreased the rate of degradation of 2,4-dichlorophenoxyaceticacid indicating that it acts as a negative catalyst. In case of heterogeneous catalytic ozonation using GAC catalyst it was found that during the initial 5 minutes of contact solution concentration decreased significantly as the pollutants were adsorbed initially. Thereafter the substrate started getting oxidized and ozonation became a dominates the treatment process. The exhausted GAC was found to be regenerated in situ. The percentage reduction of the substrate was maximum achieved in minimum possible time when GAC catalyst is employed.

Keywords : ozonation, homogeneous catalysis, heterogeneous catalysis, granular activated carbon
Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development
Conference Location : Chicago, United States
Conference Dates : December 12-13, 2020