World Academy of Science, Engineering and Technology
International Journal of Chemical and Materials Engineering
Vol:9, No:07, 2015

Synthesis of Gold Nanoparticles Stabilized in Na-Montmorillonite for Nitrophenol Reduction

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Abstract : Synthesis of gold nano particles has attracted much attention since the pioneering discovery of the high catalytic activity of supported gold nano particles in the reaction of CO oxidation at low temperature. In this research field, we used Na-montmorillonite for gold nanoparticles stabilization; different loading percentage 1, 2 and 5%. The gold nano particles were obtained using chemical reduction method using NaBH4 as reductant agent. The obtained gold nano particles Au-mont stabilized in Na-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 nano particles formation. The XRD and N2 adsorption results showed the formation of gold nano particles in the pores of montmorillonite with an average size of 5 nm obtained on samples with 2%Au-mont. The gold particles size increased with the increase of gold loading percentage. The reduction reaction of 4-nitrophenol into 4-aminophenol with NaBH4 catalyzed by Au-Na-montmorillonite catalyst exhibits remarkably a high activity; the reaction was completed within 9 min for 1Au-mont and within 3 min for 2Au-mont.

Keywords : chemical reduction, gold, montmorillonite, nano particles, 4-nitrophenol
Conference Title : ICNSE 2015 : International Conference on Nanomaterials Science and Engineering
Conference Location : Istanbul, Türkiye
Conference Dates : July 29-30, 2015