

Catalytic oxidation of aqueous phenol over co-impregnated Cu and Mn catalysts

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Industrial wastewater generally contains toxic and hazardous organic pollutants which can cause severe problems for the environment. They must be treated in order to satisfy the stringent water quality regulations and the demand for recycling of water in the process. One of the most promising technologies for water treatment is a heterogeneous catalytic wet air oxidation (CWAO) in which the organic pollutants are either partially oxidized into biodegradable intermediates or mineralized to carbon dioxide, water under mild conditions. In this work, the Cu and Mn catalysts, which show the high catalytic activities for the CWAO of various organic compounds, were co-impregnated on three different supports, namely, γ - Al_2O_3 , TiO_2 and $\text{Ce}_{0.65}\text{Zr}_{0.35}\text{O}_2$, and tested in the CWAO of phenol. Among the tested catalysts, only the $\text{Ce}_{0.65}\text{Zr}_{0.35}\text{O}_2$ -supported Cu-Mn catalyst exhibited the enhanced activity as compared to the results with Cu and Mn catalysts solely used. It was attributed to the synergy effect between active metals and $\text{Ce}_{0.65}\text{Zr}_{0.35}\text{O}_2$ support having excellent oxygen storage capacity. Co-impregnation of Cu and Mn effectively decreased the metal leaching.