

Degradation of high level m-cresol by zinc oxide as photocatalyst

ABSTRACT

In this study, the high concentration of m-cresol as a sample of organic pollutants was degraded in the presence of zinc oxide and UV irradiation during 6 h at laboratory scales. The amount of photocatalyst, pH and m-cresol concentration were considered as effective factors on the photodegradation. The demineralization of m-cresol was measured by UV–Vis spectrophotometry while the total organic carbon-analyzer was used to determine the mineralization. The ultrahigh performance LC was used to identify probable intermediates. The results showed optimum condition at pH 7–9, which is the natural pH of industrial wastewater. Moreover, 100% of m-cresol was removed after 5 h of irradiation time, which is quite significant. The detected intermediates were 3,5-hydroxytoluene, 2,5-hydroxy-benzaldehyde, and 3-hydroxy-benzaldehyde after 3 h of reaction time. Reusability of the photocatalyst showed insignificant reduction in the photo-catalytic performance. In conclusion, this investigation indicated high potential of zinc oxide suspension to remove high level concentration of m-cresol under UV irradiation.

Keyword: Advanced oxidation process; Demineralization; Photochemistry; Photodegradation; Wastewater treatment