$BaCO_3$ mediated modifications in structural and magnetic properties of natural nanoferrites

Publons ID	9442243
Wos ID	WOS:000349505000010
Doi	10.1016/j.jpcs.2014.12.011
Title	$BaCO_3$ mediated modifications in structural and magnetic properties of natural nanoferrites
First Author	Widanarto, W.; Jandra, M.; Ghoshal, S. K.;
Last Author	Cahyanto, W. T.
Authors	Widanarto, W; Jandra, M; Ghoshal, SK; Effendi, M; Cahyanto, WT;
Publish Date	APR 2015
Journal Name	JOURNAL OF PHYSICS AND CHEMISTRY OF SOLIDS
Citation	6
Abstract	Preparing M-type barium hexaferrite and improving the magnetic response of natural ferrites by incorporating barium carbonate (BaCO3) is ever-demanding. Series of barium carbonate doped ferrites with composition (100-x)Fe3O4 center dot xBaCO(3) (x=0, 10, 20, 30 wt%) are prepared through solid state reaction method and sintered gradually at temperatures of 800 and 1000 degrees C. Nanoparticles of natural ferrite and commercial BaCO3 are used as raw materials. Impacts of BaCO3 on structural and magnetic properties of these synthesized ferrites are inspected. The obtained ferrites are characterized using scanning electron microscopy (SEM), X-ray diffraction (XRD) and vibrating sample magnetometer (VSM) at room temperature. Uniform barium hexaferrite particles in terms of both morphology and size are not achieved. The average crystallite size of BaFe12O19 is observed to be within 30-600 nm. The sintering process results phase transformation from Fe3O4 (magnetite) to alpha-Fe2O3 (hematite) and the formation of hexagonal barium ferrite crystals. The occurrence of barium crystal is found to enhance with the increase of BaCO3 concentrations up to 20 wt% and suddenly drop at 30 wt%. Saturation and remanent magnetization of the doped ferrites are significantly augmented up to 1637 and 8.92 emu g(-1), respectively compared to their pure counterpart. Furthermore, the coercivity field is slightly decreased as BaCO3 concentrations are increased. BaCO3 mediated improvements in the magnetic response of natural ferrites are demonstrated. (C) 2014 Elsevier Ltd. All rights reserved.
Publish Type	Journal
Publish Year	2015
Page Begin	78
Page End	81
Issn	0022-3697
Eissn	1879-2553
Url	https://www.webofscience.com/wos/woscc/full-record/WOS:000349505000010
Author	WAHYU TRI CAHYANTO, S.Si, M.Si, Ph.D