

Er₅Rh₆Sn₁₈ Structure:

A5B6C18_tI232_142_bg_dg_e2f3g-001

Cite this page as:

- H. Eckert, S. Divilov, M. J. Mehl, D. Hicks, A. C. Zettel, M. Esters, X. Campilongo, and S. Curtarolo, *The AFLOW Library of Crystallographic Prototypes: Part 4*, Comput. Mater. Sci. **240**, 112988 (2024), doi: 10.1016/j.commatsci.2024.112988.
- D. Hicks, M. J. Mehl, M. Esters, C. Osos, O. Levy, G. L. W. Hart, C. Toher, and S. Curtarolo, *The AFLOW Library of Crystallographic Prototypes: Part 3*, Comput. Mater. Sci. **199**, 110450 (2021), doi: 10.1016/j.commatsci.2021.110450.

<https://aflow.org/prototype-encyclopedia/21TS>

https://aflow.org/prototype-encyclopedia/A5B6C18_tI232_142_bg_dg_e2f3g-001

Prototype	Er ₅ Rh ₆ Sn ₁₈
AFLOW prototype label	A5B6C18_tI232_142_bg_dg_e2f3g-001
ICSD	103302
CCDC	1661249
Pearson symbol	tI232
Space group number	142
Space group symbol	$I4_1/acd$
AFLOW prototype command	<pre>aflow --proto=A5B6C18_tI232_142_bg_dg_e2f3g-001 --params=a,c/a,z2,x3,x4,x5,x6,y6,z6,x7,y7,z7,x8,y8,z8,x9,y9,z9,x10,y10,z10</pre>

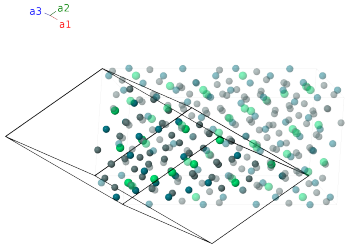
Other compounds with this structure

Lu₅Rh₆Sn₁₈, Sc₅Rh₆Sn₁₈, Y₅Rh₆Sn₁₈

- (Hodeau, 1984) found that the Er-I site is actually a mixture of erbium and tin atoms in a 2:1 ratio. The ICSD entry assumes a 1:2 ratio.

Body-centered Tetragonal primitive vectors

$$\begin{aligned} \mathbf{a}_1 &= -\frac{1}{2}a\hat{\mathbf{x}} + \frac{1}{2}a\hat{\mathbf{y}} + \frac{1}{2}c\hat{\mathbf{z}} \\ \mathbf{a}_2 &= \frac{1}{2}a\hat{\mathbf{x}} - \frac{1}{2}a\hat{\mathbf{y}} + \frac{1}{2}c\hat{\mathbf{z}} \\ \mathbf{a}_3 &= \frac{1}{2}a\hat{\mathbf{x}} + \frac{1}{2}a\hat{\mathbf{y}} - \frac{1}{2}c\hat{\mathbf{z}} \end{aligned}$$



Basis vectors

	Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B}_1$	$= \frac{3}{8}\mathbf{a}_1 + \frac{1}{8}\mathbf{a}_2 + \frac{1}{4}\mathbf{a}_3$	$=$	$\frac{1}{4}a\hat{\mathbf{y}} + \frac{1}{8}c\hat{\mathbf{z}}$	(8b)	Er I

$\mathbf{B}_2 =$	$\frac{1}{8} \mathbf{a}_1 + \frac{3}{8} \mathbf{a}_2 + \frac{3}{4} \mathbf{a}_3$	$=$	$\frac{1}{2} a \hat{\mathbf{x}} + \frac{1}{4} a \hat{\mathbf{y}} - \frac{1}{8} c \hat{\mathbf{z}}$	(8b)	Er I
$\mathbf{B}_3 =$	$\frac{5}{8} \mathbf{a}_1 + \frac{7}{8} \mathbf{a}_2 + \frac{3}{4} \mathbf{a}_3$	$=$	$\frac{1}{2} a \hat{\mathbf{x}} + \frac{1}{4} a \hat{\mathbf{y}} + \frac{3}{8} c \hat{\mathbf{z}}$	(8b)	Er I
$\mathbf{B}_4 =$	$\frac{7}{8} \mathbf{a}_1 + \frac{5}{8} \mathbf{a}_2 + \frac{1}{4} \mathbf{a}_3$	$=$	$\frac{1}{4} a \hat{\mathbf{y}} + \frac{5}{8} c \hat{\mathbf{z}}$	(8b)	Er I
$\mathbf{B}_5 =$	$(z_2 + \frac{1}{4}) \mathbf{a}_1 + z_2 \mathbf{a}_2 + \frac{1}{4} \mathbf{a}_3$	$=$	$\frac{1}{4} a \hat{\mathbf{y}} + c z_2 \hat{\mathbf{z}}$	(16d)	Rh I
$\mathbf{B}_6 =$	$z_2 \mathbf{a}_1 + (z_2 + \frac{1}{4}) \mathbf{a}_2 + \frac{3}{4} \mathbf{a}_3$	$=$	$\frac{1}{2} a \hat{\mathbf{x}} + \frac{1}{4} a \hat{\mathbf{y}} + c (z_2 - \frac{1}{4}) \hat{\mathbf{z}}$	(16d)	Rh I
$\mathbf{B}_7 =$	$-(z_2 - \frac{1}{4}) \mathbf{a}_1 - (z_2 - \frac{1}{2}) \mathbf{a}_2 + \frac{3}{4} \mathbf{a}_3$	$=$	$\frac{1}{2} a \hat{\mathbf{x}} + \frac{1}{4} a \hat{\mathbf{y}} - c z_2 \hat{\mathbf{z}}$	(16d)	Rh I
$\mathbf{B}_8 =$	$-(z_2 - \frac{1}{2}) \mathbf{a}_1 - (z_2 - \frac{1}{4}) \mathbf{a}_2 + \frac{1}{4} \mathbf{a}_3$	$=$	$\frac{1}{4} a \hat{\mathbf{y}} - c (z_2 - \frac{1}{4}) \hat{\mathbf{z}}$	(16d)	Rh I
$\mathbf{B}_9 =$	$-(z_2 - \frac{3}{4}) \mathbf{a}_1 - z_2 \mathbf{a}_2 + \frac{3}{4} \mathbf{a}_3$	$=$	$\frac{3}{4} a \hat{\mathbf{y}} - c z_2 \hat{\mathbf{z}}$	(16d)	Rh I
$\mathbf{B}_{10} =$	$-z_2 \mathbf{a}_1 - (z_2 - \frac{3}{4}) \mathbf{a}_2 + \frac{1}{4} \mathbf{a}_3$	$=$	$\frac{1}{2} a \hat{\mathbf{x}} - \frac{1}{4} a \hat{\mathbf{y}} - c (z_2 - \frac{1}{4}) \hat{\mathbf{z}}$	(16d)	Rh I
$\mathbf{B}_{11} =$	$(z_2 + \frac{3}{4}) \mathbf{a}_1 + (z_2 + \frac{1}{2}) \mathbf{a}_2 + \frac{1}{4} \mathbf{a}_3$	$=$	$\frac{1}{4} a \hat{\mathbf{y}} + c (z_2 + \frac{1}{2}) \hat{\mathbf{z}}$	(16d)	Rh I
$\mathbf{B}_{12} =$	$(z_2 + \frac{1}{2}) \mathbf{a}_1 + (z_2 + \frac{3}{4}) \mathbf{a}_2 + \frac{3}{4} \mathbf{a}_3$	$=$	$\frac{1}{2} a \hat{\mathbf{x}} + \frac{1}{4} a \hat{\mathbf{y}} + c (z_2 + \frac{1}{4}) \hat{\mathbf{z}}$	(16d)	Rh I
$\mathbf{B}_{13} =$	$\frac{1}{4} \mathbf{a}_1 + (x_3 + \frac{1}{4}) \mathbf{a}_2 + x_3 \mathbf{a}_3$	$=$	$a x_3 \hat{\mathbf{x}} + \frac{1}{4} c \hat{\mathbf{z}}$	(16e)	Sn I
$\mathbf{B}_{14} =$	$\frac{3}{4} \mathbf{a}_1 - (x_3 - \frac{1}{4}) \mathbf{a}_2 - (x_3 - \frac{1}{2}) \mathbf{a}_3$	$=$	$-a x_3 \hat{\mathbf{x}} + \frac{1}{2} a \hat{\mathbf{y}} + \frac{1}{4} c \hat{\mathbf{z}}$	(16e)	Sn I
$\mathbf{B}_{15} =$	$(x_3 + \frac{1}{4}) \mathbf{a}_1 + \frac{3}{4} \mathbf{a}_2 + x_3 \mathbf{a}_3$	$=$	$\frac{1}{4} a \hat{\mathbf{x}} + a (x_3 - \frac{1}{4}) \hat{\mathbf{y}} + \frac{1}{2} c \hat{\mathbf{z}}$	(16e)	Sn I
$\mathbf{B}_{16} =$	$-(x_3 - \frac{1}{4}) \mathbf{a}_1 + \frac{1}{4} \mathbf{a}_2 - (x_3 - \frac{1}{2}) \mathbf{a}_3$	$=$	$\frac{1}{4} a \hat{\mathbf{x}} - a (x_3 - \frac{1}{4}) \hat{\mathbf{y}}$	(16e)	Sn I
$\mathbf{B}_{17} =$	$\frac{3}{4} \mathbf{a}_1 - (x_3 - \frac{3}{4}) \mathbf{a}_2 - x_3 \mathbf{a}_3$	$=$	$-a x_3 \hat{\mathbf{x}} + \frac{3}{4} c \hat{\mathbf{z}}$	(16e)	Sn I
$\mathbf{B}_{18} =$	$\frac{1}{4} \mathbf{a}_1 + (x_3 + \frac{3}{4}) \mathbf{a}_2 + (x_3 + \frac{1}{2}) \mathbf{a}_3$	$=$	$a (x_3 + \frac{1}{2}) \hat{\mathbf{x}} + \frac{1}{4} c \hat{\mathbf{z}}$	(16e)	Sn I
$\mathbf{B}_{19} =$	$-(x_3 - \frac{3}{4}) \mathbf{a}_1 + \frac{1}{4} \mathbf{a}_2 - x_3 \mathbf{a}_3$	$=$	$-\frac{1}{4} a \hat{\mathbf{x}} - a (x_3 - \frac{1}{4}) \hat{\mathbf{y}} + \frac{1}{2} c \hat{\mathbf{z}}$	(16e)	Sn I
$\mathbf{B}_{20} =$	$(x_3 + \frac{3}{4}) \mathbf{a}_1 + \frac{3}{4} \mathbf{a}_2 + (x_3 + \frac{1}{2}) \mathbf{a}_3$	$=$	$\frac{1}{4} a \hat{\mathbf{x}} + a (x_3 + \frac{1}{4}) \hat{\mathbf{y}} + \frac{1}{2} c \hat{\mathbf{z}}$	(16e)	Sn I
$\mathbf{B}_{21} =$	$(x_4 + \frac{3}{8}) \mathbf{a}_1 + (x_4 + \frac{1}{8}) \mathbf{a}_2 + (2x_4 + \frac{1}{4}) \mathbf{a}_3$	$=$	$a x_4 \hat{\mathbf{x}} + a (x_4 + \frac{1}{4}) \hat{\mathbf{y}} + \frac{1}{8} c \hat{\mathbf{z}}$	(16f)	Sn II
$\mathbf{B}_{22} =$	$-(x_4 - \frac{3}{8}) \mathbf{a}_1 - (x_4 - \frac{1}{8}) \mathbf{a}_2 - (2x_4 - \frac{1}{4}) \mathbf{a}_3$	$=$	$-a x_4 \hat{\mathbf{x}} - a (x_4 - \frac{1}{4}) \hat{\mathbf{y}} + \frac{1}{8} c \hat{\mathbf{z}}$	(16f)	Sn II
$\mathbf{B}_{23} =$	$(x_4 + \frac{1}{8}) \mathbf{a}_1 - (x_4 - \frac{3}{8}) \mathbf{a}_2 + \frac{3}{4} \mathbf{a}_3$	$=$	$-a (x_4 - \frac{1}{2}) \hat{\mathbf{x}} + a (x_4 + \frac{1}{4}) \hat{\mathbf{y}} - \frac{1}{8} c \hat{\mathbf{z}}$	(16f)	Sn II
$\mathbf{B}_{24} =$	$-(x_4 - \frac{1}{8}) \mathbf{a}_1 + (x_4 + \frac{3}{8}) \mathbf{a}_2 + \frac{3}{4} \mathbf{a}_3$	$=$	$a (x_4 + \frac{1}{2}) \hat{\mathbf{x}} - a (x_4 - \frac{1}{4}) \hat{\mathbf{y}} - \frac{1}{8} c \hat{\mathbf{z}}$	(16f)	Sn II
$\mathbf{B}_{25} =$	$-(x_4 - \frac{5}{8}) \mathbf{a}_1 - (x_4 - \frac{7}{8}) \mathbf{a}_2 - (2x_4 - \frac{3}{4}) \mathbf{a}_3$	$=$	$-a (x_4 - \frac{1}{2}) \hat{\mathbf{x}} - a (x_4 - \frac{1}{4}) \hat{\mathbf{y}} + \frac{3}{8} c \hat{\mathbf{z}}$	(16f)	Sn II
$\mathbf{B}_{26} =$	$(x_4 + \frac{5}{8}) \mathbf{a}_1 + (x_4 + \frac{7}{8}) \mathbf{a}_2 + (2x_4 + \frac{3}{4}) \mathbf{a}_3$	$=$	$a (x_4 + \frac{1}{2}) \hat{\mathbf{x}} + a (x_4 + \frac{1}{4}) \hat{\mathbf{y}} + \frac{3}{8} c \hat{\mathbf{z}}$	(16f)	Sn II
$\mathbf{B}_{27} =$	$-(x_4 - \frac{7}{8}) \mathbf{a}_1 + (x_4 + \frac{5}{8}) \mathbf{a}_2 + \frac{1}{4} \mathbf{a}_3$	$=$	$a x_4 \hat{\mathbf{x}} - a (x_4 - \frac{1}{4}) \hat{\mathbf{y}} + \frac{5}{8} c \hat{\mathbf{z}}$	(16f)	Sn II
$\mathbf{B}_{28} =$	$(x_4 + \frac{7}{8}) \mathbf{a}_1 - (x_4 - \frac{5}{8}) \mathbf{a}_2 + \frac{1}{4} \mathbf{a}_3$	$=$	$-a x_4 \hat{\mathbf{x}} + a (x_4 + \frac{1}{4}) \hat{\mathbf{y}} + \frac{5}{8} c \hat{\mathbf{z}}$	(16f)	Sn II
$\mathbf{B}_{29} =$	$(x_5 + \frac{3}{8}) \mathbf{a}_1 + (x_5 + \frac{1}{8}) \mathbf{a}_2 + (2x_5 + \frac{1}{4}) \mathbf{a}_3$	$=$	$a x_5 \hat{\mathbf{x}} + a (x_5 + \frac{1}{4}) \hat{\mathbf{y}} + \frac{1}{8} c \hat{\mathbf{z}}$	(16f)	Sn III
$\mathbf{B}_{30} =$	$-(x_5 - \frac{3}{8}) \mathbf{a}_1 - (x_5 - \frac{1}{8}) \mathbf{a}_2 - (2x_5 - \frac{1}{4}) \mathbf{a}_3$	$=$	$-a x_5 \hat{\mathbf{x}} - a (x_5 - \frac{1}{4}) \hat{\mathbf{y}} + \frac{1}{8} c \hat{\mathbf{z}}$	(16f)	Sn III
$\mathbf{B}_{31} =$	$(x_5 + \frac{1}{8}) \mathbf{a}_1 - (x_5 - \frac{3}{8}) \mathbf{a}_2 + \frac{3}{4} \mathbf{a}_3$	$=$	$-a (x_5 - \frac{1}{2}) \hat{\mathbf{x}} + a (x_5 + \frac{1}{4}) \hat{\mathbf{y}} - \frac{1}{8} c \hat{\mathbf{z}}$	(16f)	Sn III
$\mathbf{B}_{32} =$	$-(x_5 - \frac{1}{8}) \mathbf{a}_1 + (x_5 + \frac{3}{8}) \mathbf{a}_2 + \frac{3}{4} \mathbf{a}_3$	$=$	$a (x_5 + \frac{1}{2}) \hat{\mathbf{x}} - a (x_5 - \frac{1}{4}) \hat{\mathbf{y}} - \frac{1}{8} c \hat{\mathbf{z}}$	(16f)	Sn III

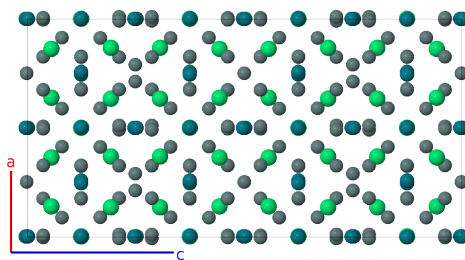
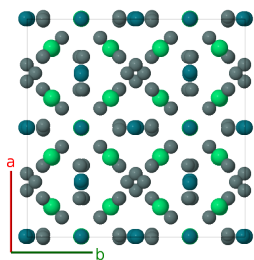
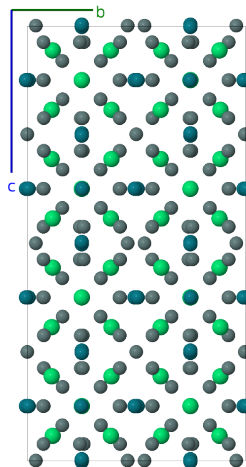
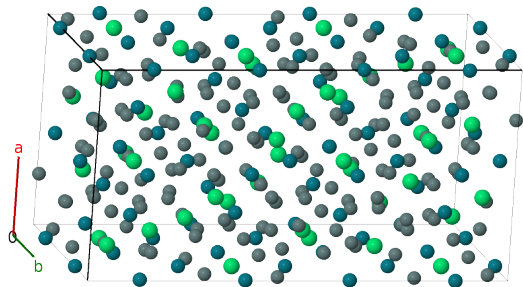
$$\begin{aligned}
\mathbf{B}_{33} &= -\left(x_5 - \frac{5}{8}\right) \mathbf{a}_1 - \left(x_5 - \frac{7}{8}\right) \mathbf{a}_2 - \left(2x_5 - \frac{3}{4}\right) \mathbf{a}_3 = -a\left(x_5 - \frac{1}{2}\right) \hat{\mathbf{x}} - a\left(x_5 - \frac{1}{4}\right) \hat{\mathbf{y}} + \frac{3}{8}c\hat{\mathbf{z}} & (16f) & \text{Sn III} \\
\mathbf{B}_{34} &= \left(x_5 + \frac{5}{8}\right) \mathbf{a}_1 + \left(x_5 + \frac{7}{8}\right) \mathbf{a}_2 + \left(2x_5 + \frac{3}{4}\right) \mathbf{a}_3 = a\left(x_5 + \frac{1}{2}\right) \hat{\mathbf{x}} + a\left(x_5 + \frac{1}{4}\right) \hat{\mathbf{y}} + \frac{3}{8}c\hat{\mathbf{z}} & (16f) & \text{Sn III} \\
\mathbf{B}_{35} &= -\left(x_5 - \frac{7}{8}\right) \mathbf{a}_1 + \left(x_5 + \frac{5}{8}\right) \mathbf{a}_2 + \frac{1}{4}\mathbf{a}_3 = ax_5\hat{\mathbf{x}} - a\left(x_5 - \frac{1}{4}\right) \hat{\mathbf{y}} + \frac{5}{8}c\hat{\mathbf{z}} & (16f) & \text{Sn III} \\
\mathbf{B}_{36} &= \left(x_5 + \frac{7}{8}\right) \mathbf{a}_1 - \left(x_5 - \frac{5}{8}\right) \mathbf{a}_2 + \frac{1}{4}\mathbf{a}_3 = -ax_5\hat{\mathbf{x}} + a\left(x_5 + \frac{1}{4}\right) \hat{\mathbf{y}} + \frac{5}{8}c\hat{\mathbf{z}} & (16f) & \text{Sn III} \\
\mathbf{B}_{37} &= (y_6 + z_6) \mathbf{a}_1 + (x_6 + z_6) \mathbf{a}_2 + (x_6 + y_6) \mathbf{a}_3 = ax_6\hat{\mathbf{x}} + ay_6\hat{\mathbf{y}} + cz_6\hat{\mathbf{z}} & (32g) & \text{Er II} \\
\mathbf{B}_{38} &= \left(-y_6 + z_6 + \frac{1}{2}\right) \mathbf{a}_1 - \left(x_6 - z_6\right) \mathbf{a}_2 - \left(x_6 + y_6 - \frac{1}{2}\right) \mathbf{a}_3 = -ax_6\hat{\mathbf{x}} - a\left(y_6 - \frac{1}{2}\right) \hat{\mathbf{y}} + cz_6\hat{\mathbf{z}} & (32g) & \text{Er II} \\
\mathbf{B}_{39} &= \left(x_6 + z_6\right) \mathbf{a}_1 + \left(-y_6 + z_6 + \frac{1}{2}\right) \mathbf{a}_2 + (x_6 - y_6) \mathbf{a}_3 = -a\left(y_6 - \frac{1}{4}\right) \hat{\mathbf{x}} + a\left(x_6 - \frac{1}{4}\right) \hat{\mathbf{y}} + c\left(z_6 + \frac{1}{4}\right) \hat{\mathbf{z}} & (32g) & \text{Er II} \\
\mathbf{B}_{40} &= -\left(x_6 - z_6\right) \mathbf{a}_1 + (y_6 + z_6) \mathbf{a}_2 + \left(-x_6 + y_6 + \frac{1}{2}\right) \mathbf{a}_3 = a\left(y_6 + \frac{1}{4}\right) \hat{\mathbf{x}} - a\left(x_6 - \frac{1}{4}\right) \hat{\mathbf{y}} + c\left(z_6 - \frac{1}{4}\right) \hat{\mathbf{z}} & (32g) & \text{Er II} \\
\mathbf{B}_{41} &= (y_6 - z_6) \mathbf{a}_1 - \left(x_6 + z_6 - \frac{1}{2}\right) \mathbf{a}_2 + \left(-x_6 + y_6 + \frac{1}{2}\right) \mathbf{a}_3 = -a\left(x_6 - \frac{1}{2}\right) \hat{\mathbf{x}} + ay_6\hat{\mathbf{y}} - cz_6\hat{\mathbf{z}} & (32g) & \text{Er II} \\
\mathbf{B}_{42} &= -\left(y_6 + z_6 - \frac{1}{2}\right) \mathbf{a}_1 + \left(x_6 - z_6 + \frac{1}{2}\right) \mathbf{a}_2 + (x_6 - y_6) \mathbf{a}_3 = ax_6\hat{\mathbf{x}} - ay_6\hat{\mathbf{y}} - c\left(z_6 - \frac{1}{2}\right) \hat{\mathbf{z}} & (32g) & \text{Er II} \\
\mathbf{B}_{43} &= \left(x_6 - z_6 + \frac{1}{2}\right) \mathbf{a}_1 + (y_6 - z_6) \mathbf{a}_2 + (x_6 + y_6) \mathbf{a}_3 = a\left(y_6 - \frac{1}{4}\right) \hat{\mathbf{x}} + a\left(x_6 + \frac{1}{4}\right) \hat{\mathbf{y}} - c\left(z_6 - \frac{1}{4}\right) \hat{\mathbf{z}} & (32g) & \text{Er II} \\
\mathbf{B}_{44} &= -\left(x_6 + z_6 - \frac{1}{2}\right) \mathbf{a}_1 - \left(y_6 + z_6 - \frac{1}{2}\right) \mathbf{a}_2 - \left(x_6 + y_6 - \frac{1}{2}\right) \mathbf{a}_3 = -a\left(y_6 - \frac{1}{4}\right) \hat{\mathbf{x}} - a\left(x_6 - \frac{1}{4}\right) \hat{\mathbf{y}} - c\left(z_6 - \frac{1}{4}\right) \hat{\mathbf{z}} & (32g) & \text{Er II} \\
\mathbf{B}_{45} &= -(y_6 + z_6) \mathbf{a}_1 - (x_6 + z_6) \mathbf{a}_2 - (x_6 + y_6) \mathbf{a}_3 = -ax_6\hat{\mathbf{x}} - ay_6\hat{\mathbf{y}} - cz_6\hat{\mathbf{z}} & (32g) & \text{Er II} \\
\mathbf{B}_{46} &= \left(y_6 - z_6 + \frac{1}{2}\right) \mathbf{a}_1 + \left(x_6 - z_6\right) \mathbf{a}_2 + \left(x_6 + y_6 + \frac{1}{2}\right) \mathbf{a}_3 = ax_6\hat{\mathbf{x}} + a\left(y_6 + \frac{1}{2}\right) \hat{\mathbf{y}} - cz_6\hat{\mathbf{z}} & (32g) & \text{Er II} \\
\mathbf{B}_{47} &= -\left(x_6 + z_6\right) \mathbf{a}_1 + \left(y_6 - z_6 + \frac{1}{2}\right) \mathbf{a}_2 - (x_6 - y_6) \mathbf{a}_3 = a\left(y_6 + \frac{1}{4}\right) \hat{\mathbf{x}} - a\left(x_6 + \frac{1}{4}\right) \hat{\mathbf{y}} - c\left(z_6 - \frac{1}{4}\right) \hat{\mathbf{z}} & (32g) & \text{Er II} \\
\mathbf{B}_{48} &= (x_6 - z_6) \mathbf{a}_1 - (y_6 + z_6) \mathbf{a}_2 + \left(x_6 - y_6 + \frac{1}{2}\right) \mathbf{a}_3 = -a\left(y_6 - \frac{1}{4}\right) \hat{\mathbf{x}} + a\left(x_6 + \frac{1}{4}\right) \hat{\mathbf{y}} - c\left(z_6 + \frac{1}{4}\right) \hat{\mathbf{z}} & (32g) & \text{Er II} \\
\mathbf{B}_{49} &= -\left(y_6 - z_6\right) \mathbf{a}_1 + \left(x_6 + z_6 + \frac{1}{2}\right) \mathbf{a}_2 + \left(x_6 - y_6 + \frac{1}{2}\right) \mathbf{a}_3 = a\left(x_6 + \frac{1}{2}\right) \hat{\mathbf{x}} - ay_6\hat{\mathbf{y}} + cz_6\hat{\mathbf{z}} & (32g) & \text{Er II} \\
\mathbf{B}_{50} &= \left(y_6 + z_6 + \frac{1}{2}\right) \mathbf{a}_1 + \left(-x_6 + z_6 + \frac{1}{2}\right) \mathbf{a}_2 - (x_6 - y_6) \mathbf{a}_3 = -ax_6\hat{\mathbf{x}} + ay_6\hat{\mathbf{y}} + c\left(z_6 + \frac{1}{2}\right) \hat{\mathbf{z}} & (32g) & \text{Er II} \\
\mathbf{B}_{51} &= \left(-x_6 + z_6 + \frac{1}{2}\right) \mathbf{a}_1 - (y_6 - z_6) \mathbf{a}_2 - (x_6 + y_6) \mathbf{a}_3 = -a\left(y_6 + \frac{1}{4}\right) \hat{\mathbf{x}} - a\left(x_6 - \frac{1}{4}\right) \hat{\mathbf{y}} + c\left(z_6 + \frac{1}{4}\right) \hat{\mathbf{z}} & (32g) & \text{Er II} \\
\mathbf{B}_{52} &= \left(x_6 + z_6 + \frac{1}{2}\right) \mathbf{a}_1 + \left(y_6 + z_6 + \frac{1}{2}\right) \mathbf{a}_2 + \left(x_6 + y_6 + \frac{1}{2}\right) \mathbf{a}_3 = a\left(y_6 + \frac{1}{4}\right) \hat{\mathbf{x}} + a\left(x_6 + \frac{1}{4}\right) \hat{\mathbf{y}} + c\left(z_6 + \frac{1}{4}\right) \hat{\mathbf{z}} & (32g) & \text{Er II} \\
\mathbf{B}_{53} &= (y_7 + z_7) \mathbf{a}_1 + (x_7 + z_7) \mathbf{a}_2 + (x_7 + y_7) \mathbf{a}_3 = ax_7\hat{\mathbf{x}} + ay_7\hat{\mathbf{y}} + cz_7\hat{\mathbf{z}} & (32g) & \text{Rh II} \\
\mathbf{B}_{54} &= \left(-y_7 + z_7 + \frac{1}{2}\right) \mathbf{a}_1 - \left(x_7 - z_7\right) \mathbf{a}_2 - \left(x_7 + y_7 - \frac{1}{2}\right) \mathbf{a}_3 = -ax_7\hat{\mathbf{x}} - a\left(y_7 - \frac{1}{2}\right) \hat{\mathbf{y}} + cz_7\hat{\mathbf{z}} & (32g) & \text{Rh II} \\
\mathbf{B}_{55} &= \left(x_7 + z_7\right) \mathbf{a}_1 + \left(-y_7 + z_7 + \frac{1}{2}\right) \mathbf{a}_2 + (x_7 - y_7) \mathbf{a}_3 = -a\left(y_7 - \frac{1}{4}\right) \hat{\mathbf{x}} + a\left(x_7 - \frac{1}{4}\right) \hat{\mathbf{y}} + c\left(z_7 + \frac{1}{4}\right) \hat{\mathbf{z}} & (32g) & \text{Rh II}
\end{aligned}$$

$$\begin{aligned}
\mathbf{B}_{56} &= -(x_7 - z_7) \mathbf{a}_1 + (y_7 + z_7) \mathbf{a}_2 + (-x_7 + y_7 + \frac{1}{2}) \mathbf{a}_3 = a(y_7 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_7 - \frac{1}{4}) \hat{\mathbf{y}} + c(z_7 - \frac{1}{4}) \hat{\mathbf{z}} & (32g) & \text{Rh II} \\
\mathbf{B}_{57} &= (y_7 - z_7) \mathbf{a}_1 - (x_7 + z_7 - \frac{1}{2}) \mathbf{a}_2 + (-x_7 + y_7 + \frac{1}{2}) \mathbf{a}_3 = -a(x_7 - \frac{1}{2}) \hat{\mathbf{x}} + ay_7 \hat{\mathbf{y}} - cz_7 \hat{\mathbf{z}} & (32g) & \text{Rh II} \\
\mathbf{B}_{58} &= -(y_7 + z_7 - \frac{1}{2}) \mathbf{a}_1 + (x_7 - z_7 + \frac{1}{2}) \mathbf{a}_2 + (x_7 - y_7) \mathbf{a}_3 = ax_7 \hat{\mathbf{x}} - ay_7 \hat{\mathbf{y}} - c(z_7 - \frac{1}{2}) \hat{\mathbf{z}} & (32g) & \text{Rh II} \\
\mathbf{B}_{59} &= (x_7 - z_7 + \frac{1}{2}) \mathbf{a}_1 + (y_7 - z_7) \mathbf{a}_2 + (x_7 + y_7) \mathbf{a}_3 = a(y_7 - \frac{1}{4}) \hat{\mathbf{x}} + a(x_7 + \frac{1}{4}) \hat{\mathbf{y}} - c(z_7 - \frac{1}{4}) \hat{\mathbf{z}} & (32g) & \text{Rh II} \\
\mathbf{B}_{60} &= -(x_7 + z_7 - \frac{1}{2}) \mathbf{a}_1 - (y_7 + z_7 - \frac{1}{2}) \mathbf{a}_2 - (x_7 + y_7 - \frac{1}{2}) \mathbf{a}_3 = -a(y_7 - \frac{1}{4}) \hat{\mathbf{x}} - a(x_7 - \frac{1}{4}) \hat{\mathbf{y}} - c(z_7 - \frac{1}{4}) \hat{\mathbf{z}} & (32g) & \text{Rh II} \\
\mathbf{B}_{61} &= -(y_7 + z_7) \mathbf{a}_1 - (x_7 + z_7) \mathbf{a}_2 - (x_7 + y_7) \mathbf{a}_3 = -ax_7 \hat{\mathbf{x}} - ay_7 \hat{\mathbf{y}} - cz_7 \hat{\mathbf{z}} & (32g) & \text{Rh II} \\
\mathbf{B}_{62} &= (y_7 - z_7 + \frac{1}{2}) \mathbf{a}_1 + (x_7 - z_7) \mathbf{a}_2 + (x_7 + y_7 + \frac{1}{2}) \mathbf{a}_3 = ax_7 \hat{\mathbf{x}} + a(y_7 + \frac{1}{2}) \hat{\mathbf{y}} - cz_7 \hat{\mathbf{z}} & (32g) & \text{Rh II} \\
\mathbf{B}_{63} &= -(x_7 + z_7) \mathbf{a}_1 + (y_7 - z_7 + \frac{1}{2}) \mathbf{a}_2 - (x_7 - y_7) \mathbf{a}_3 = a(y_7 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_7 + \frac{1}{4}) \hat{\mathbf{y}} - c(z_7 - \frac{1}{4}) \hat{\mathbf{z}} & (32g) & \text{Rh II} \\
\mathbf{B}_{64} &= (x_7 - z_7) \mathbf{a}_1 - (y_7 + z_7) \mathbf{a}_2 + (x_7 - y_7 + \frac{1}{2}) \mathbf{a}_3 = -a(y_7 - \frac{1}{4}) \hat{\mathbf{x}} + a(x_7 + \frac{1}{4}) \hat{\mathbf{y}} - c(z_7 + \frac{1}{4}) \hat{\mathbf{z}} & (32g) & \text{Rh II} \\
\mathbf{B}_{65} &= -(y_7 - z_7) \mathbf{a}_1 + (x_7 + z_7 + \frac{1}{2}) \mathbf{a}_2 + (x_7 - y_7 + \frac{1}{2}) \mathbf{a}_3 = a(x_7 + \frac{1}{2}) \hat{\mathbf{x}} - ay_7 \hat{\mathbf{y}} + cz_7 \hat{\mathbf{z}} & (32g) & \text{Rh II} \\
\mathbf{B}_{66} &= (y_7 + z_7 + \frac{1}{2}) \mathbf{a}_1 + (-x_7 + z_7 + \frac{1}{2}) \mathbf{a}_2 - (x_7 - y_7) \mathbf{a}_3 = -ax_7 \hat{\mathbf{x}} + ay_7 \hat{\mathbf{y}} + c(z_7 + \frac{1}{2}) \hat{\mathbf{z}} & (32g) & \text{Rh II} \\
\mathbf{B}_{67} &= (-x_7 + z_7 + \frac{1}{2}) \mathbf{a}_1 - (y_7 - z_7) \mathbf{a}_2 - (x_7 + y_7) \mathbf{a}_3 = -a(y_7 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_7 - \frac{1}{4}) \hat{\mathbf{y}} + c(z_7 + \frac{1}{4}) \hat{\mathbf{z}} & (32g) & \text{Rh II} \\
\mathbf{B}_{68} &= (x_7 + z_7 + \frac{1}{2}) \mathbf{a}_1 + (y_7 + z_7 + \frac{1}{2}) \mathbf{a}_2 + (x_7 + y_7 + \frac{1}{2}) \mathbf{a}_3 = a(y_7 + \frac{1}{4}) \hat{\mathbf{x}} + a(x_7 + \frac{1}{4}) \hat{\mathbf{y}} + c(z_7 + \frac{1}{4}) \hat{\mathbf{z}} & (32g) & \text{Rh II} \\
\mathbf{B}_{69} &= (y_8 + z_8) \mathbf{a}_1 + (x_8 + z_8) \mathbf{a}_2 + (x_8 + y_8) \mathbf{a}_3 = ax_8 \hat{\mathbf{x}} + ay_8 \hat{\mathbf{y}} + cz_8 \hat{\mathbf{z}} & (32g) & \text{Sn IV} \\
\mathbf{B}_{70} &= (-y_8 + z_8 + \frac{1}{2}) \mathbf{a}_1 - (x_8 - z_8) \mathbf{a}_2 - (x_8 + y_8 - \frac{1}{2}) \mathbf{a}_3 = -ax_8 \hat{\mathbf{x}} - a(y_8 - \frac{1}{2}) \hat{\mathbf{y}} + cz_8 \hat{\mathbf{z}} & (32g) & \text{Sn IV} \\
\mathbf{B}_{71} &= (x_8 + z_8) \mathbf{a}_1 + (-y_8 + z_8 + \frac{1}{2}) \mathbf{a}_2 + (x_8 - y_8) \mathbf{a}_3 = -a(y_8 - \frac{1}{4}) \hat{\mathbf{x}} + a(x_8 - \frac{1}{4}) \hat{\mathbf{y}} + c(z_8 + \frac{1}{4}) \hat{\mathbf{z}} & (32g) & \text{Sn IV} \\
\mathbf{B}_{72} &= -(x_8 - z_8) \mathbf{a}_1 + (y_8 + z_8) \mathbf{a}_2 + (-x_8 + y_8 + \frac{1}{2}) \mathbf{a}_3 = a(y_8 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_8 - \frac{1}{4}) \hat{\mathbf{y}} + c(z_8 - \frac{1}{4}) \hat{\mathbf{z}} & (32g) & \text{Sn IV} \\
\mathbf{B}_{73} &= (y_8 - z_8) \mathbf{a}_1 - (x_8 + z_8 - \frac{1}{2}) \mathbf{a}_2 + (-x_8 + y_8 + \frac{1}{2}) \mathbf{a}_3 = -a(x_8 - \frac{1}{2}) \hat{\mathbf{x}} + ay_8 \hat{\mathbf{y}} - cz_8 \hat{\mathbf{z}} & (32g) & \text{Sn IV} \\
\mathbf{B}_{74} &= -(y_8 + z_8 - \frac{1}{2}) \mathbf{a}_1 + (x_8 - z_8 + \frac{1}{2}) \mathbf{a}_2 + (x_8 - y_8) \mathbf{a}_3 = ax_8 \hat{\mathbf{x}} - ay_8 \hat{\mathbf{y}} - c(z_8 - \frac{1}{2}) \hat{\mathbf{z}} & (32g) & \text{Sn IV} \\
\mathbf{B}_{75} &= (x_8 - z_8 + \frac{1}{2}) \mathbf{a}_1 + (y_8 - z_8) \mathbf{a}_2 + (x_8 + y_8) \mathbf{a}_3 = a(y_8 - \frac{1}{4}) \hat{\mathbf{x}} + a(x_8 + \frac{1}{4}) \hat{\mathbf{y}} - c(z_8 - \frac{1}{4}) \hat{\mathbf{z}} & (32g) & \text{Sn IV} \\
\mathbf{B}_{76} &= -(x_8 + z_8 - \frac{1}{2}) \mathbf{a}_1 - (y_8 + z_8 - \frac{1}{2}) \mathbf{a}_2 - (x_8 + y_8 - \frac{1}{2}) \mathbf{a}_3 = -a(y_8 - \frac{1}{4}) \hat{\mathbf{x}} - a(x_8 - \frac{1}{4}) \hat{\mathbf{y}} - c(z_8 - \frac{1}{4}) \hat{\mathbf{z}} & (32g) & \text{Sn IV} \\
\mathbf{B}_{77} &= -(y_8 + z_8) \mathbf{a}_1 - (x_8 + z_8) \mathbf{a}_2 - (x_8 + y_8) \mathbf{a}_3 = -ax_8 \hat{\mathbf{x}} - ay_8 \hat{\mathbf{y}} - cz_8 \hat{\mathbf{z}} & (32g) & \text{Sn IV}
\end{aligned}$$

$$\begin{aligned}
\mathbf{B}_{78} &= (y_8 - z_8 + \frac{1}{2}) \mathbf{a}_1 + (x_8 - z_8) \mathbf{a}_2 + (x_8 + y_8 + \frac{1}{2}) \mathbf{a}_3 &= ax_8 \hat{\mathbf{x}} + a(y_8 + \frac{1}{2}) \hat{\mathbf{y}} - cz_8 \hat{\mathbf{z}} &(32g) &\text{Sn IV} \\
\mathbf{B}_{79} &= -(x_8 + z_8) \mathbf{a}_1 + (y_8 - z_8 + \frac{1}{2}) \mathbf{a}_2 - (x_8 - y_8) \mathbf{a}_3 &= a(y_8 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_8 + \frac{1}{4}) \hat{\mathbf{y}} - c(z_8 - \frac{1}{4}) \hat{\mathbf{z}} &(32g) &\text{Sn IV} \\
\mathbf{B}_{80} &= (x_8 - z_8) \mathbf{a}_1 - (y_8 + z_8) \mathbf{a}_2 + (x_8 - y_8 + \frac{1}{2}) \mathbf{a}_3 &= -a(y_8 - \frac{1}{4}) \hat{\mathbf{x}} + a(x_8 + \frac{1}{4}) \hat{\mathbf{y}} - c(z_8 + \frac{1}{4}) \hat{\mathbf{z}} &(32g) &\text{Sn IV} \\
\mathbf{B}_{81} &= -(y_8 - z_8) \mathbf{a}_1 + (x_8 + z_8 + \frac{1}{2}) \mathbf{a}_2 + (x_8 - y_8 + \frac{1}{2}) \mathbf{a}_3 &= a(x_8 + \frac{1}{2}) \hat{\mathbf{x}} - ay_8 \hat{\mathbf{y}} + cz_8 \hat{\mathbf{z}} &(32g) &\text{Sn IV} \\
\mathbf{B}_{82} &= (y_8 + z_8 + \frac{1}{2}) \mathbf{a}_1 + (-x_8 + z_8 + \frac{1}{2}) \mathbf{a}_2 - (x_8 - y_8) \mathbf{a}_3 &= -ax_8 \hat{\mathbf{x}} + ay_8 \hat{\mathbf{y}} + c(z_8 + \frac{1}{2}) \hat{\mathbf{z}} &(32g) &\text{Sn IV} \\
\mathbf{B}_{83} &= (-x_8 + z_8 + \frac{1}{2}) \mathbf{a}_1 - (y_8 - z_8) \mathbf{a}_2 - (x_8 + y_8) \mathbf{a}_3 &= -a(y_8 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_8 - \frac{1}{4}) \hat{\mathbf{y}} + c(z_8 + \frac{1}{4}) \hat{\mathbf{z}} &(32g) &\text{Sn IV} \\
\mathbf{B}_{84} &= (x_8 + z_8 + \frac{1}{2}) \mathbf{a}_1 + (y_8 + z_8 + \frac{1}{2}) \mathbf{a}_2 + (x_8 + y_8 + \frac{1}{2}) \mathbf{a}_3 &= a(y_8 + \frac{1}{4}) \hat{\mathbf{x}} + a(x_8 + \frac{1}{4}) \hat{\mathbf{y}} + c(z_8 + \frac{1}{4}) \hat{\mathbf{z}} &(32g) &\text{Sn IV} \\
\mathbf{B}_{85} &= (y_9 + z_9) \mathbf{a}_1 + (x_9 + z_9) \mathbf{a}_2 + (x_9 + y_9) \mathbf{a}_3 &= ax_9 \hat{\mathbf{x}} + ay_9 \hat{\mathbf{y}} + cz_9 \hat{\mathbf{z}} &(32g) &\text{Sn V} \\
\mathbf{B}_{86} &= (-y_9 + z_9 + \frac{1}{2}) \mathbf{a}_1 - (x_9 - z_9) \mathbf{a}_2 - (x_9 + y_9 - \frac{1}{2}) \mathbf{a}_3 &= -ax_9 \hat{\mathbf{x}} - a(y_9 - \frac{1}{2}) \hat{\mathbf{y}} + cz_9 \hat{\mathbf{z}} &(32g) &\text{Sn V} \\
\mathbf{B}_{87} &= (x_9 + z_9) \mathbf{a}_1 + (-y_9 + z_9 + \frac{1}{2}) \mathbf{a}_2 + (x_9 - y_9) \mathbf{a}_3 &= -a(y_9 - \frac{1}{4}) \hat{\mathbf{x}} + a(x_9 - \frac{1}{4}) \hat{\mathbf{y}} + c(z_9 + \frac{1}{4}) \hat{\mathbf{z}} &(32g) &\text{Sn V} \\
\mathbf{B}_{88} &= -(x_9 - z_9) \mathbf{a}_1 + (y_9 + z_9) \mathbf{a}_2 + (-x_9 + y_9 + \frac{1}{2}) \mathbf{a}_3 &= a(y_9 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_9 - \frac{1}{4}) \hat{\mathbf{y}} + c(z_9 - \frac{1}{4}) \hat{\mathbf{z}} &(32g) &\text{Sn V} \\
\mathbf{B}_{89} &= (y_9 - z_9) \mathbf{a}_1 - (x_9 + z_9 - \frac{1}{2}) \mathbf{a}_2 + (-x_9 + y_9 + \frac{1}{2}) \mathbf{a}_3 &= -a(x_9 - \frac{1}{2}) \hat{\mathbf{x}} + ay_9 \hat{\mathbf{y}} - cz_9 \hat{\mathbf{z}} &(32g) &\text{Sn V} \\
\mathbf{B}_{90} &= -(y_9 + z_9 - \frac{1}{2}) \mathbf{a}_1 + (x_9 - z_9 + \frac{1}{2}) \mathbf{a}_2 + (x_9 - y_9) \mathbf{a}_3 &= ax_9 \hat{\mathbf{x}} - ay_9 \hat{\mathbf{y}} - c(z_9 - \frac{1}{2}) \hat{\mathbf{z}} &(32g) &\text{Sn V} \\
\mathbf{B}_{91} &= (x_9 - z_9 + \frac{1}{2}) \mathbf{a}_1 + (y_9 - z_9) \mathbf{a}_2 + (x_9 + y_9) \mathbf{a}_3 &= a(y_9 - \frac{1}{4}) \hat{\mathbf{x}} + a(x_9 + \frac{1}{4}) \hat{\mathbf{y}} - c(z_9 - \frac{1}{4}) \hat{\mathbf{z}} &(32g) &\text{Sn V} \\
\mathbf{B}_{92} &= -(x_9 + z_9 - \frac{1}{2}) \mathbf{a}_1 - (y_9 + z_9 - \frac{1}{2}) \mathbf{a}_2 - (x_9 + y_9 - \frac{1}{2}) \mathbf{a}_3 &= -a(y_9 - \frac{1}{4}) \hat{\mathbf{x}} - a(x_9 - \frac{1}{4}) \hat{\mathbf{y}} - c(z_9 - \frac{1}{4}) \hat{\mathbf{z}} &(32g) &\text{Sn V} \\
\mathbf{B}_{93} &= -(y_9 + z_9) \mathbf{a}_1 - (x_9 + z_9) \mathbf{a}_2 - (x_9 + y_9) \mathbf{a}_3 &= -ax_9 \hat{\mathbf{x}} - ay_9 \hat{\mathbf{y}} - cz_9 \hat{\mathbf{z}} &(32g) &\text{Sn V} \\
\mathbf{B}_{94} &= (y_9 - z_9 + \frac{1}{2}) \mathbf{a}_1 + (x_9 - z_9) \mathbf{a}_2 + (x_9 + y_9 + \frac{1}{2}) \mathbf{a}_3 &= ax_9 \hat{\mathbf{x}} + a(y_9 + \frac{1}{2}) \hat{\mathbf{y}} - cz_9 \hat{\mathbf{z}} &(32g) &\text{Sn V} \\
\mathbf{B}_{95} &= -(x_9 + z_9) \mathbf{a}_1 + (y_9 - z_9 + \frac{1}{2}) \mathbf{a}_2 - (x_9 - y_9) \mathbf{a}_3 &= a(y_9 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_9 + \frac{1}{4}) \hat{\mathbf{y}} - c(z_9 - \frac{1}{4}) \hat{\mathbf{z}} &(32g) &\text{Sn V} \\
\mathbf{B}_{96} &= (x_9 - z_9) \mathbf{a}_1 - (y_9 + z_9) \mathbf{a}_2 + (x_9 - y_9 + \frac{1}{2}) \mathbf{a}_3 &= -a(y_9 - \frac{1}{4}) \hat{\mathbf{x}} + a(x_9 + \frac{1}{4}) \hat{\mathbf{y}} - c(z_9 + \frac{1}{4}) \hat{\mathbf{z}} &(32g) &\text{Sn V} \\
\mathbf{B}_{97} &= -(y_9 - z_9) \mathbf{a}_1 + (x_9 + z_9 + \frac{1}{2}) \mathbf{a}_2 + (x_9 - y_9 + \frac{1}{2}) \mathbf{a}_3 &= a(x_9 + \frac{1}{2}) \hat{\mathbf{x}} - ay_9 \hat{\mathbf{y}} + cz_9 \hat{\mathbf{z}} &(32g) &\text{Sn V} \\
\mathbf{B}_{98} &= (y_9 + z_9 + \frac{1}{2}) \mathbf{a}_1 + (-x_9 + z_9 + \frac{1}{2}) \mathbf{a}_2 - (x_9 - y_9) \mathbf{a}_3 &= -ax_9 \hat{\mathbf{x}} + ay_9 \hat{\mathbf{y}} + c(z_9 + \frac{1}{2}) \hat{\mathbf{z}} &(32g) &\text{Sn V} \\
\mathbf{B}_{99} &= (-x_9 + z_9 + \frac{1}{2}) \mathbf{a}_1 - (y_9 - z_9) \mathbf{a}_2 - (x_9 + y_9) \mathbf{a}_3 &= -a(y_9 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_9 - \frac{1}{4}) \hat{\mathbf{y}} + c(z_9 + \frac{1}{4}) \hat{\mathbf{z}} &(32g) &\text{Sn V}
\end{aligned}$$

$$\begin{aligned}
\mathbf{B}_{100} &= \begin{pmatrix} (x_9 + z_9 + \frac{1}{2}) \mathbf{a}_1 + \\ (y_9 + z_9 + \frac{1}{2}) \mathbf{a}_2 + \\ (x_9 + y_9 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a \left(y_9 + \frac{1}{4} \right) \hat{\mathbf{x}} + a \left(x_9 + \frac{1}{4} \right) \hat{\mathbf{y}} + c \left(z_9 + \frac{1}{4} \right) \hat{\mathbf{z}} & (32g) & \text{Sn V} \\
\mathbf{B}_{101} &= \begin{pmatrix} (y_{10} + z_{10}) \mathbf{a}_1 + (x_{10} + z_{10}) \mathbf{a}_2 + \\ (x_{10} + y_{10}) \mathbf{a}_3 \end{pmatrix} = ax_{10} \hat{\mathbf{x}} + ay_{10} \hat{\mathbf{y}} + cz_{10} \hat{\mathbf{z}} & (32g) & \text{Sn VI} \\
\mathbf{B}_{102} &= \begin{pmatrix} (-y_{10} + z_{10} + \frac{1}{2}) \mathbf{a}_1 - \\ (x_{10} - z_{10}) \mathbf{a}_2 - \\ (x_{10} + y_{10} - \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -ax_{10} \hat{\mathbf{x}} - a \left(y_{10} - \frac{1}{2} \right) \hat{\mathbf{y}} + cz_{10} \hat{\mathbf{z}} & (32g) & \text{Sn VI} \\
\mathbf{B}_{103} &= \begin{pmatrix} (x_{10} + z_{10}) \mathbf{a}_1 + \\ (-y_{10} + z_{10} + \frac{1}{2}) \mathbf{a}_2 + \\ (x_{10} - y_{10}) \mathbf{a}_3 \end{pmatrix} = -a \left(y_{10} - \frac{1}{4} \right) \hat{\mathbf{x}} + a \left(x_{10} - \frac{1}{4} \right) \hat{\mathbf{y}} + c \left(z_{10} + \frac{1}{4} \right) \hat{\mathbf{z}} & (32g) & \text{Sn VI} \\
\mathbf{B}_{104} &= \begin{pmatrix} -(x_{10} - z_{10}) \mathbf{a}_1 + \\ (y_{10} + z_{10}) \mathbf{a}_2 + \\ (-x_{10} + y_{10} + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a \left(y_{10} + \frac{1}{4} \right) \hat{\mathbf{x}} - a \left(x_{10} - \frac{1}{4} \right) \hat{\mathbf{y}} + c \left(z_{10} - \frac{1}{4} \right) \hat{\mathbf{z}} & (32g) & \text{Sn VI} \\
\mathbf{B}_{105} &= \begin{pmatrix} (y_{10} - z_{10}) \mathbf{a}_1 - \\ (x_{10} + z_{10} - \frac{1}{2}) \mathbf{a}_2 + \\ (-x_{10} + y_{10} + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a \left(x_{10} - \frac{1}{2} \right) \hat{\mathbf{x}} + ay_{10} \hat{\mathbf{y}} - cz_{10} \hat{\mathbf{z}} & (32g) & \text{Sn VI} \\
\mathbf{B}_{106} &= \begin{pmatrix} -(y_{10} + z_{10} - \frac{1}{2}) \mathbf{a}_1 + \\ (x_{10} - z_{10} + \frac{1}{2}) \mathbf{a}_2 + \\ (x_{10} - y_{10}) \mathbf{a}_3 \end{pmatrix} = ax_{10} \hat{\mathbf{x}} - ay_{10} \hat{\mathbf{y}} - c \left(z_{10} - \frac{1}{2} \right) \hat{\mathbf{z}} & (32g) & \text{Sn VI} \\
\mathbf{B}_{107} &= \begin{pmatrix} (x_{10} - z_{10} + \frac{1}{2}) \mathbf{a}_1 + \\ (y_{10} - z_{10}) \mathbf{a}_2 + (x_{10} + y_{10}) \mathbf{a}_3 \end{pmatrix} = a \left(y_{10} - \frac{1}{4} \right) \hat{\mathbf{x}} + a \left(x_{10} + \frac{1}{4} \right) \hat{\mathbf{y}} - c \left(z_{10} - \frac{1}{4} \right) \hat{\mathbf{z}} & (32g) & \text{Sn VI} \\
\mathbf{B}_{108} &= \begin{pmatrix} -(x_{10} + z_{10} - \frac{1}{2}) \mathbf{a}_1 - \\ (y_{10} + z_{10} - \frac{1}{2}) \mathbf{a}_2 - \\ (x_{10} + y_{10} - \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a \left(y_{10} - \frac{1}{4} \right) \hat{\mathbf{x}} - a \left(x_{10} - \frac{1}{4} \right) \hat{\mathbf{y}} - c \left(z_{10} - \frac{1}{4} \right) \hat{\mathbf{z}} & (32g) & \text{Sn VI} \\
\mathbf{B}_{109} &= \begin{pmatrix} -(y_{10} + z_{10}) \mathbf{a}_1 - \\ (x_{10} + z_{10}) \mathbf{a}_2 - (x_{10} + y_{10}) \mathbf{a}_3 \end{pmatrix} = -ax_{10} \hat{\mathbf{x}} - ay_{10} \hat{\mathbf{y}} - cz_{10} \hat{\mathbf{z}} & (32g) & \text{Sn VI} \\
\mathbf{B}_{110} &= \begin{pmatrix} (y_{10} - z_{10} + \frac{1}{2}) \mathbf{a}_1 + \\ (x_{10} - z_{10}) \mathbf{a}_2 + \\ (x_{10} + y_{10} + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = ax_{10} \hat{\mathbf{x}} + a \left(y_{10} + \frac{1}{2} \right) \hat{\mathbf{y}} - cz_{10} \hat{\mathbf{z}} & (32g) & \text{Sn VI} \\
\mathbf{B}_{111} &= \begin{pmatrix} -(x_{10} + z_{10}) \mathbf{a}_1 + \\ (y_{10} - z_{10} + \frac{1}{2}) \mathbf{a}_2 - \\ (x_{10} - y_{10}) \mathbf{a}_3 \end{pmatrix} = a \left(y_{10} + \frac{1}{4} \right) \hat{\mathbf{x}} - a \left(x_{10} + \frac{1}{4} \right) \hat{\mathbf{y}} - c \left(z_{10} - \frac{1}{4} \right) \hat{\mathbf{z}} & (32g) & \text{Sn VI} \\
\mathbf{B}_{112} &= \begin{pmatrix} (x_{10} - z_{10}) \mathbf{a}_1 - (y_{10} + z_{10}) \mathbf{a}_2 + \\ (x_{10} - y_{10} + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a \left(y_{10} - \frac{1}{4} \right) \hat{\mathbf{x}} + a \left(x_{10} + \frac{1}{4} \right) \hat{\mathbf{y}} - c \left(z_{10} + \frac{1}{4} \right) \hat{\mathbf{z}} & (32g) & \text{Sn VI} \\
\mathbf{B}_{113} &= \begin{pmatrix} -(y_{10} - z_{10}) \mathbf{a}_1 + \\ (x_{10} + z_{10} + \frac{1}{2}) \mathbf{a}_2 + \\ (x_{10} - y_{10} + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a \left(x_{10} + \frac{1}{2} \right) \hat{\mathbf{x}} - ay_{10} \hat{\mathbf{y}} + cz_{10} \hat{\mathbf{z}} & (32g) & \text{Sn VI} \\
\mathbf{B}_{114} &= \begin{pmatrix} (y_{10} + z_{10} + \frac{1}{2}) \mathbf{a}_1 + \\ (-x_{10} + z_{10} + \frac{1}{2}) \mathbf{a}_2 - \\ (x_{10} - y_{10}) \mathbf{a}_3 \end{pmatrix} = -ax_{10} \hat{\mathbf{x}} + ay_{10} \hat{\mathbf{y}} + c \left(z_{10} + \frac{1}{2} \right) \hat{\mathbf{z}} & (32g) & \text{Sn VI} \\
\mathbf{B}_{115} &= \begin{pmatrix} (-x_{10} + z_{10} + \frac{1}{2}) \mathbf{a}_1 - \\ (y_{10} - z_{10}) \mathbf{a}_2 - (x_{10} + y_{10}) \mathbf{a}_3 \end{pmatrix} = -a \left(y_{10} + \frac{1}{4} \right) \hat{\mathbf{x}} - a \left(x_{10} - \frac{1}{4} \right) \hat{\mathbf{y}} + c \left(z_{10} + \frac{1}{4} \right) \hat{\mathbf{z}} & (32g) & \text{Sn VI} \\
\mathbf{B}_{116} &= \begin{pmatrix} (x_{10} + z_{10} + \frac{1}{2}) \mathbf{a}_1 + \\ (y_{10} + z_{10} + \frac{1}{2}) \mathbf{a}_2 + \\ (x_{10} + y_{10} + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a \left(y_{10} + \frac{1}{4} \right) \hat{\mathbf{x}} + a \left(x_{10} + \frac{1}{4} \right) \hat{\mathbf{y}} + c \left(z_{10} + \frac{1}{4} \right) \hat{\mathbf{z}} & (32g) & \text{Sn VI}
\end{aligned}$$

Er
Rh
Sn



References

- [1] J. L. Hodeau, M. Marezio, and J. P. Remeika, *The structure of $[Er(1)_{1-x}, Sn(1)_x]Er(2)_4Rh_6Sn(2)_4Sn(3)_{12}Sn(4)_2$, a ternary reentrant superconductor*, Acta Crystallogr. Sect. B **40**, 26–38 (1984), doi:10.1107/S0108768184001713.

Found in

- [1] A. Ślebarski, P. Zajdel, M. M. Maśka, J. Deniszczuk, and M. Fijałkowski, *Superconductivity of $Y_5Rh_6Sn_{18}$; Coexistence of the high temperature thermal lattice relaxation process and superconductivity*, J. Alloys Compd. **819**, 152959 (2020), doi:10.1016/j.jallcom.2019.152959.

First cited in

- H. Eckert, S. Divilov, M. J. Mehl, D. Hicks, A. C. Zettel, M. Esters, X. Campilongo, and S. Curtarolo, *The AFLOW Library of Crystallographic Prototypes: Part 4*, Comput. Mater. Sci. **240**, 112988 (2024), doi: 10.1016/j.commatsci.2024.112988.