11.4 Maximum Entropy Analysis of the Spectroscopic Data

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It is shown how the multitude of equations usually solved within the maximum-entropy-method (MEM) scheme of the data analysis can be reduced to the number of equations equal to the number of the available experimental data. This helps to understand how the limited experimental information is distributed over much richer space of the resulting maps. Next, the MEM is shown to be an efficient tool for the analysis of the spectroscopic data with particular emphasis on its possible use in the Mössbauer spectroscopy.

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11.5 Neutron and X-ray Scattering Study of the Magnetic Structure of $ScFe_4Al_8$

by K.Rećko[1], L.Dobrzyński[1], A.Goukassov[2], A.Makal[3], M.Brancewicz[1], K.Szymański[1], D.Satuła[1], J.Waliszewski[1], E.Talik[4], B.Kotur[5], W.Suski[6,7]

The nuclear and magnetic structure refinement in the body centered tetragonal ScFe4Al8 single crystal is presented. The results of neutron and high resolution X-ray diffraction measurements fully confirm the nuclear order. We have studied iron magnetic ordering in the antiferromagnetic single crystal by unpolarized neutron diffraction in the temperature range 8 K - 250 K. LT neutron measurements show that the scandium compound orders with double cycloid spiral (DCS). The scandium *(2a)* site remains magnetically disordered while the iron *(8f)* site splits into two independent magnetic sublattices (orbits). Below T_{N1} ~100 K two sets of magnetic reflections were found. Each of them requires a different wave vector representation i.e. for 1st orbit (1) $\bar{q}=(0.13,0.13,0)$ and for 2nd orbit $\bar{q}_2=(0.17,0.17,0)$. Between Fe moments of adjacent chains extending along c axis (different orbits) there is a constant phase difference while along the face diagonals (the same orbit) the moments are parallel. The iron moments rotate in the plane of the wave vectors (001), but the existence of small moment component along the c-axis which would give rise to a double cone cycloid (DCC) structure and magnetic scattering contribution to the nuclear reflections cannot be excluded from the present data. The magnetic structure seen in the single crystal studies is different from the one observed earlier by means of magnetic neutron powder diffraction [1, 2]. The reasons of this different magnetic behavior are discussed.

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11.6 Remarkable Solvent Effect on the Structure and Electrochemical Properties of [M(bipirydyl)₃](ClO₄)₃ (M = Co, Fe and Ru) Films

by K.Winkler[1], M.E.Płońska[1], K.Rećko[2], L.Dobrzyński[2]

In low dielectric constant media the electrooxidation of bipirydyl and phenantroline complexes of transition divalent metal cations results in the precipitation of microcrystalline film on the electrode surface. In most solvents the film is reversibly reduced. However, films formed in the presence of acetonitrile are electrochemically inactive over a large potential range. The morphology and structure of solid phase formed on the electrode surface during the electrochemical oxidation of