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Ferromagnetic Properties of the Intermetallic Compound with the Hexagonal Laves-Phase Structure in Cobalt-Titanium System*

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Abstract

The homogeneous composition range and magnetic properties of the hexagonal Laves-Phase compound, $Co_{2+x}Ti_{1-x}$ ($x>0$), have been determined by X-ray diffraction and magnetic studies. X-ray diffraction studies show that the $MgNi_2$-type structure is stable in a narrow composition range from about 29 to 31.3 at.% Ti at room temperature. Magnetic measurements made at temperatures from 4.2° to 1,000°K indicate that these $MgNi_2$ phase compounds are ferromagnetic with Curie points lower than 44°K, showing a conspicuous concave toward the temperature axis in every reciprocal magnetic susceptibility vs. temperature curve above the Curie point. It is shown that magnetic data can be interpreted under the assumption that excess cobalt atoms behave as impurity atoms with a localized moment located in the matrix of a paramagnetic compound, similarly to the case of the analysis of the magnetism of dilute magnetic alloys.

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