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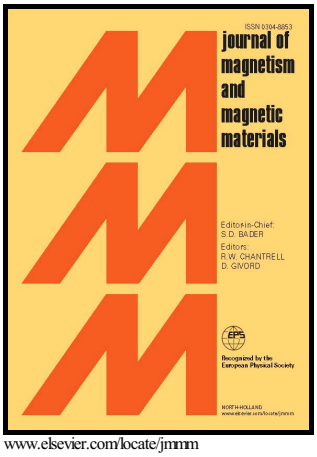

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Synthesis, thermal and magnetic properties of RE-diborides

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Abstract

Techniques of synthesis of RE diborides (RB_2) are developed (R=Tb, Dy, Ho, Er, Lu). Temperature dependence of magnetization, a heat capacity, a lattice parameters of diborides in the range of 2-300K are measured. According to joint calorimetric and X-ray research the analysis of a phonon component of a heat capacity and thermal expansion of RE-diborides is carried out by Debye-Einstein's models, the parameters of the model are determined.

The change of magnetization of the ferromagnetic RB_2 compounds with growth of temperature caused by violation of ordering in the system of the atomic magnetic moments is compared with the change of entropy of a magnetic subsystem calculated from calorimetric data. Analytical expansion for calculation of a magnetic component of a heat capacity by RB_2 magnetization data at the temperatures of 2-300K is obtained.

Keywords: borides, heat capacity, magnetic phase transition, ferromagnets, magnetization.

Introduction

Rare-earth diborides (RB_2, where R stands for the rare-earth ion) are an under-investigated family of isostructural compounds with some specific magnetic