

Catalytic Wet Air Oxidation as a Pretreatment Option for Biodegradability Enhancement of Industrial Effluent

Authors : Sushma Yadav, Anil K. Saroha

Abstract : Complex industrial effluent generated from chemical industry is contaminated with toxic and hazardous organic compounds and not amenable to direct biological treatment. To effectively remove many toxic organic pollutants has made it evident that new, compact and more efficient systems are needed. Catalytic Wet Air Oxidation (CWAO) is a promising treatment technology for the abatement of organic pollutants in wastewater. A lot of information is available on using CWAO for the treatment of synthetic solution containing single organic pollutant. But the real industrial effluents containing multi-component mixture of organic compounds were less studied. The main objective of this study is to use the CWAO process for converting the organics into compounds more amenable to biological treatment; complete oxidation may be too expensive. Therefore efforts were made in the present study to explore the potential of alumina based Platinum (Pt) catalyst for the treatment of industrial organic raffinate containing toxic constituents like ammoniacal nitrogen, pyridine etc. The catalysts were prepared by incipient wetness impregnation method and characterized by scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDX) and BET (Brunauer, Emmett, and Teller) surface area. CWAO experiments were performed at atmospheric pressure and (30 °C - 70 °C) temperature conditions and the results were evaluated in terms of COD removal efficiency. The biodegradability test was performed by BOD/COD ratio for checking the toxicity of the industrial wastewater as well as for the treated water. The BOD/COD ratio of treated water was significantly increased and signified that the toxicity of the organics was decreased while the biodegradability was increased, indicating the more amenability towards biological treatment.

Keywords : alumina based pt catalyst, BOD/COD ratio, catalytic wet air oxidation, COD removal efficiency, industrial organic raffinate

Conference Title : ICEST 2015 : International Conference on Environmental Science and Technology

Conference Location : Singapore, Singapore

Conference Dates : September 10-11, 2015