

Title: Local structure of hexagonal ferrites studied by NMR

Author: Karel Kouřil

Department/Institute: Department of Low Temperature Physics

Supervisor of the doctoral thesis: prof. RNDr. Helena Štěpánková, CSc.

Abstract: Hexagonal ferrites of M, W, X and Y structure types were studied by means of NMR, electronic structure calculations and magnetoelectric experiments. Presented results deal with cation distribution, localization of ferrous ions, interpretation of NMR spectra of studied materials and effects of size reduction. In oriented layers M type strontium ferrite and submicron particles of M type barium ferrite pronounced effects of reduced size were observed on ^{57}Fe NMR spectra. Performance of magnetoelectric barium-strontium Y type hexaferrites with divalent zinc cations improved upon thermal treatment of samples while distribution of zinc was not significantly altered. In Sc substituted BaM, Sc content was found to be uniform throughout TSSG grown crystal. In LaSrM systems electron localization in $2a$ sublattice was observed, co-substitution with La+Zn, La+Co and La+Cu was found to lead to partial charge compensation. In strontium ferrites of type W and X localization of ferrous ions in octahedral sites in SS block pair was observed.

Keywords: NMR, hexagonal ferrites, structure, multiferroics, defects