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Preparation of Gold Nanoparticles Stabilized in Acid-Activated Montmorillonite for Nitrophenol Reduction

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Abstract : Synthesis of gold nanoparticles (AuNPs) has attracted much attention since the pioneering discovery of the high catalytic activity of supported gold nanoparticles in the reaction of CO oxidation at low temperature. In this research field, we used montmorillonite pre-acidified under gentle conditions for AuNPs stabilization; using different loading percentage 1, 2 and 5%. The gold nanoparticles were obtained using chemical reduction method using NaBH4 as reductant agent. The obtained gold nanoparticles stabilized in acid-activated montmorillonite were used as catalysts for reduction of 4-nitrophenol to aminophenol with sodium borohydride at room temperature The UV-Vis results confirm directly the gold nanaoparticles formation. The XRD N2 adsorption and MET results showed the formation of gold nanoparticles in the pores of preacidified montmorillonite with an average size of 5.7nm. The reduction reaction of 4-nitrophenol into 4-aminophenol with NaBH4 catalyzed by Au°-montmorillonite catalyst exhibits remarkably a high activity; the reaction was completed within 4.5min.

Keywords : gold, acid-activated montmorillonite, nanoparticles, 4-nitrophenol
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