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Study of the crystalline and magnetic structure of half-Heusler compounds MnNi0.9M0.1Sb (M = Ti, V, Cr, Fe, Co, Zn) at high pressures and 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.

In our work we present the results of investigation the crystal and magnetic structure of half-Heusler intemetallic compounds MnNiSb and MnNi0.9M0.1Sb (M = Ti, V, Cr, Fe, Co, Zn) by means of neutron diffraction in the temperature range 10–300 K and by X-ray diffraction in the pressure range 0–30 GPa at room temperature.

It has been found that the initial cubic structure F4¯3m and ferromagnetic phase remain in the investigated temperature range. New reflections correspond to the antiferromagnetic phase have not been found. Partial substitution of another transition element for nickel leads to a decrease in the magnetic moment of the Mn ions. Under high pressure, the cubic structure F4¯3m remains stable for all compounds under study.

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