

Ln-M mixed oxides nanoparticles (M = Fe,Ni,Co): synthesis, characterization, catalyst effect, hydrogen storage, optical and magnetic studies

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In recent years, most studies have been focused to prepare nanometric and nanostructured for technological applications. Particularly, nano oxides have various applications such as high index oxide for optics, the catalyst supports or even catalysts, mixed catalysts in the field of heterogeneous catalysis [1,2]. These mixed systems may be more active than their separate components [3]. The so-called mixed catalysts are often produced by thermal decomposition of the mixed components of their metal salts [4]. It is well known that, nanostructured materials have been extensively explored for the fundamental scientific and technological interests in accessing new classes of functional materials with unprecedented properties and applications [5]. Thus a reduction in particle size to nanometer scale results in various interesting properties compared with their bulk properties. In this research, at first some new bimetallic complexes of lanthanides and transition metals (Fe, Ni, Co) have been successfully synthesized. Then their mixed oxide nanoparticles have been prepared from these precursor complexes by two different methods, solvothermal and thermal decomposition methods. The products were characterized by XRD, SEM, FT-IR, TGA and UV-vis spectroscopy. The size of the nanoparticles is between 30-40 nm. Further, their magnetic and optical properties were investigated by SQUID and PL. Also, they were used as the hydrogen storage materials and catalyst for CO₂ reduction to CO.

References:

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