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Study the effect of microstructures and mechanical properties of AZ31 alloy processed by equal channel angular pressing (ECAP)

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Equal Channel Angular Pressing is being carried out to deform the AZ31 alloy at a processing temperature of 633K up to 4 passes for route Bc. In the present work, mechanical properties are enhanced by refining the grain size of AZ31 alloy at 633K for route Bc. The effect of microstructural changes in the AZ31 alloy has been studied resulting improvement of respective passes of mechanical properties illustrated in the present work. The average grain size of the as received material is obtained to be 31.8 μm and it is reduced to be 13.3 μm, 11 μm, 9 μm, and 7 μm after first, second, third and fourth pass respectively. Mechanical properties of AZ31 alloy improved prominently with increase in number ECAP passes at 633K. X-ray diffraction analysis was carried out to understand the phase changes in the AZ31 alloy for before and after ECAP processed specimen.

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XPS and room temperature ferromagnetic properties of Ln^{3+} (RE= Ho, Er) ions in ZnO nanostructures

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The current investigation describes the synthesis of ZnO nanostructures containing Ln^{3+} (Ln= Er, Ho) ions via a conventional sol-gel synthesis method. The quantum dots produced were found to exhibit hexagonal wurtzite structure in both ZnO and ZnO:Ln^{3+} samples. Morphology mutation was observed with addition of dopant in the ZnO host matrix, resulting from the Ostwald ripening effect occurring during the nanocrystals growth. The photoluminescence properties of the samples have been studied under room temperature conditions. The Ln^{3+} ions luminescence lines 4f-4f electronic transitions were detected in ZnO:Ln^{3+} samples. Finally, defect states in the samples were analyzed using X-ray Photoelectron Spectroscopy (XPS) and Electron Spin Resonance (ESR) techniques.

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