

**substance: boron compounds with lanthanides**  
**property: properties of ternary LnAlB<sub>4</sub> tetraborides**

### ErAlB<sub>4</sub>

Structure: orthorhombic

#### lattice parameters

(in Å)

<i>a</i>	5.8138...6.0150			94Y
<i>b</i>	10.3885...11.4314			
<i>c</i>	3.4816...3.5070			

### TmAlB<sub>4</sub>

Structure: orthorhombic

Space group: Pbam

#### lattice parameters

(in Å)

<i>a</i>	5.9175(6)	<i>T</i> = 300 K	X-ray diffraction, TmAl <sub>0.89</sub> B <sub>3.75</sub>	94O2
<i>b</i>	11.472(1)			
<i>c</i>	3.4773(3)			
<i>V</i>	236.07(3) Å <sup>3</sup>			

#### resistivity

$\rho$	3.99·10 <sup>-3</sup> Ω cm	<i>T</i> = 300 K		92O, 94O1
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#### microhardness

(in GPa)

<i>H<sub>V</sub></i>	13.1...15.9	<i>T</i> = 300 K		92O
	12.8...15.6	<i>T</i> = 300 K	load 100 g	94O2
	14.2(14)	<i>T</i> = 300 K	load 100 g	96O

### YbAlB<sub>4</sub>

Structure: orthorhombic YCrB<sub>4</sub> type

Space group: Pbam

Single crystal preparation by the aluminum-flux method [94O1].

Preparation of single crystals by the high-temperature aluminum solution method [96O].

#### lattice parameters

(in Å)

<i>a</i>	5.927(5)	<i>T</i> = 300 K	X-ray diffraction	91D
<i>b</i>	11.47(1)			
<i>c</i>	3.492(1)			
<i>a</i>	5.919(1)	<i>T</i> = 300 K		94O1
<i>b</i>	11.465(2)			
<i>c</i>	3.492(1)			
<i>V</i>	236.91(8) Å <sup>3</sup>			

<b>density</b> (in g cm <sup>-3</sup> )				
<i>d</i>	6.78(5) 6.82(3)	<i>T</i> = 300 K	pycnometric X-ray	94O1

<b>resistivity</b>				
$\rho$	0.26·10 <sup>-3</sup> Ω cm	<i>T</i> = 300 K		94O1
<b>microhardness</b> (in GPa)				
<i>H<sub>V</sub></i>	22.1(15) 26.6 14.5(14)	<i>T</i> = 300 K  <i>T</i> = 300 K		94O1 80S 96O

#### **LuAlB<sub>4</sub>**

Structure: orthorhombic

Space group: Pbam

<b>lattice parameters</b> (in Å)				
<i>a</i>	5.906(2)	<i>T</i> = 300 K	X-ray diffraction	91D
<i>b</i>	11.44(1)			
<i>c</i>	3.480(1)			
<i>a</i>	5.898(1)	<i>T</i> = 300 K	X-ray diffraction	96O
<i>b</i>	11.420(1)			
<i>c</i>	3.485(1)			
<i>V</i>	234.7 Å <sup>3</sup>			

<b>resistivity</b>				
$\rho$	86(6) μΩ cm	<i>T</i> = 300 K		96O
<b>microhardness</b>				
<i>H<sub>V</sub></i>	14.0(6) GPa	<i>T</i> = 300 K		96O

#### **(M<sub>1</sub>M<sub>2</sub>)B<sub>4</sub>**

Crystal growth and some properties of (Cr<sub>1-x</sub>Mo<sub>x</sub>)B<sub>4</sub> and (Cr<sub>1-x</sub>W<sub>x</sub>)B<sub>4</sub> using molten aluminum as solvent [99O].

#### **Gd<sub>2</sub>B<sub>5</sub>**

##### **standard enthalpy of formation**

$\Delta H_f^0$	-43.5(14) kJ/g atom	synthesis calorimetry from the elements	95M
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## References:

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