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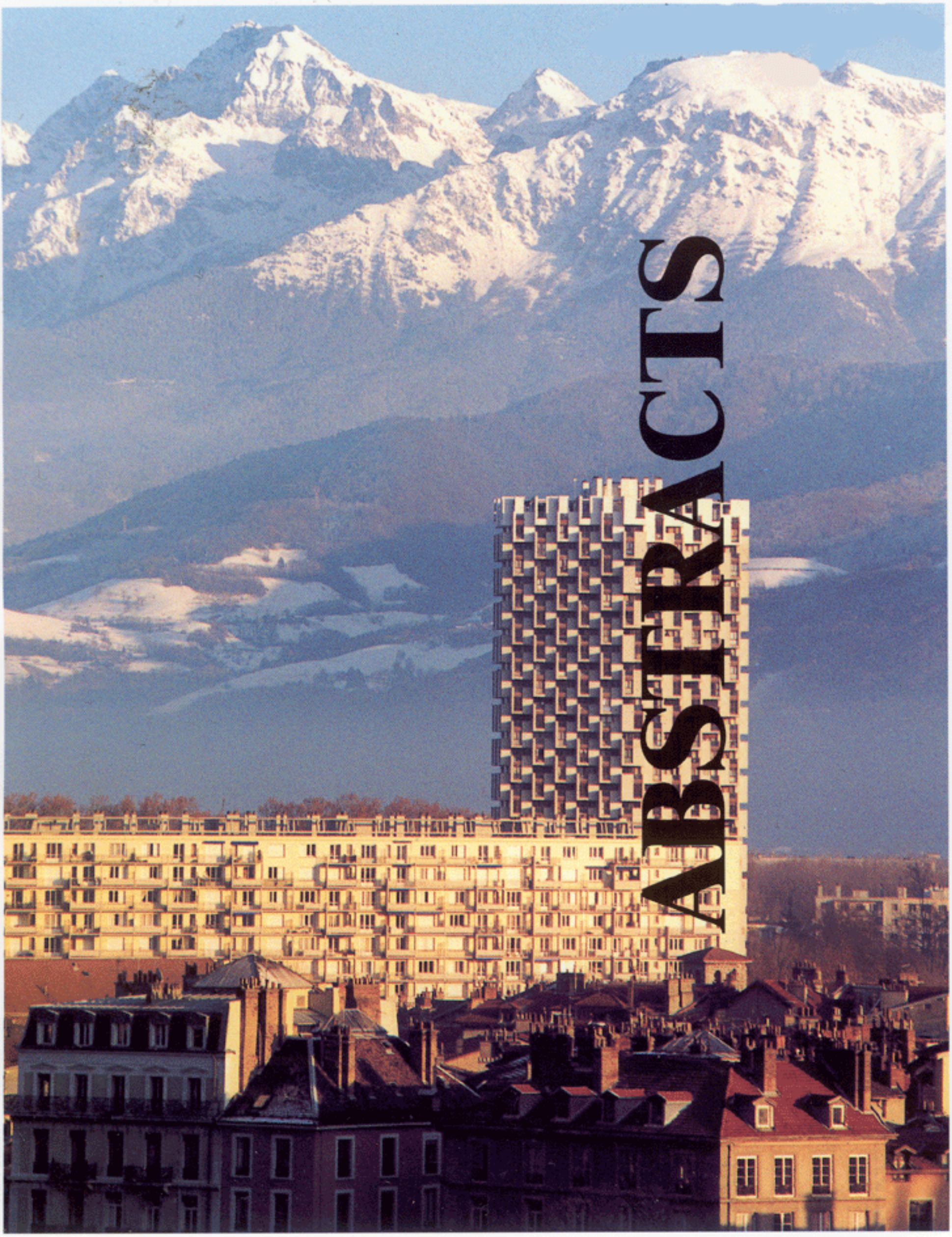

Sa-E4-P11 E037

NEUTRON DIFFRACTION STUDY OF THE MAGNETIC AND STRUCTURAL PHASE TRANSITIONS IN THE DEUTERATED MOLECULAR FERROMAGNET $Fe(dtc)_2Cl$.

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The $Fe(dtc)_2Cl$, where dtc = diethyl-ditiocarbamate, has been described as a non-collinear Ising 3-d ferromagnet. The space group is $P2_1/c$ and the unit cell is formed by two pairs of molecules of $Fe(dtc)_2Cl$ related by one inversion centre. The iron atom is covalent bonded to 4 sulfur and one halogen forming a distorted square pyramid. The packing of the pyramids in the unit cell is governed by Van der Walls forces. The special symmetry of this pentacoordinated distorted structure makes the Fe(III) ion to stabilise the $^4A_2$ as groundstate (S=3/2).
Magnetic susceptibility curves versus temperature measured in single crystals show a ferromagnetic phase transition at 2.45 K. In addition, there has been observed an anomaly in the specific heat of $Fe(dtc)_2Cl$ which has been ascribed to an structural phase transition occurring at around 150 K. This structural transition is at the origin of the difficulties found to refine from the single crystal data the nuclear structure at low temperature as well as the magnetic structure. We have determined the nuclear and magnetic structures at several temperatures between 1.5 K and RT by powder neutron diffraction in a deuterated sample. Thermodiffractograms reveal that the structural transition extends over the temperature region 175 to 140 K. In this structural transition the ethyl groups which at RT are disordered between two non equivalent positions become frozen in only one position. A canting angle of around 20 degrees has been estimated from the analysis of the magnetic diffraction data at low temperature.

Sa-E4-P12 E150

NEUTRON AND MÖSSBAUER STUDIES OF THE DOUBLE PEROVSKITE A_2FeMoO_6 (A=Sr AND Ba)

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The double perovskite oxides A_2FeMoO_6 (A=Sr and Ba) have been studied by Mössbauer technique, SEM, neutron and x-ray diffraction. The single phases of the polycrystalline A_2FeMoO_6 powders have been prepared by a solid-state reaction method, and chemical composition of the samples were confirmed to be stoichiometric by Rutherford backscattering spectrometer (RBS) and induction coupled plasma (ICP) analysis. Ba_2FeMoO_6 has a cubic structure with a=8.0747 Å whereas Sr_2FeMoO_6 has a tetragonal symmetry with a=5.5729 Å and c=7.9077 Å. In Sr_2FeMoO_6, the atomic positions for oxygen indicate slight displacements toward Fe atom. The unit-cell parameters of the strontium compound increase linearly with increasing the temperature, and the crystal symmetry changes into cubic in the paramagnetic phase (above T_C). Magnetization measurements show a ferrimagnetic behaviour for both materials, with T_C=345 K for Ba_2FeMoO_6 and T_C=425 K for Sr_2FeMoO_6, rspectively.
Mössbauer spectra measurements of the A_2FeMoO_6 have been taken at various temperatures ranging from 10 to 473 K. As the temperature increases toward to Curie temperature, Mössbauer spectra show the line broadning and 1, 6 and 3, 4 line-width difference because of anisotropic hyperfine field flutuation. Temperature dependence of anisotropy energy is calculated from the relaxation rate.

Sa-E4-P13 E087

Co - MOMENT COLLAPSE IN $Er_{0.6}Y_{0.4}Co_2$

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The particular behaviour known for $Er_{1-x}Y_xCo_2$ compounds is determined by the two magnetic subsystems formed by the localised 4f electrons of Rare Earth (RE) and the itinerant d electrons showing itinerant electron metamagnetism (IEM). The latter is driven by the H_{6l}^{Co} exchange field acting on the Co-sites. Whereas for $ErCo_2$ both subsystems undergo a common magnetic phase transition, beyond a critical Y concentration two distinct magnetic phase transitions are observed.[1] Thus in $Er_{0.6}Y_{0.4}Co_2$ on cooling a second-order phase transition is detected at T_C^R=14.5 K, which is ascribed to ordering of the RE-sublattice only, followed by a first-order phase transition at T_C^{Co}=11 K, consistent with the metamagnetic character of the itinerant d sublattice.
In order to elucidate both magnetic phase transitions observed we have performed detailed studies of the thermal expansion under applied external magnetic field and pressure, and neutron diffraction experiments under external magnetic fields. The results obtained are discussed with respect to the induced moment of the itinerant d sublattice.[2]

[1]R. Hauser et al, Phys. Rev. B 61 (2000) 1198
[2]H. Yamada, Phys. Rev B 47 (1993) 11211.

Sa-E4-P14 E032

INFLUENCE OF INNER STRUCTURE AND FORM OF THE FERRITE SAMPLES UPON MAGNETIC SPECTRA

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One of the principal reasons influencing the ranges of dispersion and absorption in magnetic spectra of polycrystalline ferrites is the form of the sample. Its changes and therefore changes of demagnetizing factor N_X results in diminution of magnetic permeability values and also in extension of dispersion range and resonance absorption maximum shift to high frequencies area. Investigating the influence of demagnetizing factors on spectra would allow to determine the magnetic characteristics of ferrites.
This paper considers the influence of inner structure and form of samples upon their magnetic spectra. The investigated samples were ring-shaped manganese-zinc spinels of various compounds. In order to change the form of the samples a thin transversal cut of various depths was made in them. The spectra of samples with several complete and incomplete cuts were taken too.
It can be observed that incomplete cuts reduce the components of magnetic permeability much more less compared to complete cuts (approximately by 10 and 200 times correspondingly). However the dispersion range extends not proportionally (approximately by 5-10 and 10-100 times depending on the sample structure). The extension of frequency range within which the magnetic permeability component remains constant is obtained as a result of outer demagnetizing factors' values increase.
It was offered the following formula for change of demagnetizing factors ΔN evaluation: $\Delta N = A + B\,N_X$, where A and B are functions of cut volume, magnetic permeability and change of magnetic permeability.