CRYSTAL AND MAGNETIC STRUCTURE OF HALF-HEUSLER COMPOUNDS $MnNi_{0.9}M_{0.1}Sb$ (M = Ti, V, Cr, Fe, Co) AT LOW TEMPERATURES

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Half-Heisler magnetic intermetallic compounds of transition metals exhibit interesting physical properties such as magnetoresistance, ferromagnetic and antiferromagnetic magnetic states, and superconductivity. It is observed the shape memory effect and superelasticity with opportunity to control there phenomena by means magnetic field. It makes these compounds promising materials to apply for creation permanent magnets, elements of electronic devices and cooling technology.

To understand the formation of magnetic states in doped half-Heusler compounds based on MnNiSb it is necessary to correctly separate the contribution to the magnetic properties from the sublattices of nickel and manganese ions and to identify the relationship between the structural and magnetic properties of these materials.

In our work we present the results of investigation the crystal and magnetic structure of half-Heusler intemetallic compounds MnNiSb and $MnNi_{0.9}M_{0.1}Sb$ (M = Ti, V, Cr, Fe, Co) by means of neutron diffraction under normal conditions. Partial substitution of another transition element for nickel leads to a decrease in the magnetic moment of the Mn ions. Also MnNiSb, $MnNi_{0.99}Sb$, $MnNi_{0.9}Cr_{0.1}Sb$ and $MnNi_{0.9}Fe_{0.1}Sb$ compounds have been studied in the temperature range from 13 to 300 K. It has been found that the initial cubic structure $F\bar{4}3m$ and ferromagnetic phase remain in the investigated temperature range. New reflections corresponds to the antiferromagnetic phase have not been found. The unit cell volume increases in the MnNiSb and MnNi0.9Fe0.1Sb compounds as the temperature decreases from 50 to 13 K. The MnNi0.99Sb alloy exhibits an isomorphic structural transition at low temperatures. This may be due to the metal-semimetal transition in these compounds.

This work have been supported by the Russian Foundation for Basic Research, project no. 20-52-04003 Bel_mol_a (Belarusian Foundation for Basic Research, project no. T21RM-029).