Cu-Co/ACTIVATED CARBON CATALYSTS FOR BENZYL ALCOHOL OXIDATION REACTION

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Abstract. In this study, the effect of Co_x addition in the range of 0.1 to 1 mole into Cu supported on activated carbon (AC) catalysts fabricated by deposition-precipitation method was assessed. $CuCo_x$/AC prepared via the same method under different calcination temperature was done to evaluate the effect on the properties and activity of the catalysts. The bimetallic Cu-Co catalysts are structurally characterized by X-ray Diffraction (XRD) and Scanning Electron Microscopy (SEM). It was found that Co was clearly incorporated in Cu/AC lattice and improved the crystalline structure with optimum Co loading. $CuCo_x$/AC nanoparticles formed with uniform shapes and size under the present synthesis conditions. The catalytic performances of the as-prepared catalysts were evaluated towards the aerobic oxidation of benzyl alcohol using hydrogen peroxide as oxidant. Cu/AC, Co/AC and $CuCo_x$/AC showed ability to oxidize benzyl alcohol to benzaldehyde. $CuCo_{0.2}$/AC calcined at 450°C showed highest catalytic activity exhibiting 86% conversion of benzyl alcohol due to the high crystallinity as compared to the monometallic counterpart. It was found that the crystallinity of the catalysts could be tuned by varying the amount of Co. The synergistic effects of Cu-Co in optimum mole ratio and calcination temperature influenced the availability of active sites participating in the catalytic activity.

Keywords: Cu-Co, activated carbon, benzyl alcohol, benzaldehyde, oxidation.