Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

EXAFS and XANES in $Fe_{3-x}M_xO_4$, M = Zn, Ti, Al with 0 $\leq$ x $<$ 0.065.[1] J. SABOL, Chemical Consultants, Racine WI, USA, D. OWOC, Z. KAKOL[2], C. KAPUSTA, A. KOZLOWSKI, AGH-UST, Krakow, Poland, J. HONIG, Purdue Univ., West Lafayette IN, USA — We present an extended EXAFS and XANES study at the Fe K edge of the local structural changes in $Fe_{3-x}M_xO_4$, M = Zn, Ti, Al, with x within the first and second order Verwey transition regimes. The aim of this work was to investigate how the local Fe symmetry is altered at the transition, in view of the drastic change of the overall crystal structure. The comparison of the interatomic distances and Debye-Waller factors shows that the local Fe-O structure around either the octahedral or tetrahedral Fe atoms in magnetite remains nearly unaltered crossing the Verwey transition. This is also independent of the level of doping and dopant atom, i.e., independent of lattice parameters, as Zn and Ti increase the unit cell volume and Al decreases the unit cell volume. Therefore, the local distortion of Fe sites is not a parameter sensitive enough to elucidate the mechanism of the Verwey transition and the change of its character. An examination of different factors, other than local order, is needed to explain the apparent charge ordering below the Verwey transition temperature T_V.

[1]Supported by Polish Ministry of Education and Science Grant 2006-08.
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Date submitted: 27 Nov 2007 Electronic form version 1.4