



Efficient oxidation of benzyl alcohol mediated by palladium chloride impregnated on aluminium oxide-pillared clay

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Aluminium oxide-pillared bentonite was synthesized by the intercalation of aluminium (III) chloride into clay interlayers and calcination at 500°C for 1 h. The impregnation with PdCl₂ (Pd/Al-PILC) was carried out with calcination at 450°C for 4 h. The synthesized clay and raw clay were characterized by X-ray diffraction (XRD) and N₂ adsorption-desorption (BET) techniques. From the characterization, XRD pattern exhibited the characteristic peaks of montmorillonite at 2θ of 7° and 22°. Additionally, the N₂ adsorption-desorption isotherm indicated mesoporous structure and BET specific surface area was 102 m²/g. The catalytic activity of Pd/Al-PILC was performed for the oxidation of benzyl alcohol furnishing benzaldehyde. The effect of various reaction factors such as time, temperature, solvent system and the amount of catalyst were studied in order to optimize the reaction conditions. Pd/Al-PILC was efficiently catalyzed the oxidation of benzyl alcohol to produce benzaldehyde in quantitative yield under extremely mild reaction conditions. The optimized conditions were also applied for the oxidation of various alcohols to furnish the desired products in moderate to excellent yields. The catalytic system could be reused up to three times without appreciable loss of activity.

Keywords: Aluminium oxide-pillared clay; Palladium chloride; Benzaldehyde; Benzyl alcohol