

Structural, microstructural and magnetic properties of 1% Fe-doped ZnO powder nanostructures prepared by mechanical alloying.

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Abstract: ZnO powder nanoparticles were doped with iron (mixing produced by mechanical alloying). Their structure, microstructure and magnetic properties were investigated by X-ray diffraction (XRD), scanning electron microscopy (SEM) and vibrating sample magnetometry (VSM). ZnO starting pure powder exhibits a hexagonal crystal structure with space group P6₃mc. Otherwise, with the addition of 1% Fe in the ZnO milled powder, the hexagonal ZnO phase remained unchanged, whereas the microstructural parameters were subject to significant variations due to the introduction of Fe atoms into the ZnO hexagonal matrix to replace oxygen ones. The size of crystallites and microstrains were milling time-dependent.

Keywords : microstructure; ZnO; mechanical alloying; XRD; SEM-VSM.