s8.m27.p6 **Magnetic Properties of $NdMn_{2-x}Cu_xGe_2$ Compounds.** A. Elmali, Y. Elerman and I. Dincer, *Ankara University, Faculty of Engineering, Department of Engineering Physics,06100 Besevler-Ankara, Turkey. E-mail: elmali@eng.ankara.edu.tr*

Keywords: Rare earth compounds; Transition metal compounds; Magnetic measurements

The nature of the magnetic coupling within and between the Mn layers in the RMn_2X_2 compounds is closely related to the intralayer Mn-Mn spacing d^a_{Mn-Mn} . Roughly, if d^a_{Mn-Mn} >2.87 Å (a>4.06 Å), the intralayer coupling is antiferromagnetic, and the interlayer coupling is ferromagnetic. When 2.84 Å< d^a_{Mn-Mn} <2.87 Å (4.02 Å<*a*<4.06 Å), the intralayer in-plane coupling is again antiferromagnetic, but the interlayer coupling is, in this case, antiferromagnetic. In the case d^a_{Mn-Mn} <2.84 Å (*a*<4.02 Å), there is effectively no intralayer in-plane spin component, and the interlayer coupling remains antiferromagnetic[1]. Due to the strong dependence of the interlayer Mn-Mn exchange interaction on the lattice constant a, the replacement of Mn by another transition metal atom leads to different changes of the magnetic properties of these systems[2-3].

In this work, the structure and magnetic properties of $NdMn_{2-x}Cu_xGe_2$ ($0.0 \leq x \leq 1.0$) were studied by X-ray powder diffraction and magnetization measurements. X-ray diffraction patterns at room temperature indicated that all compounds are single phase and crystallize in the $ThCr_2Si_2$-type structure with the space group *I4/mmm*. Substitution of Cu for Mn leads to a linear decrease in the lattice constant *c* and the unit cell volume *V* and a linear increase in the lattice constant *a*. In all compounds, the *ab*-plane antiferromagnetic state transforms to a ferromagnetic state on decreasing the temperature and the ferromagnetic structure is canted. At T_{SR}, the canted ferromagnetism undergoes a spin reorientation to a conical ferromagnetic state. The Nd sublattice orders below T_C(Nd) and magnetization increases with decreasing temperature for all compounds. Substituting Cu for Mn leads to a destabilisation of the ferromagnetic interactions and the overall magnetization decreases with increasing Cu concentration. The results are summarized in a preliminary magnetic phase diagram[4].

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s8.m27.p7 **Effect of Tb substitution structural and magnetic properties of $La_{1-x}Tb_xMn_2Si_2$ ($0 \leq x \leq 0.5$).** Bari Emre,[a] [a]*Department of Engineering Physics, Ankara University, TR-06100, Ankara, Turkey. E-mail: bemre@eng.ankara.edu.tr*

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The structure and magnetic properties of $La_{1-x}Tb_xMn_2Si_2$ ($0 \leq x \leq 0.5$) were studied by X-ray powder diffraction and magnetization measurements. All the compounds crystallize $ThCr_2Si_2$ -type structure[1]. Linear decrease in the lattice constants and the unit-cell volume is observed by substituting Tb. Ferromagnetism is observed up to x=0.3 samples. However T_C shifts to lower temperatures as the Tb content increase. Increasing Tb concentration causes, decrease of ferromagnetic ordering and increase antiferromagnetic ordering. This ferromagnetic to antiferromagnetic phase transition leads to an intermediate phase. Thermal contraction of the lattice parameter a causes this intermediate phase. For x<0.3 splitting between the ZFC and FC curves is observed at TC which indicates the ferromagnetic component of the Mn moments is pinned by the anisotropy of the in-plane antiferromagnetic component.

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