Poster Presentation

MS110.P05

Temperature dependent structural changes in alkaline earth ferrites

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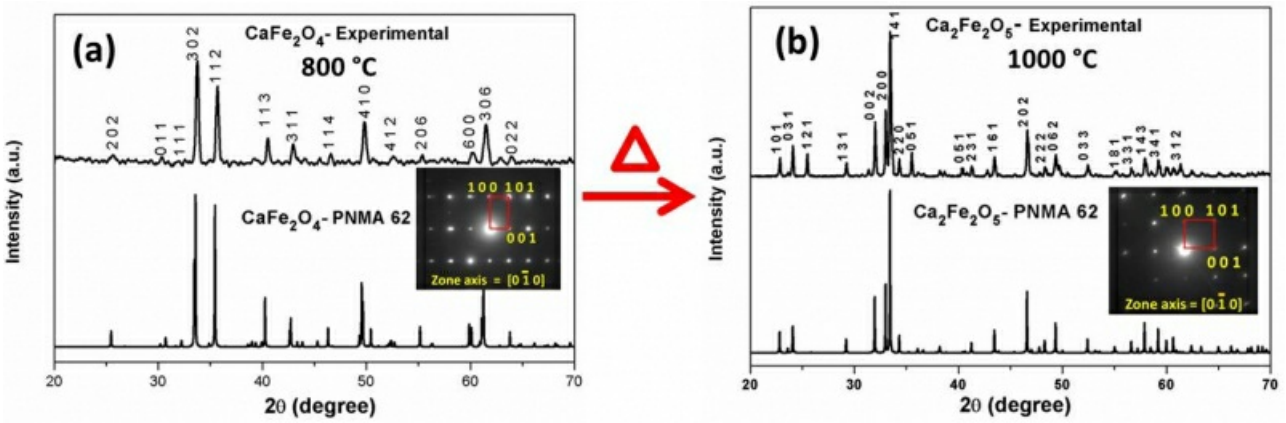
Iron based complex oxides have been showing excellent catalytic, magnetic and electrical properties due to the multiple valence state of Fe ion and larger size of alkaline elements which stabilizes smaller sized Fe ion [1]. We have observed two polymorphs of iron based complex oxides in some of the compositions after heat treatment at two different temperatures. The alkaline earth ferrites were synthesised by wet chemical method. The intermediate phase obtained after the chemical reaction at room temperature corresponding to each composition was subjected to thermogravimetric analysis to check the phase formation temperature and its stability range. Based on the Thermal analysis, the ferrites were calcined at two different temperatures (800 °C and 1000 °C). X-ray diffraction (XRD) studies of calcium ferrite showed the transformation of Spinel to Brownmillerite structure as shown in figure 1. The crystal structure corresponding to the space group Pnma (62) and cell parameters were refined by Rietveld method using Fullprof software. Powder XRD gives average crystallographic information over a large area, where a large number of crystallites are distributed with random orientations in the powder. From electron diffraction analyses we get local structural information, composition and distribution of atoms from small areas. The coherence length for X-rays and electrons are very different. Therefore in this study further detailed structural analysis of alkaline earth ferrites was carried out using transmission electron microscopy. Detailed local structural analysis (through electron diffraction) and average structural analysis (through powder XRD) were performed and results are compared for all the compositions.

Kudo et al. (2009), Energy Environ. Sci. 2, 306–314.
Rao et al. (1986), J. Mater. Res. 2, 280-294.



Keywords: Ferrites, Spinel, Brownmillerite