

The evaluation of kinetic parameters for cadmium doped Co-Zn ferrite using thermogravimetric analysis

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Abstract. This work had the objective to analyze the thermodynamic properties of cadmium doped cobalt zinc ferrite ($\text{Co}_{0.5}\text{Zn}_{0.5}\text{Cd}_{0.3}\text{Fe}_{1.8}\text{O}_4$), obtained by solid state reaction method and characterized by TGA-DTA. The TG analysis show sharp peaks at four points, two for water reduction, one for decomposition of chlorides and last one for formation of end product. The ratio of weight of end product to starting material match with ratio of molecular weight of end product and starting materials; this confirms the formation of ferrite sample. Broido, Coats-Redfern, Chang and Horowitz-Metzger approximations are employed to compute the activation energy (E_a) of formation of ferrite sample. The kinetic parameters like frequency factor (A), entropy change (ΔS), enthalpy change (ΔH) and changes in internal energy (ΔG) of sample are also reported.

Keywords: cadmium doped cobalt zinc ferrites ($\text{Co}_{0.5}\text{Zn}_{0.5}\text{Cd}_{0.3}\text{Fe}_{1.8}\text{O}_4$), TG-DTA, activation energy, frequency factor.

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