P_4Se_3 Structure: A4B3_oP112_62_8c4d_4c4d-001

This structure originally had the label `A4B3_oP112_62_8c4d_4c4d`. Calls to that address will be redirected here.

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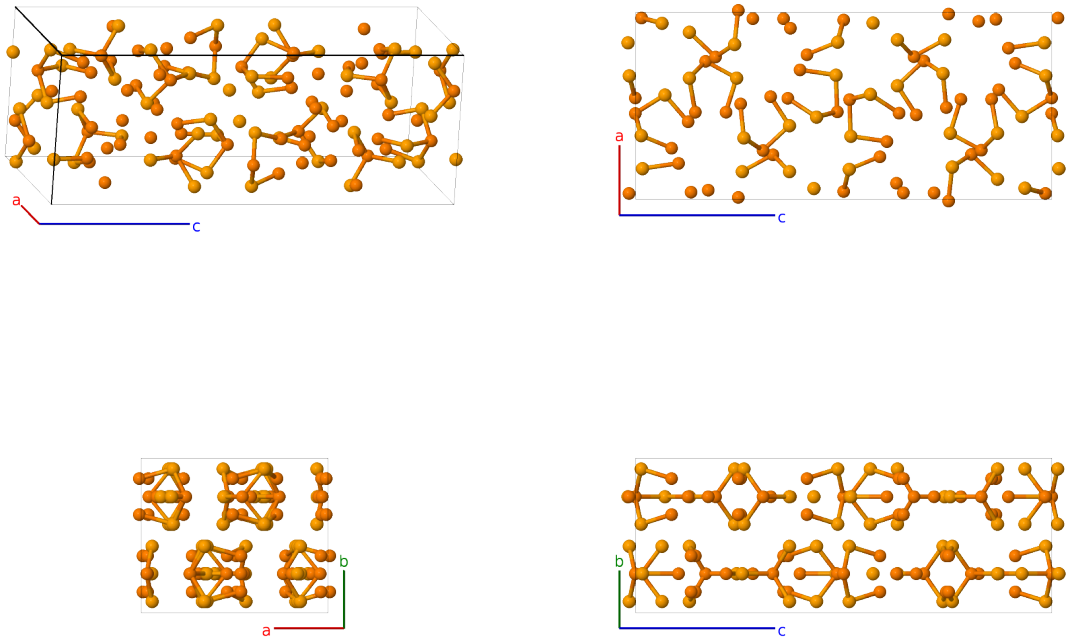
https://aflow.org/p/DMDS

https://aflow.org/p/A4B3_oP112_62_8c4d_4c4d-001

P
Se

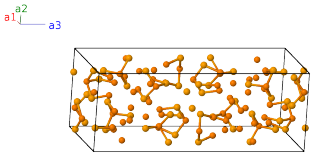


Prototype	P_4Se_3
AFLOW prototype label	A4B3_oP112_62_8c4d_4c4d-001
ICSD	26483
Pearson symbol	oP112
Space group number	62
Space group symbol	*Pnma*
AFLOW prototype command	`aflow --proto=A4B3_oP112_62_8c4d_4c4d-001 --params=`$a, b/a, c/a, x_1, z_1, x_2, z_2, x_3, z_3, x_4, z_4, x_5, z_5, x_6, z_6, x_7, z_7, x_8, z_8, x_9, z_9, x_{10}, z_{10}, x_{11}, z_{11}, x_{12}, z_{12}, x_{13}, y_{13}, z_{13}, x_{14}, y_{14}, z_{14}, x_{15}, y_{15}, z_{15}, x_{16}, y_{16}, z_{16}, x_{17}, y_{17}, z_{17}, x_{18}, y_{18}, z_{18}, x_{19}, y_{19}, z_{19}, x_{20}, y_{20}, z_{20}$

- (Keulen, 1959) give this structure in the *Pmnb* setting of space group #62. We used FINDSYM to translate this into the standard *Pnma* setting.
- The original version of this structure (Hicks, 1999) had errors in the positions of several atoms. These have now been corrected.

Simple Orthorhombic primitive vectors

$$\mathbf{a_1} = a\,\hat{\mathbf{x}}$$
$$\mathbf{a_2} = b\,\hat{\mathbf{y}}$$
$$\mathbf{a_3} = c\,\hat{\mathbf{z}}$$



Basis vectors

		Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B_1}$	=	$x_1\,\mathbf{a}_1 + \frac{1}{4}\,\mathbf{a}_2 + z_1\,\mathbf{a}_3$	=	$ax_1\,\hat{\mathbf{x}} + \frac{1}{4}b\,\hat{\mathbf{y}} + cz_1\,\hat{\mathbf{z}}$	(4c)	P I
$\mathbf{B_2}$	=	$-\left(x_1 - \frac{1}{2}\right)\,\mathbf{a}_1 + \frac{3}{4}\,\mathbf{a}_2 + \left(z_1 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-a\left(x_1 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + \frac{3}{4}b\,\hat{\mathbf{y}} + c\left(z_1 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4c)	P I
$\mathbf{B_3}$	=	$-x_1\,\mathbf{a}_1 + \frac{3}{4}\,\mathbf{a}_2 - z_1\,\mathbf{a}_3$	=	$-ax_1\,\hat{\mathbf{x}} + \frac{3}{4}b\,\hat{\mathbf{y}} - cz_1\,\hat{\mathbf{z}}$	(4c)	P I
$\mathbf{B_4}$	=	$\left(x_1 + \frac{1}{2}\right)\,\mathbf{a}_1 + \frac{1}{4}\,\mathbf{a}_2 - \left(z_1 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$a\left(x_1 + \frac{1}{2}\right)\,\hat{\mathbf{x}} + \frac{1}{4}b\,\hat{\mathbf{y}} - c\left(z_1 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4c)	P I
$\mathbf{B_5}$	=	$x_2\,\mathbf{a}_1 + \frac{1}{4}\,\mathbf{a}_2 + z_2\,\mathbf{a}_3$	=	$ax_2\,\hat{\mathbf{x}} + \frac{1}{4}b\,\hat{\mathbf{y}} + cz_2\,\hat{\mathbf{z}}$	(4c)	P II
$\mathbf{B_6}$	=	$-\left(x_2 - \frac{1}{2}\right)\,\mathbf{a}_1 + \frac{3}{4}\,\mathbf{a}_2 + \left(z_2 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-a\left(x_2 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + \frac{3}{4}b\,\hat{\mathbf{y}} + c\left(z_2 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4c)	P II
$\mathbf{B_7}$	=	$-x_2\,\mathbf{a}_1 + \frac{3}{4}\,\mathbf{a}_2 - z_2\,\mathbf{a}_3$	=	$-ax_2\,\hat{\mathbf{x}} + \frac{3}{4}b\,\hat{\mathbf{y}} - cz_2\,\hat{\mathbf{z}}$	(4c)	P II
$\mathbf{B_8}$	=	$\left(x_2 + \frac{1}{2}\right)\,\mathbf{a}_1 + \frac{1}{4}\,\mathbf{a}_2 - \left(z_2 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$a\left(x_2 + \frac{1}{2}\right)\,\hat{\mathbf{x}} + \frac{1}{4}b\,\hat{\mathbf{y}} - c\left(z_2 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4c)	P II
$\mathbf{B_9}$	=	$x_3\,\mathbf{a}_1 + \frac{1}{4}\,\mathbf{a}_2 + z_3\,\mathbf{a}_3$	=	$ax_3\,\hat{\mathbf{x}} + \frac{1}{4}b\,\hat{\mathbf{y}} + cz_3\,\hat{\mathbf{z}}$	(4c)	P III
$\mathbf{B_{10}}$	=	$-\left(x_3 - \frac{1}{2}\right)\,\mathbf{a}_1 + \frac{3}{4}\,\mathbf{a}_2 + \left(z_3 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-a\left(x_3 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + \frac{3}{4}b\,\hat{\mathbf{y}} + c\left(z_3 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4c)	P III
$\mathbf{B_{11}}$	=	$-x_3\,\mathbf{a}_1 + \frac{3}{4}\,\mathbf{a}_2 - z_3\,\mathbf{a}_3$	=	$-ax_3\,\hat{\mathbf{x}} + \frac{3}{4}b\,\hat{\mathbf{y}} - cz_3\,\hat{\mathbf{z}}$	(4c)	P III
$\mathbf{B_{12}}$	=	$\left(x_3 + \frac{1}{2}\right)\,\mathbf{a}_1 + \frac{1}{4}\,\mathbf{a}_2 - \left(z_3 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$a\left(x_3 + \frac{1}{2}\right)\,\hat{\mathbf{x}} + \frac{1}{4}b\,\hat{\mathbf{y}} - c\left(z_3 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4c)	P III
$\mathbf{B_{13}}$	=	$x_4\,\mathbf{a}_1 + \frac{1}{4}\,\mathbf{a}_2 + z_4\,\mathbf{a}_3$	=	$ax_4\,\hat{\mathbf{x}} + \frac{1}{4}b\,\hat{\mathbf{y}} + cz_4\,\hat{\mathbf{z}}$	(4c)	P IV
$\mathbf{B_{14}}$	=	$-\left(x_4 - \frac{1}{2}\right)\,\mathbf{a}_1 + \frac{3}{4}\,\mathbf{a}_2 + \left(z_4 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-a\left(x_4 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + \frac{3}{4}b\,\hat{\mathbf{y}} + c\left(z_4 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4c)	P IV
$\mathbf{B_{15}}$	=	$-x_4\,\mathbf{a}_1 + \frac{3}{4}\,\mathbf{a}_2 - z_4\,\mathbf{a}_3$	=	$-ax_4\,\hat{\mathbf{x}} + \frac{3}{4}b\,\hat{\mathbf{y}} - cz_4\,\hat{\mathbf{z}}$	(4c)	P IV
$\mathbf{B_{16}}$	=	$\left(x_4 + \frac{1}{2}\right)\,\mathbf{a}_1 + \frac{1}{4}\,\mathbf{a}_2 - \left(z_4 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$a\left(x_4 + \frac{1}{2}\right)\,\hat{\mathbf{x}} + \frac{1}{4}b\,\hat{\mathbf{y}} - c\left(z_4 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4c)	P IV
$\mathbf{B_{17}}$	=	$x_5\,\mathbf{a}_1 + \frac{1}{4}\,\mathbf{a}_2 + z_5\,\mathbf{a}_3$	=	$ax_5\,\hat{\mathbf{x}} + \frac{1}{4}b\,\hat{\mathbf{y}} + cz_5\,\hat{\mathbf{z}}$	(4c)	P V
$\mathbf{B_{18}}$	=	$-\left(x_5 - \frac{1}{2}\right)\,\mathbf{a}_1 + \frac{3}{4}\,\mathbf{a}_2 + \left(z_5 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-a\left(x_5 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + \frac{3}{4}b\,\hat{\mathbf{y}} + c\left(z_5 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4c)	P V
$\mathbf{B_{19}}$	=	$-x_5\,\mathbf{a}_1 + \frac{3}{4}\,\mathbf{a}_2 - z_5\,\mathbf{a}_3$	=	$-ax_5\,\hat{\mathbf{x}} + \frac{3}{4}b\,\hat{\mathbf{y}} - cz_5\,\hat{\mathbf{z}}$	(4c)	P V
$\mathbf{B_{20}}$	=	$\left(x_5 + \frac{1}{2}\right)\,\mathbf{a}_1 + \frac{1}{4}\,\mathbf{a}_2 - \left(z_5 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$a\left(x_5 + \frac{1}{2}\right)\,\hat{\mathbf{x}} + \frac{1}{4}b\,\hat{\mathbf{y}} - c\left(z_5 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4c)	P V
$\mathbf{B_{21}}$	=	$x_6\,\mathbf{a}_1 + \frac{1}{4}\,\mathbf{a}_2 + z_6\,\mathbf{a}_3$	=	$ax_6\,\hat{\mathbf{x}} + \frac{1}{4}b\,\hat{\mathbf{y}} + cz_6\,\hat{\mathbf{z}}$	(4c)	P VI
$\mathbf{B_{22}}$	=	$-\left(x_6 - \frac{1}{2}\right)\,\mathbf{a}_1 + \frac{3}{4}\,\mathbf{a}_2 + \left(z_6 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-a\left(x_6 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + \frac{3}{4}b\,\hat{\mathbf{y}} + c\left(z_6 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4c)	P VI
$\mathbf{B_{23}}$	=	$-x_6\,\mathbf{a}_1 + \frac{3}{4}\,\mathbf{a}_2 - z_6\,\mathbf{a}_3$	=	$-ax_6\,\hat{\mathbf{x}} + \frac{3}{4}b\,\hat{\mathbf{y}} - cz_6\,\hat{\mathbf{z}}$	(4c)	P VI

$$
\begin{array}{lcccccc}
\mathbf{B_{24}} & = & \left(x_6+\frac{1}{2}\right)\,\mathbf{a}_1+\frac{1}{4}\,\mathbf{a}_2-\left(z_6-\frac{1}{2}\right)\,\mathbf{a}_3 & = & a\left(x_6+\frac{1}{2}\right)\,\hat{\mathbf{x}}+\frac{1}{4}b\,\hat{\mathbf{y}}-c\left(z_6-\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(4c)} & \text{P VI} \\
\mathbf{B_{25}} & = & x_7\,\mathbf{a}_1+\frac{1}{4}\,\mathbf{a}_2+z_7\,\mathbf{a}_3 & = & ax_7\,\hat{\mathbf{x}}+\frac{1}{4}b\,\hat{\mathbf{y}}+cz_7\,\hat{\mathbf{z}} & \text{(4c)} & \text{P VII} \\
\mathbf{B_{26}} & = & -\left(x_7-\frac{1}{2}\right)\,\mathbf{a}_1+\frac{3}{4}\,\mathbf{a}_2+\left(z_7+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -a\left(x_7-\frac{1}{2}\right)\,\hat{\mathbf{x}}+\frac{3}{4}b\,\hat{\mathbf{y}}+c\left(z_7+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(4c)} & \text{P VII} \\
\mathbf{B_{27}} & = & -x_7\,\mathbf{a}_1+\frac{3}{4}\,\mathbf{a}_2-z_7\,\mathbf{a}_3 & = & -ax_7\,\hat{\mathbf{x}}+\frac{3}{4}b\,\hat{\mathbf{y}}-cz_7\,\hat{\mathbf{z}} & \text{(4c)} & \text{P VII} \\
\mathbf{B_{28}} & = & \left(x_7+\frac{1}{2}\right)\,\mathbf{a}_1+\frac{1}{4}\,\mathbf{a}_2-\left(z_7-\frac{1}{2}\right)\,\mathbf{a}_3 & = & a\left(x_7+\frac{1}{2}\right)\,\hat{\mathbf{x}}+\frac{1}{4}b\,\hat{\mathbf{y}}-c\left(z_7-\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(4c)} & \text{P VII} \\
\mathbf{B_{29}} & = & x_8\,\mathbf{a}_1+\frac{1}{4}\,\mathbf{a}_2+z_8\,\mathbf{a}_3 & = & ax_8\,\hat{\mathbf{x}}+\frac{1}{4}b\,\hat{\mathbf{y}}+cz_8\,\hat{\mathbf{z}} & \text{(4c)} & \text{P VIII} \\
\mathbf{B_{30}} & = & -\left(x_8-\frac{1}{2}\right)\,\mathbf{a}_1+\frac{3}{4}\,\mathbf{a}_2+\left(z_8+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -a\left(x_8-\frac{1}{2}\right)\,\hat{\mathbf{x}}+\frac{3}{4}b\,\hat{\mathbf{y}}+c\left(z_8+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(4c)} & \text{P VIII} \\
\mathbf{B_{31}} & = & -x_8\,\mathbf{a}_1+\frac{3}{4}\,\mathbf{a}_2-z_8\,\mathbf{a}_3 & = & -ax_8\,\hat{\mathbf{x}}+\frac{3}{4}b\,\hat{\mathbf{y}}-cz_8\,\hat{\mathbf{z}} & \text{(4c)} & \text{P VIII} \\
\mathbf{B_{32}} & = & \left(x_8+\frac{1}{2}\right)\,\mathbf{a}_1+\frac{1}{4}\,\mathbf{a}_2-\left(z_8-\frac{1}{2}\right)\,\mathbf{a}_3 & = & a\left(x_8+\frac{1}{2}\right)\,\hat{\mathbf{x}}+\frac{1}{4}b\,\hat{\mathbf{y}}-c\left(z_8-\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(4c)} & \text{P VIII} \\
\mathbf{B_{33}} & = & x_9\,\mathbf{a}_1+\frac{1}{4}\,\mathbf{a}_2+z_9\,\mathbf{a}_3 & = & ax_9\,\hat{\mathbf{x}}+\frac{1}{4}b\,\hat{\mathbf{y}}+cz_9\,\hat{\mathbf{z}} & \text{(4c)} & \text{Se I} \\
\mathbf{B_{34}} & = & -\left(x_9-\frac{1}{2}\right)\,\mathbf{a}_1+\frac{3}{4}\,\mathbf{a}_2+\left(z_9+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -a\left(x_9-\frac{1}{2}\right)\,\hat{\mathbf{x}}+\frac{3}{4}b\,\hat{\mathbf{y}}+c\left(z_9+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(4c)} & \text{Se I} \\
\mathbf{B_{35}} & = & -x_9\,\mathbf{a}_1+\frac{3}{4}\,\mathbf{a}_2-z_9\,\mathbf{a}_3 & = & -ax_9\,\hat{\mathbf{x}}+\frac{3}{4}b\,\hat{\mathbf{y}}-cz_9\,\hat{\mathbf{z}} & \text{(4c)} & \text{Se I} \\
\mathbf{B_{36}} & = & \left(x_9+\frac{1}{2}\right)\,\mathbf{a}_1+\frac{1}{4}\,\mathbf{a}_2-\left(z_9-\frac{1}{2}\right)\,\mathbf{a}_3 & = & a\left(x_9+\frac{1}{2}\right)\,\hat{\mathbf{x}}+\frac{1}{4}b\,\hat{\mathbf{y}}-c\left(z_9-\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(4c)} & \text{Se I} \\
\mathbf{B_{37}} & = & x_{10}\,\mathbf{a}_1+\frac{1}{4}\,\mathbf{a}_2+z_{10}\,\mathbf{a}_3 & = & ax_{10}\,\hat{\mathbf{x}}+\frac{1}{4}b\,\hat{\mathbf{y}}+cz_{10}\,\hat{\mathbf{z}} & \text{(4c)} & \text{Se II} \\
\mathbf{B_{38}} & = & -\left(x_{10}-\frac{1}{2}\right)\,\mathbf{a}_1+\frac{3}{4}\,\mathbf{a}_2+\left(z_{10}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -a\left(x_{10}-\frac{1}{2}\right)\,\hat{\mathbf{x}}+\frac{3}{4}b\,\hat{\mathbf{y}}+c\left(z_{10}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(4c)} & \text{Se II} \\
\mathbf{B_{39}} & = & -x_{10}\,\mathbf{a}_1+\frac{3}{4}\,\mathbf{a}_2-z_{10}\,\mathbf{a}_3 & = & -ax_{10}\,\hat{\mathbf{x}}+\frac{3}{4}b\,\hat{\mathbf{y}}-cz_{10}\,\hat{\mathbf{z}} & \text{(4c)} & \text{Se II} \\
\mathbf{B_{40}} & = & \left(x_{10}+\frac{1}{2}\right)\,\mathbf{a}_1+\frac{1}{4}\,\mathbf{a}_2-\left(z_{10}-\frac{1}{2}\right)\,\mathbf{a}_3 & = & a\left(x_{10}+\frac{1}{2}\right)\,\hat{\mathbf{x}}+\frac{1}{4}b\,\hat{\mathbf{y}}-c\left(z_{10}-\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(4c)} & \text{Se II} \\
\mathbf{B_{41}} & = & x_{11}\,\mathbf{a}_1+\frac{1}{4}\,\mathbf{a}_2+z_{11}\,\mathbf{a}_3 & = & ax_{11}\,\hat{\mathbf{x}}+\frac{1}{4}b\,\hat{\mathbf{y}}+cz_{11}\,\hat{\mathbf{z}} & \text{(4c)} & \text{Se III} \\
\mathbf{B_{42}} & = & -\left(x_{11}-\frac{1}{2}\right)\,\mathbf{a}_1+\frac{3}{4}\,\mathbf{a}_2+\left(z_{11}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -a\left(x_{11}-\frac{1}{2}\right)\,\hat{\mathbf{x}}+\frac{3}{4}b\,\hat{\mathbf{y}}+c\left(z_{11}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(4c)} & \text{Se III} \\
\mathbf{B_{43}} & = & -x_{11}\,\mathbf{a}_1+\frac{3}{4}\,\mathbf{a}_2-z_{11}\,\mathbf{a}_3 & = & -ax_{11}\,\hat{\mathbf{x}}+\frac{3}{4}b\,\hat{\mathbf{y}}-cz_{11}\,\hat{\mathbf{z}} & \text{(4c)} & \text{Se III} \\
\mathbf{B_{44}} & = & \left(x_{11}+\frac{1}{2}\right)\,\mathbf{a}_1+\frac{1}{4}\,\mathbf{a}_2-\left(z_{11}-\frac{1}{2}\right)\,\mathbf{a}_3 & = & a\left(x_{11}+\frac{1}{2}\right)\,\hat{\mathbf{x}}+\frac{1}{4}b\,\hat{\mathbf{y}}-c\left(z_{11}-\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(4c)} & \text{Se III} \\
\mathbf{B_{45}} & = & x_{12}\,\mathbf{a}_1+\frac{1}{4}\,\mathbf{a}_2+z_{12}\,\mathbf{a}_3 & = & ax_{12}\,\hat{\mathbf{x}}+\frac{1}{4}b\,\hat{\mathbf{y}}+cz_{12}\,\hat{\mathbf{z}} & \text{(4c)} & \text{Se IV} \\
\mathbf{B_{46}} & = & -\left(x_{12}-\frac{1}{2}\right)\,\mathbf{a}_1+\frac{3}{4}\,\mathbf{a}_2+\left(z_{12}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -a\left(x_{12}-\frac{1}{2}\right)\,\hat{\mathbf{x}}+\frac{3}{4}b\,\hat{\mathbf{y}}+c\left(z_{12}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(4c)} & \text{Se IV} \\
\mathbf{B_{47}} & = & -x_{12}\,\mathbf{a}_1+\frac{3}{4}\,\mathbf{a}_2-z_{12}\,\mathbf{a}_3 & = & -ax_{12}\,\hat{\mathbf{x}}+\frac{3}{4}b\,\hat{\mathbf{y}}-cz_{12}\,\hat{\mathbf{z}} & \text{(4c)} & \text{Se IV} \\
\mathbf{B_{48}} & = & \left(x_{12}+\frac{1}{2}\right)\,\mathbf{a}_1+\frac{1}{4}\,\mathbf{a}_2-\left(z_{12}-\frac{1}{2}\right)\,\mathbf{a}_3 & = & a\left(x_{12}+\frac{1}{2}\right)\,\hat{\mathbf{x}}+\frac{1}{4}b\,\hat{\mathbf{y}}-c\left(z_{12}-\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(4c)} & \text{Se IV} \\
\mathbf{B_{49}} & = & x_{13}\,\mathbf{a}_1+y_{13}\,\mathbf{a}_2+z_{13}\,\mathbf{a}_3 & = & ax_{13}\,\hat{\mathbf{x}}+by_{13}\,\hat{\mathbf{y}}+cz_{13}\,\hat{\mathbf{z}} & \text{(8d)} & \text{P IX} \\
\mathbf{B_{50}} & = & -\left(x_{13}-\frac{1}{2}\right)\,\mathbf{a}_1-y_{13}\,\mathbf{a}_2+\left(z_{13}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -a\left(x_{13}-\frac{1}{2}\right)\,\hat{\mathbf{x}}-by_{13}\,\hat{\mathbf{y}}+c\left(z_{13}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8d)} & \text{P IX} \\
\mathbf{B_{51}} & = & -x_{13}\,\mathbf{a}_1+\left(y_{13}+\frac{1}{2}\right)\,\mathbf{a}_2-z_{13}\,\mathbf{a}_3 & = & -ax_{13}\,\hat{\mathbf{x}}+b\left(y_{13}+\frac{1}{2}\right)\,\hat{\mathbf{y}}-cz_{13}\,\hat{\mathbf{z}} & \text{(8d)} & \text{P IX} \\
\mathbf{B_{52}} & = & \left(x_{13}+\frac{1}{2}\right)\,\mathbf{a}_1-\left(y_{13}-\frac{1}{2}\right)\,\mathbf{a}_2-\left(z_{13}-\frac{1}{2}\right)\,\mathbf{a}_3 & = & a\left(x_{13}+\frac{1}{2}\right)\,\hat{\mathbf{x}}-b\left(y_{13}-\frac{1}{2}\right)\,\hat{\mathbf{y}}-c\left(z_{13}-\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8d)} & \text{P IX} \\
\mathbf{B_{53}} & = & -x_{13}\,\mathbf{a}_1-y_{13}\,\mathbf{a}_2-z_{13}\,\mathbf{a}_3 & = & -ax_{13}\,\hat{\mathbf{x}}-by_{13}\,\hat{\mathbf{y}}-cz_{13}\,\hat{\mathbf{z}} & \text{(8d)} & \text{P IX} \\
\mathbf{B_{54}} & = & \left(x_{13}+\frac{1}{2}\right)\,\mathbf{a}_1+y_{13}\,\mathbf{a}_2-\left(z_{13}-\frac{1}{2}\right)\,\mathbf{a}_3 & = & a\left(x_{13}+\frac{1}{2}\right)\,\hat{\mathbf{x}}+by_{13}\,\hat{\mathbf{y}}-c\left(z_{13}-\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8d)} & \text{P IX} \\
\mathbf{B_{55}} & = & x_{13}\,\mathbf{a}_1-\left(y_{13}-\frac{1}{2}\right)\,\mathbf{a}_2+z_{13}\,\mathbf{a}_3 & = & ax_{13}\,\hat{\mathbf{x}}-b\left(y_{13}-\frac{1}{2}\right)\,\hat{\mathbf{y}}+cz_{13}\,\hat{\mathbf{z}} & \text{(8d)} & \text{P IX}
\end{array}
$$

$$\mathbf{B_{56}} = -\left(x_{13}-\tfrac{1}{2}\right)\mathbf{a}_1+\left(y_{13}+\tfrac{1}{2}\right)\mathbf{a}_2+\left(z_{13}+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_{13}-\tfrac{1}{2}\right)\hat{\mathbf{x}}+b\left(y_{13}+\tfrac{1}{2}\right)\hat{\mathbf{y}}+c\left(z_{13}+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8d) \quad \text{P IX}$$

$$\mathbf{B_{57}} = x_{14}\mathbf{a}_1+y_{14}\mathbf{a}_2+z_{14}\mathbf{a}_3 = ax_{14}\hat{\mathbf{x}}+by_{14}\hat{\mathbf{y}}+cz_{14}\hat{\mathbf{z}} \quad (8d) \quad \text{P X}$$

$$\mathbf{B_{58}} = -\left(x_{14}-\tfrac{1}{2}\right)\mathbf{a}_1-y_{14}\mathbf{a}_2+\left(z_{14}+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_{14}-\tfrac{1}{2}\right)\hat{\mathbf{x}}-by_{14}\hat{\mathbf{y}}+c\left(z_{14}+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8d) \quad \text{P X}$$

$$\mathbf{B_{59}} = -x_{14}\mathbf{a}_1+\left(y_{14}+\tfrac{1}{2}\right)\mathbf{a}_2-z_{14}\mathbf{a}_3 = -ax_{14}\hat{\mathbf{x}}+b\left(y_{14}+\tfrac{1}{2}\right)\hat{\mathbf{y}}-cz_{14}\hat{\mathbf{z}} \quad (8d) \quad \text{P X}$$

$$\mathbf{B_{60}} = \left(x_{14}+\tfrac{1}{2}\right)\mathbf{a}_1-\left(y_{14}-\tfrac{1}{2}\right)\mathbf{a}_2-\left(z_{14}-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_{14}+\tfrac{1}{2}\right)\hat{\mathbf{x}}-b\left(y_{14}-\tfrac{1}{2}\right)\hat{\mathbf{y}}-c\left(z_{14}-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8d) \quad \text{P X}$$

$$\mathbf{B_{61}} = -x_{14}\mathbf{a}_1-y_{14}\mathbf{a}_2-z_{14}\mathbf{a}_3 = -ax_{14}\hat{\mathbf{x}}-by_{14}\hat{\mathbf{y}}-cz_{14}\hat{\mathbf{z}} \quad (8d) \quad \text{P X}$$

$$\mathbf{B_{62}} = \left(x_{14}+\tfrac{1}{2}\right)\mathbf{a}_1+y_{14}\mathbf{a}_2-\left(z_{14}-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_{14}+\tfrac{1}{2}\right)\hat{\mathbf{x}}+by_{14}\hat{\mathbf{y}}-c\left(z_{14}-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8d) \quad \text{P X}$$

$$\mathbf{B_{63}} = x_{14}\mathbf{a}_1-\left(y_{14}-\tfrac{1}{2}\right)\mathbf{a}_2+z_{14}\mathbf{a}_3 = ax_{14}\hat{\mathbf{x}}-b\left(y_{14}-\tfrac{1}{2}\right)\hat{\mathbf{y}}+cz_{14}\hat{\mathbf{z}} \quad (8d) \quad \text{P X}$$

$$\mathbf{B_{64}} = -\left(x_{14}-\tfrac{1}{2}\right)\mathbf{a}_1+\left(y_{14}+\tfrac{1}{2}\right)\mathbf{a}_2+\left(z_{14}+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_{14}-\tfrac{1}{2}\right)\hat{\mathbf{x}}+b\left(y_{14}+\tfrac{1}{2}\right)\hat{\mathbf{y}}+c\left(z_{14}+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8d) \quad \text{P X}$$

$$\mathbf{B_{65}} = x_{15}\mathbf{a}_1+y_{15}\mathbf{a}_2+z_{15}\mathbf{a}_3 = ax_{15}\hat{\mathbf{x}}+by_{15}\hat{\mathbf{y}}+cz_{15}\hat{\mathbf{z}} \quad (8d) \quad \text{P XI}$$

$$\mathbf{B_{66}} = -\left(x_{15}-\tfrac{1}{2}\right)\mathbf{a}_1-y_{15}\mathbf{a}_2+\left(z_{15}+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_{15}-\tfrac{1}{2}\right)\hat{\mathbf{x}}-by_{15}\hat{\mathbf{y}}+c\left(z_{15}+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8d) \quad \text{P XI}$$

$$\mathbf{B_{67}} = -x_{15}\mathbf{a}_1+\left(y_{15}+\tfrac{1}{2}\right)\mathbf{a}_2-z_{15}\mathbf{a}_3 = -ax_{15}\hat{\mathbf{x}}+b\left(y_{15}+\tfrac{1}{2}\right)\hat{\mathbf{y}}-cz_{15}\hat{\mathbf{z}} \quad (8d) \quad \text{P XI}$$

$$\mathbf{B_{68}} = \left(x_{15}+\tfrac{1}{2}\right)\mathbf{a}_1-\left(y_{15}-\tfrac{1}{2}\right)\mathbf{a}_2-\left(z_{15}-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_{15}+\tfrac{1}{2}\right)\hat{\mathbf{x}}-b\left(y_{15}-\tfrac{1}{2}\right)\hat{\mathbf{y}}-c\left(z_{15}-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8d) \quad \text{P XI}$$

$$\mathbf{B_{69}} = -x_{15}\mathbf{a}_1-y_{15}\mathbf{a}_2-z_{15}\mathbf{a}_3 = -ax_{15}\hat{\mathbf{x}}-by_{15}\hat{\mathbf{y}}-cz_{15}\hat{\mathbf{z}} \quad (8d) \quad \text{P XI}$$

$$\mathbf{B_{70}} = \left(x_{15}+\tfrac{1}{2}\right)\mathbf{a}_1+y_{15}\mathbf{a}_2-\left(z_{15}-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_{15}+\tfrac{1}{2}\right)\hat{\mathbf{x}}+by_{15}\hat{\mathbf{y}}-c\left(z_{15}-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8d) \quad \text{P XI}$$

$$\mathbf{B_{71}} = x_{15}\mathbf{a}_1-\left(y_{15}-\tfrac{1}{2}\right)\mathbf{a}_2+z_{15}\mathbf{a}_3 = ax_{15}\hat{\mathbf{x}}-b\left(y_{15}-\tfrac{1}{2}\right)\hat{\mathbf{y}}+cz_{15}\hat{\mathbf{z}} \quad (8d) \quad \text{P XI}$$

$$\mathbf{B_{72}} = -\left(x_{15}-\tfrac{1}{2}\right)\mathbf{a}_1+\left(y_{15}+\tfrac{1}{2}\right)\mathbf{a}_2+\left(z_{15}+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_{15}-\tfrac{1}{2}\right)\hat{\mathbf{x}}+b\left(y_{15}+\tfrac{1}{2}\right)\hat{\mathbf{y}}+c\left(z_{15}+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8d) \quad \text{P XI}$$

$$\mathbf{B_{73}} = x_{16}\mathbf{a}_1+y_{16}\mathbf{a}_2+z_{16}\mathbf{a}_3 = ax_{16}\hat{\mathbf{x}}+by_{16}\hat{\mathbf{y}}+cz_{16}\hat{\mathbf{z}} \quad (8d) \quad \text{P XII}$$

$$\mathbf{B_{74}} = -\left(x_{16}-\tfrac{1}{2}\right)\mathbf{a}_1-y_{16}\mathbf{a}_2+\left(z_{16}+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_{16}-\tfrac{1}{2}\right)\hat{\mathbf{x}}-by_{16}\hat{\mathbf{y}}+c\left(z_{16}+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8d) \quad \text{P XII}$$

$$\mathbf{B_{75}} = -x_{16}\mathbf{a}_1+\left(y_{16}+\tfrac{1}{2}\right)\mathbf{a}_2-z_{16}\mathbf{a}_3 = -ax_{16}\hat{\mathbf{x}}+b\left(y_{16}+\tfrac{1}{2}\right)\hat{\mathbf{y}}-cz_{16}\hat{\mathbf{z}} \quad (8d) \quad \text{P XII}$$

$$\mathbf{B_{76}} = \left(x_{16}+\tfrac{1}{2}\right)\mathbf{a}_1-\left(y_{16}-\tfrac{1}{2}\right)\mathbf{a}_2-\left(z_{16}-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_{16}+\tfrac{1}{2}\right)\hat{\mathbf{x}}-b\left(y_{16}-\tfrac{1}{2}\right)\hat{\mathbf{y}}-c\left(z_{16}-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8d) \quad \text{P XII}$$

$$\mathbf{B_{77}} = -x_{16}\mathbf{a}_1-y_{16}\mathbf{a}_2-z_{16}\mathbf{a}_3 = -ax_{16}\hat{\mathbf{x}}-by_{16}\hat{\mathbf{y}}-cz_{16}\hat{\mathbf{z}} \quad (8d) \quad \text{P XII}$$

$$\mathbf{B_{78}} = \left(x_{16}+\tfrac{1}{2}\right)\mathbf{a}_1+y_{16}\mathbf{a}_2-\left(z_{16}-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_{16}+\tfrac{1}{2}\right)\hat{\mathbf{x}}+by_{16}\hat{\mathbf{y}}-c\left(z_{16}-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8d) \quad \text{P XII}$$

$$\mathbf{B_{79}} = x_{16}\mathbf{a}_1-\left(y_{16}-\tfrac{1}{2}\right)\mathbf{a}_2+z_{16}\mathbf{a}_3 = ax_{16}\hat{\mathbf{x}}-b\left(y_{16}-\tfrac{1}{2}\right)\hat{\mathbf{y}}+cz_{16}\hat{\mathbf{z}} \quad (8d) \quad \text{P XII}$$

$$\mathbf{B_{80}} = -\left(x_{16}-\tfrac{1}{2}\right)\mathbf{a}_1+\left(y_{16}+\tfrac{1}{2}\right)\mathbf{a}_2+\left(z_{16}+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_{16}-\tfrac{1}{2}\right)\hat{\mathbf{x}}+b\left(y_{16}+\tfrac{1}{2}\right)\hat{\mathbf{y}}+c\left(z_{16}+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8d) \quad \text{P XII}$$

$$\mathbf{B_{81}} = x_{17}\mathbf{a}_1+y_{17}\mathbf{a}_2+z_{17}\mathbf{a}_3 = ax_{17}\hat{\mathbf{x}}+by_{17}\hat{\mathbf{y}}+cz_{17}\hat{\mathbf{z}} \quad (8d) \quad \text{Se V}$$

$$\mathbf{B_{82}} = -\left(x_{17}-\tfrac{1}{2}\right)\mathbf{a}_1-y_{17}\mathbf{a}_2+\left(z_{17}+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_{17}-\tfrac{1}{2}\right)\hat{\mathbf{x}}-by_{17}\hat{\mathbf{y}}+c\left(z_{17}+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8d) \quad \text{Se V}$$

$$\mathbf{B_{83}} = -x_{17}\mathbf{a}_1+\left(y_{17}+\tfrac{1}{2}\right)\mathbf{a}_2-z_{17}\mathbf{a}_3 = -ax_{17}\hat{\mathbf{x}}+b\left(y_{17}+\tfrac{1}{2}\right)\hat{\mathbf{y}}-cz_{17}\hat{\mathbf{z}} \quad (8d) \quad \text{Se V}$$

$$\mathbf{B_{84}} = \left(x_{17}+\tfrac{1}{2}\right)\mathbf{a}_1-\left(y_{17}-\tfrac{1}{2}\right)\mathbf{a}_2-\left(z_{17}-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_{17}+\tfrac{1}{2}\right)\hat{\mathbf{x}}-b\left(y_{17}-\tfrac{1}{2}\right)\hat{\mathbf{y}}-c\left(z_{17}-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8d) \quad \text{Se V}$$

$$\mathbf{B_{85}} = -x_{17}\mathbf{a}_1-y_{17}\mathbf{a}_2-z_{17}\mathbf{a}_3 = -ax_{17}\hat{\mathbf{x}}-by_{17}\hat{\mathbf{y}}-cz_{17}\hat{\mathbf{z}} \quad (8d) \quad \text{Se V}$$

$$\mathbf{B_{86}} = \left(x_{17}+\tfrac{1}{2}\right)\mathbf{a}_1 + y_{17}\,\mathbf{a}_2 - \left(z_{17}-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_{17}+\tfrac{1}{2}\right)\hat{\mathbf{x}} + by_{17}\,\hat{\mathbf{y}} - c\left(z_{17}-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se V}$$

$$\mathbf{B_{87}} = x_{17}\,\mathbf{a}_1 - \left(y_{17}-\tfrac{1}{2}\right)\mathbf{a}_2 + z_{17}\,\mathbf{a}_3 = ax_{17}\,\hat{\mathbf{x}} - b\left(y_{17}-\tfrac{1}{2}\right)\hat{\mathbf{y}} + cz_{17}\,\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se V}$$

$$\mathbf{B_{88}} = -\left(x_{17}-\tfrac{1}{2}\right)\mathbf{a}_1 + \left(y_{17}+\tfrac{1}{2}\right)\mathbf{a}_2 + \left(z_{17}+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_{17}-\tfrac{1}{2}\right)\hat{\mathbf{x}} + b\left(y_{17}+\tfrac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_{17}+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se V}$$

$$\mathbf{B_{89}} = x_{18}\,\mathbf{a}_1 + y_{18}\,\mathbf{a}_2 + z_{18}\,\mathbf{a}_3 = ax_{18}\,\hat{\mathbf{x}} + by_{18}\,\hat{\mathbf{y}} + cz_{18}\,\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VI}$$

$$\mathbf{B_{90}} = -\left(x_{18}-\tfrac{1}{2}\right)\mathbf{a}_1 - y_{18}\,\mathbf{a}_2 + \left(z_{18}+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_{18}-\tfrac{1}{2}\right)\hat{\mathbf{x}} - by_{18}\,\hat{\mathbf{y}} + c\left(z_{18}+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VI}$$

$$\mathbf{B_{91}} = -x_{18}\,\mathbf{a}_1 + \left(y_{18}+\tfrac{1}{2}\right)\mathbf{a}_2 - z_{18}\,\mathbf{a}_3 = -ax_{18}\,\hat{\mathbf{x}} + b\left(y_{18}+\tfrac{1}{2}\right)\hat{\mathbf{y}} - cz_{18}\,\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VI}$$

$$\mathbf{B_{92}} = \left(x_{18}+\tfrac{1}{2}\right)\mathbf{a}_1 - \left(y_{18}-\tfrac{1}{2}\right)\mathbf{a}_2 - \left(z_{18}-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_{18}+\tfrac{1}{2}\right)\hat{\mathbf{x}} - b\left(y_{18}-\tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_{18}-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VI}$$

$$\mathbf{B_{93}} = -x_{18}\,\mathbf{a}_1 - y_{18}\,\mathbf{a}_2 - z_{18}\,\mathbf{a}_3 = -ax_{18}\,\hat{\mathbf{x}} - by_{18}\,\hat{\mathbf{y}} - cz_{18}\,\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VI}$$

$$\mathbf{B_{94}} = \left(x_{18}+\tfrac{1}{2}\right)\mathbf{a}_1 + y_{18}\,\mathbf{a}_2 - \left(z_{18}-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_{18}+\tfrac{1}{2}\right)\hat{\mathbf{x}} + by_{18}\,\hat{\mathbf{y}} - c\left(z_{18}-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VI}$$

$$\mathbf{B_{95}} = x_{18}\,\mathbf{a}_1 - \left(y_{18}-\tfrac{1}{2}\right)\mathbf{a}_2 + z_{18}\,\mathbf{a}_3 = ax_{18}\,\hat{\mathbf{x}} - b\left(y_{18}-\tfrac{1}{2}\right)\hat{\mathbf{y}} + cz_{18}\,\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VI}$$

$$\mathbf{B_{96}} = -\left(x_{18}-\tfrac{1}{2}\right)\mathbf{a}_1 + \left(y_{18}+\tfrac{1}{2}\right)\mathbf{a}_2 + \left(z_{18}+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_{18}-\tfrac{1}{2}\right)\hat{\mathbf{x}} + b\left(y_{18}+\tfrac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_{18}+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VI}$$

$$\mathbf{B_{97}} = x_{19}\,\mathbf{a}_1 + y_{19}\,\mathbf{a}_2 + z_{19}\,\mathbf{a}_3 = ax_{19}\,\hat{\mathbf{x}} + by_{19}\,\hat{\mathbf{y}} + cz_{19}\,\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VII}$$

$$\mathbf{B_{98}} = -\left(x_{19}-\tfrac{1}{2}\right)\mathbf{a}_1 - y_{19}\,\mathbf{a}_2 + \left(z_{19}+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_{19}-\tfrac{1}{2}\right)\hat{\mathbf{x}} - by_{19}\,\hat{\mathbf{y}} + c\left(z_{19}+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VII}$$

$$\mathbf{B_{99}} = -x_{19}\,\mathbf{a}_1 + \left(y_{19}+\tfrac{1}{2}\right)\mathbf{a}_2 - z_{19}\,\mathbf{a}_3 = -ax_{19}\,\hat{\mathbf{x}} + b\left(y_{19}+\tfrac{1}{2}\right)\hat{\mathbf{y}} - cz_{19}\,\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VII}$$

$$\mathbf{B_{100}} = \left(x_{19}+\tfrac{1}{2}\right)\mathbf{a}_1 - \left(y_{19}-\tfrac{1}{2}\right)\mathbf{a}_2 - \left(z_{19}-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_{19}+\tfrac{1}{2}\right)\hat{\mathbf{x}} - b\left(y_{19}-\tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_{19}-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VII}$$

$$\mathbf{B_{101}} = -x_{19}\,\mathbf{a}_1 - y_{19}\,\mathbf{a}_2 - z_{19}\,\mathbf{a}_3 = -ax_{19}\,\hat{\mathbf{x}} - by_{19}\,\hat{\mathbf{y}} - cz_{19}\,\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VII}$$

$$\mathbf{B_{102}} = \left(x_{19}+\tfrac{1}{2}\right)\mathbf{a}_1 + y_{19}\,\mathbf{a}_2 - \left(z_{19}-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_{19}+\tfrac{1}{2}\right)\hat{\mathbf{x}} + by_{19}\,\hat{\mathbf{y}} - c\left(z_{19}-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VII}$$

$$\mathbf{B_{103}} = x_{19}\,\mathbf{a}_1 - \left(y_{19}-\tfrac{1}{2}\right)\mathbf{a}_2 + z_{19}\,\mathbf{a}_3 = ax_{19}\,\hat{\mathbf{x}} - b\left(y_{19}-\tfrac{1}{2}\right)\hat{\mathbf{y}} + cz_{19}\,\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VII}$$

$$\mathbf{B_{104}} = -\left(x_{19}-\tfrac{1}{2}\right)\mathbf{a}_1 + \left(y_{19}+\tfrac{1}{2}\right)\mathbf{a}_2 + \left(z_{19}+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_{19}-\tfrac{1}{2}\right)\hat{\mathbf{x}} + b\left(y_{19}+\tfrac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_{19}+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VII}$$

$$\mathbf{B_{105}} = x_{20}\,\mathbf{a}_1 + y_{20}\,\mathbf{a}_2 + z_{20}\,\mathbf{a}_3 = ax_{20}\,\hat{\mathbf{x}} + by_{20}\,\hat{\mathbf{y}} + cz_{20}\,\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VIII}$$

$$\mathbf{B_{106}} = -\left(x_{20}-\tfrac{1}{2}\right)\mathbf{a}_1 - y_{20}\,\mathbf{a}_2 + \left(z_{20}+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_{20}-\tfrac{1}{2}\right)\hat{\mathbf{x}} - by_{20}\,\hat{\mathbf{y}} + c\left(z_{20}+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VIII}$$

$$\mathbf{B_{107}} = -x_{20}\,\mathbf{a}_1 + \left(y_{20}+\tfrac{1}{2}\right)\mathbf{a}_2 - z_{20}\,\mathbf{a}_3 = -ax_{20}\,\hat{\mathbf{x}} + b\left(y_{20}+\tfrac{1}{2}\right)\hat{\mathbf{y}} - cz_{20}\,\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VIII}$$

$$\mathbf{B_{108}} = \left(x_{20}+\tfrac{1}{2}\right)\mathbf{a}_1 - \left(y_{20}-\tfrac{1}{2}\right)\mathbf{a}_2 - \left(z_{20}-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_{20}+\tfrac{1}{2}\right)\hat{\mathbf{x}} - b\left(y_{20}-\tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_{20}-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VIII}$$

$$\mathbf{B_{109}} = -x_{20}\,\mathbf{a}_1 - y_{20}\,\mathbf{a}_2 - z_{20}\,\mathbf{a}_3 = -ax_{20}\,\hat{\mathbf{x}} - by_{20}\,\hat{\mathbf{y}} - cz_{20}\,\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VIII}$$

$$\mathbf{B_{110}} = \left(x_{20}+\tfrac{1}{2}\right)\mathbf{a}_1 + y_{20}\,\mathbf{a}_2 - \left(z_{20}-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_{20}+\tfrac{1}{2}\right)\hat{\mathbf{x}} + by_{20}\,\hat{\mathbf{y}} - c\left(z_{20}-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VIII}$$

$$\mathbf{B_{111}} = x_{20}\,\mathbf{a}_1 - \left(y_{20}-\tfrac{1}{2}\right)\mathbf{a}_2 + z_{20}\,\mathbf{a}_3 = ax_{20}\,\hat{\mathbf{x}} - b\left(y_{20}-\tfrac{1}{2}\right)\hat{\mathbf{y}} + cz_{20}\,\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VIII}$$

$$\mathbf{B_{112}} = -\left(x_{20}-\tfrac{1}{2}\right)\mathbf{a}_1 + \left(y_{20}+\tfrac{1}{2}\right)\mathbf{a}_2 + \left(z_{20}+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_{20}-\tfrac{1}{2}\right)\hat{\mathbf{x}} + b\left(y_{20}+\tfrac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_{20}+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad \text{(8d)} \quad \text{Se VIII}$$

References

[1] E. Keulen and A. Vos, *The Crystal Structure of P_4Se_3*, Acta Cryst. **12**, 323–329 (1959), doi:10.1107/S0365110X59000950.

[2] D. Hicks, M. J.Mehl, M. Esters, C. Oses, 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.