



Iranian Journal of Physics Research, Vol. 17, No. 3, 2017

## Synthesis and evaluation of physical and magnetic properties of barium hexaferrite doped with $\text{BaZn}_{0.6}\text{Zr}_{0.3}\text{X}_{0.3}\text{Fe}_{10.8}\text{O}_{19}$ (X=Ti, Ce, Sn) composition

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(Received 5 December 2015 ; in final form 15 November 2016)

### Abstract

In this research, barium hexaferrite samples with  $\text{BaZn}_{0.6}\text{Zr}_{0.3}\text{X}_{0.3}\text{Fe}_{10.8}\text{O}_{19}$  (X=Ti, Ce, Sn) composition were synthesized via mechanical activation method and were evaluated by Simultaneous Thermal Analysis (STA), X-Ray Diffraction (XRD), Field Emission Electron Microscopy (FE-SEM) and Vibrating Sample Magnetometer (VSM). All the synthesized samples were almost single phase and with average particles size of about 450 nm and 250 nm for samples without and with dopant respectively. Significant changes in magnetic properties of barium hexaferrite were observed as a result of Fe ions substitution. According to the results, maximum magnetic saturation (33.1 emu/g) and minimum coercivity force (8.14 Oe) were related to samples with composition of  $\text{BaZn}_{0.6}\text{Zr}_{0.3}\text{X}_{0.3}\text{Fe}_{10.8}\text{O}_{19}$  and  $\text{BaZn}_{0.6}\text{Zr}_{0.3}\text{X}_{0.3}\text{Fe}_{10.8}\text{O}_{19}$  respectively.

**Keywords:** barium hexaferrites, mechanical activation, microstructure, magnetic properties

For full article, refer to the Persian section