

Characterization of copper–manganese catalysts for toluene oxidation

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The catalytic incineration of toluene over γ -Al₂O₃-supported copper–manganese oxide catalysts in the temperature range of 160–280°C was investigated employing a fixed bed flow reactor. The catalysts were characterized by BET, SEM, TPR, TPO, XPS, XRD. Incineration of toluene was achieved in the 280°C bellow and we found that the optimal content was 15.0wt.%–Cu10.0wt.%Mn. BET results, surface area have no correlation with activity of catalyst. TPR/TPO, XPS results, redox peak of 10Mn–15Cu catalyst shifted at lower temperature and binding energy shifted toward higher binding energy. XRD results, It assumed that Cu_{1.5}Mn_{1.5}O₄ is active sites of catalysts. It appears to be responsible for catalyst activity that the redox ability of catalysts and high oxidation state. The catalyst showed to metal according to the reduction reactions: Cu_{1.5}Mn_{1.5}O₄ and CuO → Cu.