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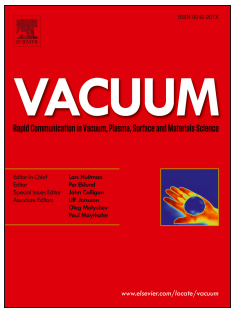

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PII: S0042-207X(17)30340-8

DOI: 10.1016/j.vacuum.2017.04.021

Reference: VAC 7381

To appear in: *Vacuum*

Received Date: 21 March 2017

Revised Date: 11 April 2017

Accepted Date: 12 April 2017

Please cite this article as: Ozkendir OM, Yuzer A, Influence of erbium substitution on the crystal and electronic properties of $FeBO_3$ oxide, *Vacuum* (2017), doi: 10.1016/j.vacuum.2017.04.021.

Influence of Erbium Substitution on the Crystal and Electronic Properties of $FeBO_3$ oxide

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Abstract

Influence of rare earth erbium substitution in the $FeBO_3$ material was investigated on its crystal and electronic properties. Studies were mainly carried by the absorption spectroscopy techniques (XAS) in coordination with the x-ray diffraction (XRD) patterns. Crystal structure properties of the samples were studied by x-ray absorption fine structure spectroscopy (XAFS) technique as a complementary probe of $FeBO_3$ material at the room tempeartures (RT). During the study, 4*f* level of Er was selected as the main playground due to their interesting relations that may yield fruitful physical phenomena in the materials. Besides, 4*f*-3*d* interplay were determined to emerge dominant interactions causing phase transitions both in crystal and magnetic structures of the samples. With the increasing Erbium substitutions, interesting electronic and magnetic properties were observed in the samples like; varying electrical resistivity of the samples and related crystal phase transition etc..

Keywords: Magnetic Materials; Crystal Structure; Oxides ; XAFS (EXAFS and XANES); Electronic Structure

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1. Introduction