^{57}Fe HYPERFINE FIELD ANISOTROPY IN FERRITES AND ITS RELATION TO THE NON-UNIFORMITY OF THE IONIC SURROUNDING

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9.7 cm

In magnetic oxides, the crystal environment influences the hyperfine field on the nuclei of Fe^{3+} ions strongly via the covalency and the electron supertransfer in the iron-oxygen-cation triads. These contributions consist of an isotropic and anisotropic (i.e. dependent on the magnetization direction) parts. The hyperfine field anisotropy tensors, obtained from analysis of ^{57}Fe NMR spectra for iron sites in various magnetic oxides (barium hexaferrite, lithium spinel, magnetite and yttrium-iron garnet) were used to investigate the relation between the hf anisotropy and surrounding ionic arrangement. While a reasonable correlation has been found when the distribution of the nearest cations was considered, no correlation has been obtained between the hyperfine field anisotropy and the positions of the nearest oxygen anions. This finding may indicate a minor role of the covalency contribution in the anisotropic part of the hyperfine field or its strong dependence on the other cationic neighbours of the nearest oxygen anions.

13.4 cm

Subject category :

3. Transition Metals, Alloys and Compounds

Presentation mode :
poster

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