

substance: boron compounds with lanthanides
property: properties of lanthanide borides of the type MB₅₀

YB₅₀

Structure: orthorhombic

lattice parameters

(in Å)

<i>a</i>	16.625	<i>T</i> = 300 K	X-ray diffraction	97T
<i>b</i>	17.620			
<i>c</i>	9.44797			

TbB₅₀

Structure: orthorhombic (isostructural to YB₅₀) [99M2].

Space group: I112, I11m, or I112/m [99M2].

Curie-Weiss behavior of the magnetic susceptibility [99M2, 99M3].

lattice parameters

(in Å)

<i>a</i>	16.618	<i>T</i> = 300 K	X-ray diffraction	99M2
<i>b</i>	17.644			
<i>c</i>	9.488			

Curie-Weiss parameters of the magnetic susceptibility

($\chi = (C1 + C2/(T - \Theta))$)

<i>C</i> 1	0.0006 cm ³ / mol Tb	χ in CGS-emu	99M2
<i>C</i> 2	11.81 cm ³ K/ mol Tb		
Θ	-16.4 K	<i>T</i> < 5 K	
<i>p</i> _{eff}	9.72 μ _B /Tb atom		

For magnetic properties see Figs. 1...3.

References:

- 97T Tanaka, T., Okada, S., Yu, Y., Ishizawa, Y.: J. Solid State Chem. 133 (1997) 122 (Proc. 12th Int. Symp. Boron, Borides and Rel. Compounds, Baden, Austria, 1996).
- 99M1 Mori, T., Tanaka, T.: J. Solid State Chem. (2000) (Proc. 13th Int. Symp. Boron, Borides and Rel. Compounds, Dinard, France, Sept. 1999).
- 99M2 Mori, T., Tanaka, T.: J. Phys. Soc. Jpn. 68 (1999) 2033.
- 99M3 Mori, T., Tanaka, T.: J. Alloys Compounds 288 (1999) 32.

Fig. 1.

YB₅₀ – type structure. Magnetization at 2K vs. magnetic field. **(a)** DyB₅₀, TbB₅₀; **(b)** ErB₅₀, HoB₅₀; **(c)** TbB₄₁Si_{1.2}. The critical magnetic fields H_c are indicated by arrows (H_c , field, where the derivative of the magnetization is maximum) [99M1]. p_{RE} : magnetic moment per rare earth atom.

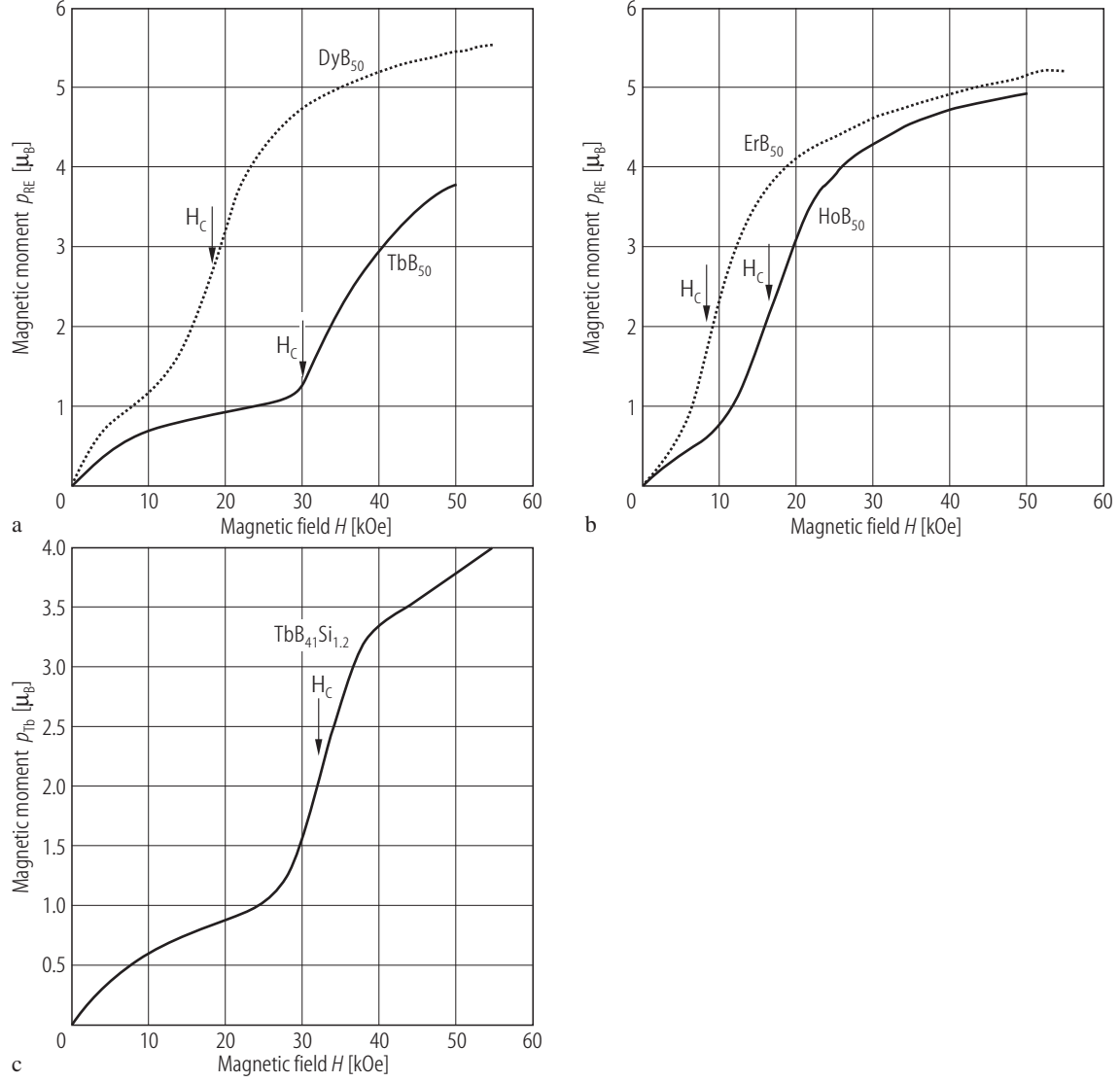


Fig. 2.

YB₅₀ – type structure (TbB₄₁Si_{1.2}). Magnetic susceptibility vs. T . $T_N \sim 18$ K (peak temperature, temperature of an antiferromagnetic-like transition) [99M1].

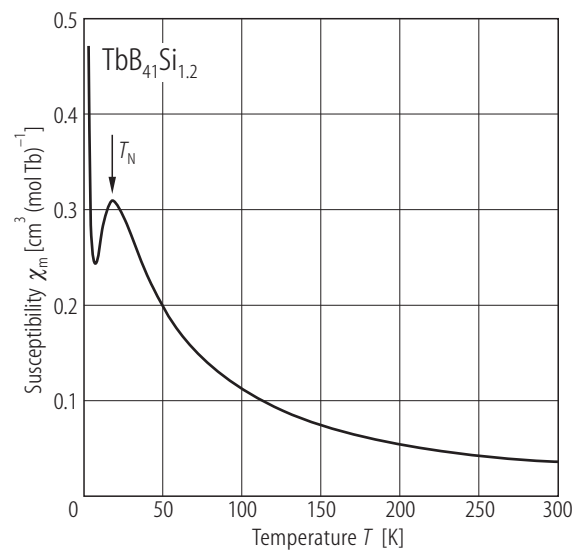


Fig. 3.

YB₅₀ – type structure (TbB₄₁Si_{1.2}). Heat capacity C/T vs. T^2 . Circles, experimental results; solid line, calculated according to $C = \gamma T + c_2 T^2$ with $c_2 = 109 \text{ mJ}/(\text{mol K}^3)$ [99M1].

