

curves transform from Q type for Fe_2NiO_4 to P type for $x \geq 0.1$. The nature of interactions between magnetic ions has been deduced from sign and values of n , α , β .

Etude Magnetique de Compose $\text{SrTb}_2\text{Fe}_2\text{O}_7$. Determination des Structures Magnetiques par Diffraction Neutronique. D. SAMARAS, A. COLLOMB, J. C. JOUBERT AND E. F. BERTAUT. Laboratoire des Rayons X, C.N.R.S., B. P. No. 166, Centre de Tri, 38042 Grenoble Cedex, France. Magnetic properties of the compound $\text{SrTb}_2\text{Fe}_2\text{O}_7$ (space group $P4_2/mnm$) have been investigated by magnetic measurements of susceptibility and magnetization and by neutron diffraction. The Néel temperature of the iron sublattice is 628°K. At 295°K the configuration of the Fe^{3+} spins is $G_x^- \pm A_y^-$ (antiferromagnetic). At 4.2°K the configuration of Tb^{3+} spins is represented by the modes F_x^+ , C_y^+ , A_z^- coupled in the representation E_g with the mode A_z^- of the Fe^{3+} spins. The values of the magnetic moments corresponding to the different modes are obtained from the magnetic structure refinement. The value of the F_x^+ ferromagnetic mode of Tb^{3+} is $2.6 \mu_B/\text{ion}$ at 4.2°K. At room temperature the orientation of Fe^{3+} spins perpendicularly to the c axis seems to be due to a site anisotropy, the easy direction coinciding with the axis of the FeO_5 bipyramids. The reorientation of Fe^{3+} spins along the c axis observed at 4.2°K can be explained by a strong $\text{Fe}^{3+}\text{-Tb}^{3+}$ coupling which overcomes the Fe^{3+} one ion anisotropy. The low site symmetry (m) of Tb lifts the degeneracy completely and gives rise to a pseudodoublet (formed by two singlets of small separation) associated with an Ising-like behavior. In fact the Tb^{3+} spins are in the m planes, containing the c -axis.

Etude de Nouveaux Oxydes Ternaires d'Europium Divalent, de Type Bronze Oxygene de Tungstene Quadratique et de Type Peroxskite. J. P. FAYOLLE, F. STUDER, G. DESGARDIN, AND B. RAVEAU. Groupe de Cristallographie et Chimie du Solide, ERA 305, Laboratoire de Chimie Minérale du Solide, Université de Caen, 14032 Caen, France. New divalent europium ternary oxides have been isolated and studied by X-ray diffraction and electron microscopy. Fifteen of them crystallize with tetragonal bronzelike structures: EuM_2O_6 ; $\text{Eu}_6\text{M}_{34}\text{O}_{64}$ ($M = \text{Ta}, \text{Nb}$); $\text{EuBCM}_5\text{O}_{15}$ ($B = \text{Ca}, \text{Eu}, \text{Ba}$; $C = \text{Na}, \text{K}$; $M = \text{Ta}, \text{Nb}$) and $\text{Eu}_{0.60}\text{NbO}_3$. The compound Eu_xNbO_3 ($0.80 \leq x \leq 0.90$) is of perovskite type. Structural evolution of these phases, compared to the strontium homologous compounds, is discussed.

Etude Structurale des Systemes $\text{Ln}_2\text{S}_3\text{-GeS}_2$. A. MICHELET, A. MAZURIER, G. COLLIN, P. LARUELLE, AND J. FLAHAUT. Laboratoire de Chimie Structurale, C.N.R.S. No. 200, Faculté des Sciences Pharmaceutiques et Biologiques, 4, Avenue de l'Observatoire, Paris 6, France. In the systems formed between the Ln_2S_3 sulfides of the rare earth and GeS_2 , three kinds of new crystal structures are observed: $\text{Ln}_4\text{Ge}_3\text{S}_{12}$, rhombohedral $R3c$; Ln_2GeS_5 monoclinic $P2_1/a$; $\text{Ln}_6\text{Ge}_2\text{S}_{14}$, hexagonal superstructure $P6_3$ of the $\text{Ce}_6\text{Al}_{10/3}\text{S}_{14}$ structure. The three structures are established from single crystals studies. Germanium atoms are inside isolated tetrahedra of sulfur atoms. Lanthanide atoms are inside two or three-capped trigonal prisms, often with very long equatorial Ln-S distances. The La_2GeS_5 compound belongs to the series of two anions compounds, with layers of [LaS] composition alternating with GeS_4 tetrahedra.

Influence de la Substitution de fer sur les Propriétés Magnetiques des Solutions Solides $\text{Ca}_2\text{Fe}_{2-x}\text{M}_x\text{O}_5$ ($M = \text{Al}, \text{Sc}, \text{Cr}, \text{Co}, \text{Ga}$). J. C. GRENIER, M. POUCHARD, AND P. HAGENMULLER. As dicalcium ferrite the derived phases of formula $\text{Ca}_2\text{Fe}_{2-x}\text{M}_x\text{O}_5$ ($M = \text{Al}, \text{Sc}, \text{Cr}, \text{Co}, \text{Ga}$) contain two different sites for the trivalent cations. The cationic distribution between the sites is obtained by Mössbauer spectroscopy. The evolution of the ordering temperature can be explained by this distribution; the thermal variation of the magnetic susceptibilities allows an estimation of the relative values of the couplings.

Magnetic Ordering in $\text{Ba}_2\text{MnReO}_6$. C. P. KHATTAK, D. E. COX AND F. F. Y. WANG. Department of Materials Science, SUNY at Stony Brook, New York 11790. The ordered perovskite $\text{Ba}_2\text{MnReO}_6$ has been reported to be ferrimagnetic with a Curie temperature of 105°K and a saturation moment of $3.9 \mu_B$, consistent with antiparallel coupling of spin-only moments of the combination $\text{Mn}^{2+}\text{-Re}^{6+}$. Neutron diffraction studies on polycrystalline material have confirmed that the Mn and Re ions are completely ordered chemically. At 4.6°K, two sets of magnetic peaks were observed, the stronger consistent with the ferrimagnetic model, and the weaker characteristic of antiferromagnetic ordering of the first kind, indicative of some canting of the moments in adjacent (001) planes. The moment on the Mn ion was found to be $4.8 \mu_B$, but that on the Re ion was found to be less than $0.2 \mu_B$ if a localized