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Structural, Mössbauer, magnetic and optical studies of $\text{Sn}_{0.2}\text{Fe}_x\text{Cr}_{1.8-x}\text{O}_3$ nano oxides prepared by reflux and pressure reactor methods

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We have investigated the properties of $\text{Sn}_{0.2}\text{Fe}_x\text{Cr}_{1.8-x}\text{O}_3$ synthesized directly from high purity metal by reflux and by pressure reactor process. These alloys series were synthesized at low reaction temperature of about 100°C using hydrothermal methods. XRD analysis for the samples synthesized in a stirred pressure reactor and in a reflux indicate the basic corundum structure for the compositions after annealing at 600°C . TEM experiment indicate a similar trend for both methods of preparation with a particle size for samples prepared in a pressure reactor slightly reduced compared to that synthesized in a reflux. No appreciable difference was observed on the magnetic properties of the two sets of samples. Particle sizes and chemical disorder are shown to play critical roles in influencing the properties of the nanomaterials. The ^{57}Fe Mössbauer spectra measured at room temperature are well fitted by two magnetic components that range from two sextets for Fe-rich nanomaterials to two doublets for Cr-rich ones.

Apply to be considered for a student award (Yes / No)?

No

Level for award (Hons, MSc, PhD, N/A)?

N/A

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