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Graphene-Oxide-Supported Coal-Layered Double Hydroxides: Synthesis and Characterizations

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Abstract : Nanosheets for cobalt-layered double hydroxide (Co-Al-LDH)/GO were successfully synthesized with different Co:Mg:Al ratios (0:3:1, 1.5:1.5:1, and 3:0:1). The layered double hydroxide structure and morphology were determined using x-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), and scanning electron microscopy (SEM). Temperature prgrammed reduction (TPR) of Co-Al-LDH showed reduction peaks at lower temperature which indicates the ease reducibility of this particular sample. The thermal behaviour was studied using thermal graviemetric technique (TG), and the BET-surface area was determined using N2 physisorption at -196°C. The C-C coupling reaction was carried out over all the investigated catalysts. The Mg–Al LDH catalyst without Co ions is inactive, but the isomorphic substitution of Mg by Co ions (Co:Mg:Al = 1.5:1.5:1) in the cationic sheet resulted in 88% conversion of iodobenzene under reflux. LDH/GO hybrid is up to 2 times higher activity than for the unsupported LDH.

Keywords : adsorption, co-precipitation, graphene oxide, layer double hydroxide
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