

substance: boron compounds with group V elements
property: heat capacity of compounds with Vb elements

group Vb transition metal borides (V₃B₂, VB, VB₂, Ta₂B, TaB, TaB₂)

Low temperature electron heat capacity of transition metal borides (and carbides) with narrow energy d bands in [86P].

low temperature heat capacity coefficient γ

(degree of band filling m calculated for the electron transfer $n = 1$ from the B atom to the d zone)

Compound	d config. of metal	m	γ [mJ (g atom Me) ⁻¹ K ⁻²]	
V	3d ³	0.30	9	86P
V ₃ B ₂		0.37	3.27	
VB		0.40	2.66	
VB ₂		0.50	4.84	
V ₂ C		0.35	3	
VC		0.4	3.2	
Nb	4d ³	0.30	8	
Nb ₂ C		0.35	1.8	
NbC		0.40	2.8	
Ta	5d ³	0.30	6	
Ta ₂ B		0.35	2.88	
TaB		0.40	1.28	
TaB ₂		0.50	1.70	
Ta ₂ C		0.35	1.3	
TaC		0.40	3.6	
Mo	4d ²	0.40	2	
Mo ₂ B		0.45	4.26	
MoB ₂		0.60	3.38	
Mo ₂ C		0.45	3	
MoC		0.50	3.8	

As an example, the data for V (metal and compounds) in Fig. 1 [86P].

References:

- 86P Povzner, A.A., Zilichikhis, A.L., Abel'skii, Sh.Sh., Knyshev, E.A.: J. Less-Common Met. 117 (1986) 319 (Proc. 8th Int. Symp. Boron, Borides, Carbides, Nitrides and Rel. Compounds, Tbilisi, Oct. 8 - 12, 1984.

Fig. 1.

Lower vanadium borides. Low temperature electron heat capacity coefficient γ over the filling zone ($\Delta/Q = 1.4141$; $\alpha = 12Q/k_B^2\pi^2$) vs. degree of band filling m [86P]. Q : Coulomb repulsion energy, Δ : halfwidth of the initial band (Hubbard model).

