

Relation of the Structure and Magnetic and Dielectric Properties of the Core/Shell Composite $\text{Co}_{1-x}\text{Ni}_x\text{Fe}_2\text{O}_4$

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The searching for novel materials with functionalities suitable for new electronic devices has been renewed in different branches of science. Namely, on magnetoelectric coupling effects using multiferroic oxides. In this work, the $\text{Co}_{1-x}\text{Ni}_x\text{Fe}_2\text{O}_4\text{-BaTiO}_3$ ($0 \leq x \leq 1$) core-shell nanostructure composites were successfully synthesized using a combination of coprecipitation and sol-gel route method. X-ray diffraction showed that the composite consisted of two single phases: the solid solution and BaTiO_3 . Scanning electron microscopy and high resolution transmission electron microscopy confirmed the core shell nanostructure. Dielectric and magnetic measurements showed the improvement of the properties relative to the single phases and the influence of the Ni addition into the structure of the core.