

Synthesis and characterization of new bimetallic complexes and their mixed metal oxides nanoparticles

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Mixed metal oxides nanoparticles can play an appreciable role in many areas of chemistry and physics. The unique magnetic properties obtained when combining two metals in an oxide matrix have been well studied [1]. However, the most common use for mixed metal oxide nanoparticles has been in the area of catalysis [2]. These mixed systems may be more active than their separate components [3]. The development of efficient catalysts for the selective oxidation of carbon monoxide in the presence of excess hydrogen has attracted renewed interest during the last years due to the potential application of such catalysts in the environmentally important fuel cell technology [4]. In this report, the three new bimetallic complexes of dysprosium and transition metals (Fe, Ni, Co) were synthesized and characterized. Their mixed oxides nanoparticles with the average size about 20-40 nm were prepared by calcination and hydrothermal methods. Research shows that reduction in particle size to nanometer scale and their shape results in various interesting properties compared with their bulk properties. These mixed oxides nanoparticles were characterized by scanning electron microscopy (SEM), X-ray powder diffraction (XRD), thermogravimetric analysis (TGA), Fourier transform infrared (FT-IR) and ultraviolet-visible (UV-Vis) spectroscopy. Also, their catalyst effect for reduction of CO₂ to CO was investigated by cyclic voltammetry.

References:

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