

substance: boron compounds with group V elements
property: properties of boron-tantalum compounds

Ta₂B

Preparation [75S, 77L], crystalline structure [75S, 77G], electronic structure [76S, 79P]

Low temperature electron heat capacity [86P].

Ta₃B₂

Preparation [75S], crystalline structure [75S, 77G]

TaB

Preparation [75S, 77L], crystalline structure [75S, 77G], electronic structure [76S, 79P]

Structure: orthorhombic

Single crystal preparation [93O1].

lattice parameters

(in Å)

<i>a</i>	3.280(1)	93O1
<i>b</i>	3.1385(10)	
<i>c</i>	3.155(2)	

Low temperature electron heat capacity in [86P].

critical temperature of superconductivity

<i>T_c</i>	4.0 K	91F, 52M
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microhardness

<i>H_V</i>	2330...2530 kg mm ⁻²	<i>T</i> = 300 K	93O1
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Ta₅B₆

Structure: orthorhombic

Space group Cmmm

Preparation in [90B].

Preparation of single crystals by the aluminum-flux method [91O], from high-temperature metal solution [93O1].

lattice parameters

(in Å)

<i>a</i>	22.602(8)	<i>T</i> = 300 K	X-ray diffraction	90B
<i>b</i>	3.1385(7)			
<i>c</i>	3.2895(4)			

Occupancy of all Ta(1) – Ta(3) and B(1) – B(3) sites: 1.0.

Similar results of lattice parameters in [93O1].

density

<i>d</i>	13.80 g cm ⁻³	<i>T</i> = 300 K	X-ray diffraction	90B
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Ta₃B₄

Preparation [75S, 77L], crystalline structure [75S, 77G]

Structure: orthorhombic

Single crystal preparation from high-temperature metal solutions in [93O1], by the aluminum-flux method in [92O].

lattice parameters

(in Å)

<i>a</i>	3.2914(8)	<i>T</i> = 300 K	X-ray diffraction	93O1
<i>b</i>	13.994(3)			
<i>c</i>	3.1327(6)			
<i>V</i>	144.29(8) Å ³			

microhardness

<i>H_V</i>	2330...2530 kg mm ⁻²	<i>T</i> = 300 K	93O1
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TaB₂

Metallic; preparation [75S, 77L], crystalline structure [75S, 77G], electronic structure [76S, 79P], electronic transport, thermal properties [77C]

Growth and crystal data for preparation by high temperature solution growth [84L1] and references therein. Single crystal preparation from high-temperature metal solutions [93O1].

High temperature thermodynamic properties in [86B].

Structure: hexagonal

lattice parameters

<i>a</i>	3.097(1)...3.076(1) Å	for atomic ratio B/Ta = 2.0...3.0	93O2
<i>c</i>	3.242(2)...3.275(2) Å		
<i>V</i>	31.10(3)...30.99(4) Å ³		

Low temperature electron heat capacity in [86P].

A study of the thermal expansion of samples within the homogeneity ranges of NbB₂ and TaB₂ [87L].

microhardness

<i>H_V</i>	2780...2960 kg mm ⁻²	<i>T</i> = 300 K	93O1
	2950...3080 kg mm ⁻²		83N
	21.6...23.7 GN m ⁻²	<i>T</i> = 300 K	increase within the homogeneity range 84L2

thermal expansion coefficient

α	8.3(5)·10 ⁻⁶ K ⁻¹	<i>T</i> = 300...923 K	<i>c</i> axis, X-ray diffraction	88L
	6.2(5)·10 ⁻⁶ K ⁻¹		<i>a</i> axis	

Within the homogeneity range the expansion coefficients are largely independent of the composition [88L].

amorphous tantalum borides

Structure and properties of tantalum borides obtained by molten salt electrolysis [98M].

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