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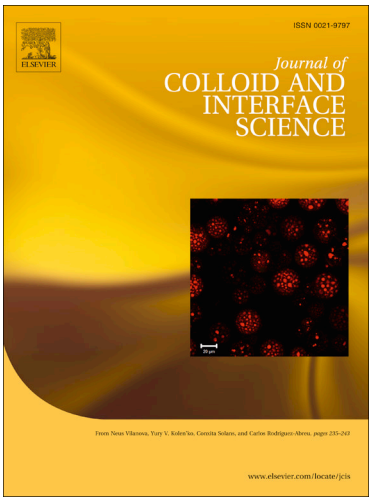

Simple sol-gel synthesis and characterization of new $CoTiO_3/CoFe_2O_4$ nanocomposite by using liquid glucose, maltose and starch as fuel, capping and reducing agents

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Simple sol-gel synthesis and characterization of new $CoTiO_3/CoFe_2O_4$ nanocomposite by using liquid glucose, maltose and starch as fuel, capping and reducing agents

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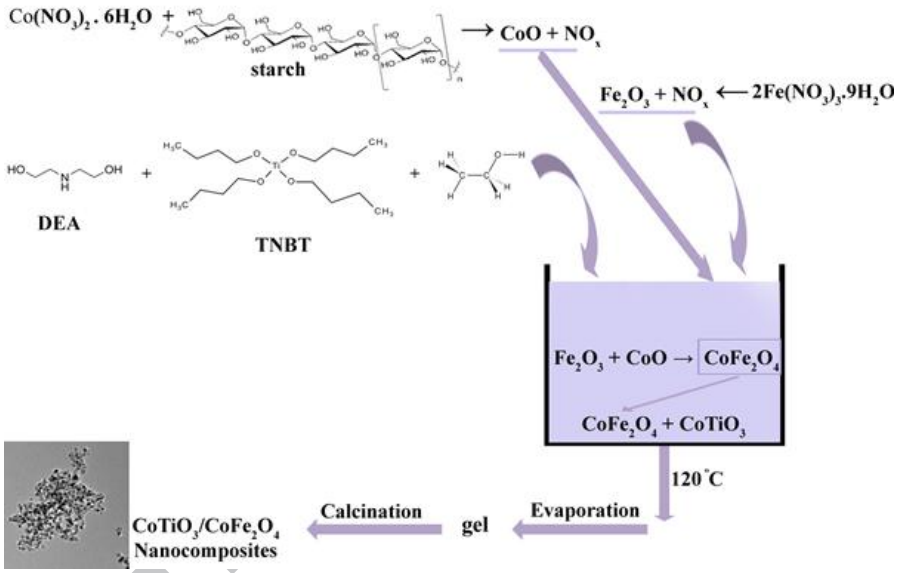
Graphical abstract



Abstract

The sol-gel auto-combustion technique is an effective method for the synthesis of the composites. In this research for the first time, $CoTiO_3/CoFe_2O_4$ nanocomposites are successfully synthesized via a new sol-gel auto-combustion technique. The glucose, maltose and starch are used as fuel, capping and reducing agents, also the optimal reducing agent is chosen. The effects of quantity of reducing agent, molar ratio of Ti:Co, calcination temperature and time on the morphology, particle size, magnetic property, purity and phase of the nanocomposites are investigated. XRD patterns show formation of $CoTiO_3/CoFe_2O_4$ spherical nanoparticles with nearly evenly distribution, when the molar ratio of Co/Ti is 1:1. EDS analysis confirm results of XRD. The magnetic behavior of the nanocomposites is studied by VSM. The nanocomposites exhibit a high coercivity at room temperature.