$Ba_{19}Li_{44}$ Structure: A19B44_tI252_122_ac4e_2d10e-001

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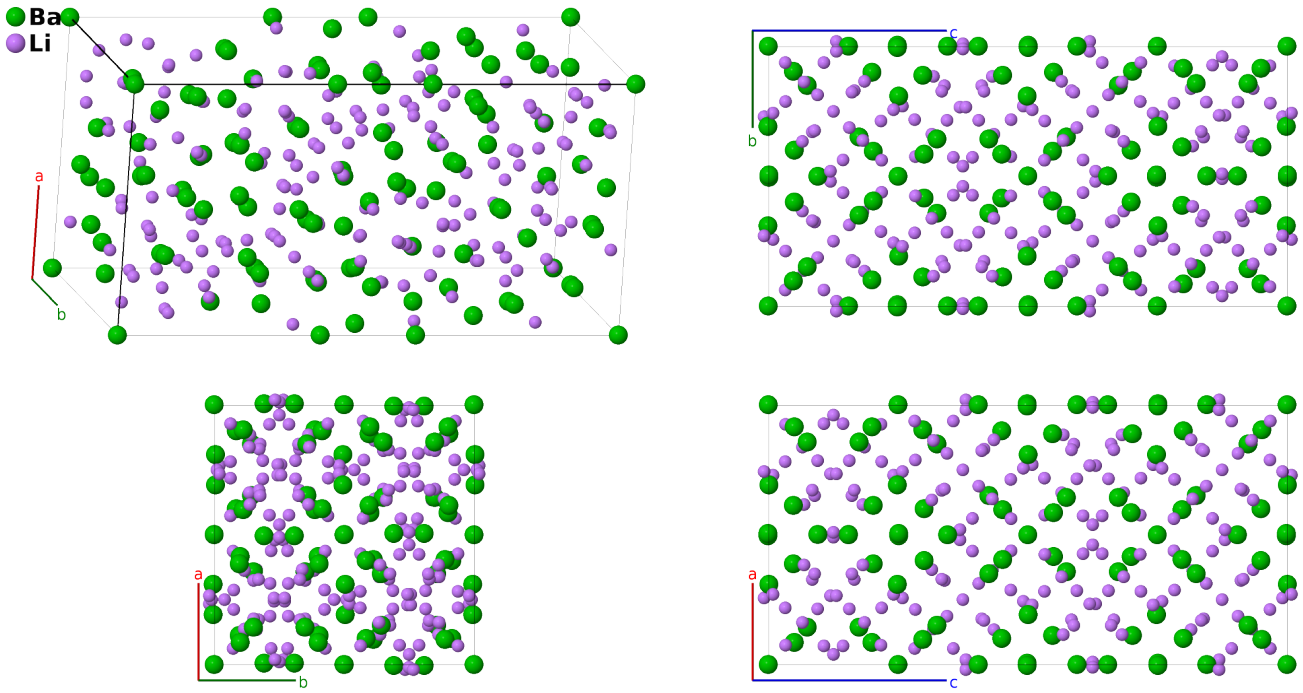
https://aflow.org/p/HB2V

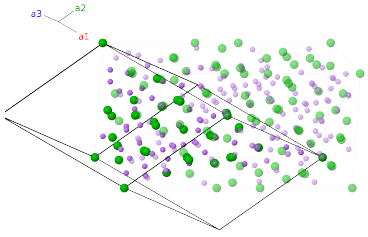
https://aflow.org/p/A19B44_tI252_122_ac4e_2d10e-001



Prototype	$Ba_{19}Li_{44}$
AFLOW prototype label	A19B44_tI252_122_ac4e_2d10e-001
ICSD	249574
Pearson symbol	tI252
Space group number	122
Space group symbol	$I\bar{4}2d$
AFLOW prototype command	`aflow --proto=A19B44_tI252_122_ac4e_2d10e-001 --params=`$a, c/a, z_2, x_3, x_4, x_5, y_5, z_5, x_6, y_6, z_6, x_7, y_7, z_7, x_8, y_8, z_8, x_9, y_9, z_9, x_{10}, y_{10}, z_{10}, x_{11}, y_{11}, z_{11}, x_{12}, y_{12}, z_{12}, x_{13}, y_{13}, z_{13}, x_{14}, y_{14}, z_{14}, x_{15}, y_{15}, z_{15}, x_{16}, y_{16}, z_{16}, x_{17}, y_{17}, z_{17}, x_{18}, y_{18}, z_{18}$

Body-centered Tetragonal primitive vectors

$$\mathbf{a_1} = -\frac{1}{2}a\,\hat{\mathbf{x}} + \frac{1}{2}a\,\hat{\mathbf{y}} + \frac{1}{2}c\,\hat{\mathbf{z}}$$
$$\mathbf{a_2} = \frac{1}{2}a\,\hat{\mathbf{x}} - \frac{1}{2}a\,\hat{\mathbf{y}} + \frac{1}{2}c\,\hat{\mathbf{z}}$$
$$\mathbf{a_3} = \frac{1}{2}a\,\hat{\mathbf{x}} + \frac{1}{2}a\,\hat{\mathbf{y}} - \frac{1}{2}c\,\hat{\mathbf{z}}$$



Basis vectors

		Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B_1}$	=	0	=	0	(4a)	Ba I
$\mathbf{B_2}$	=	$\frac{3}{4}\,\mathbf{a}_1 + \frac{1}{4}\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{y}} + \frac{1}{4}c\,\hat{\mathbf{z}}$	(4a)	Ba I
$\mathbf{B_3}$	=	$z_2\,\mathbf{a}_1 + z_2\,\mathbf{a}_2$	=	$cz_2\,\hat{\mathbf{z}}$	(8c)	Ba II
$\mathbf{B_4}$	=	$-z_2\,\mathbf{a}_1 - z_2\,\mathbf{a}_2$	=	$-cz_2\,\hat{\mathbf{z}}$	(8c)	Ba II
$\mathbf{B_5}$	=	$-\left(z_2 - \frac{3}{4}\right)\,\mathbf{a}_1 - \left(z_2 - \frac{1}{4}\right)\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{y}} - c\left(z_2 - \frac{1}{4}\right)\,\hat{\mathbf{z}}$	(8c)	Ba II
$\mathbf{B_6}$	=	$\left(z_2 + \frac{3}{4}\right)\,\mathbf{a}_1 + \left(z_2 + \frac{1}{4}\right)\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{y}} + c\left(z_2 + \frac{1}{4}\right)\,\hat{\mathbf{z}}$	(8c)	Ba II
$\mathbf{B_7}$	=	$\frac{3}{8}\,\mathbf{a}_1 + \left(x_3 + \frac{1}{8}\right)\,\mathbf{a}_2 + \left(x_3 + \frac{1}{4}\right)\,\mathbf{a}_3$	=	$ax_3\,\hat{\mathbf{x}} + \frac{1}{4}a\,\hat{\mathbf{y}} + \frac{1}{8}c\,\hat{\mathbf{z}}$	(8d)	Li I
$\mathbf{B_8}$	=	$\frac{7}{8}\,\mathbf{a}_1 - \left(x_3 - \frac{1}{8}\right)\,\mathbf{a}_2 - \left(x_3 - \frac{3}{4}\right)\,\mathbf{a}_3$	=	$-ax_3\,\hat{\mathbf{x}} + \frac{3}{4}a\,\hat{\mathbf{y}} + \frac{1}{8}c\,\hat{\mathbf{z}}$	(8d)	Li I
$\mathbf{B_9}$	=	$-\left(x_3 - \frac{7}{8}\right)\,\mathbf{a}_1 + \frac{1}{8}\,\mathbf{a}_2 - \left(x_3 - \frac{1}{4}\right)\,\mathbf{a}_3$	=	$-\frac{1}{4}a\,\hat{\mathbf{x}} - a\left(x_3 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + \frac{3}{8}c\,\hat{\mathbf{z}}$	(8d)	Li I
$\mathbf{B_{10}}$	=	$\left(x_3 + \frac{7}{8}\right)\,\mathbf{a}_1 + \frac{5}{8}\,\mathbf{a}_2 + \left(x_3 + \frac{3}{4}\right)\,\mathbf{a}_3$	=	$\frac{1}{4}a\,\hat{\mathbf{x}} + a\left(x_3 + \frac{1}{2}\right)\,\hat{\mathbf{y}} + \frac{3}{8}c\,\hat{\mathbf{z}}$	(8d)	Li I
$\mathbf{B_{11}}$	=	$\frac{3}{8}\,\mathbf{a}_1 + \left(x_4 + \frac{1}{8}\right)\,\mathbf{a}_2 + \left(x_4 + \frac{1}{4}\right)\,\mathbf{a}_3$	=	$ax_4\,\hat{\mathbf{x}} + \frac{1}{4}a\,\hat{\mathbf{y}} + \frac{1}{8}c\,\hat{\mathbf{z}}$	(8d)	Li II
$\mathbf{B_{12}}$	=	$\frac{7}{8}\,\mathbf{a}_1 - \left(x_4 - \frac{1}{8}\right)\,\mathbf{a}_2 - \left(x_4 - \frac{3}{4}\right)\,\mathbf{a}_3$	=	$-ax_4\,\hat{\mathbf{x}} + \frac{3}{4}a\,\hat{\mathbf{y}} + \frac{1}{8}c\,\hat{\mathbf{z}}$	(8d)	Li II
$\mathbf{B_{13}}$	=	$-\left(x_4 - \frac{7}{8}\right)\,\mathbf{a}_1 + \frac{1}{8}\,\mathbf{a}_2 - \left(x_4 - \frac{1}{4}\right)\,\mathbf{a}_3$	=	$-\frac{1}{4}a\,\hat{\mathbf{x}} - a\left(x_4 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + \frac{3}{8}c\,\hat{\mathbf{z}}$	(8d)	Li II
$\mathbf{B_{14}}$	=	$\left(x_4 + \frac{7}{8}\right)\,\mathbf{a}_1 + \frac{5}{8}\,\mathbf{a}_2 + \left(x_4 + \frac{3}{4}\right)\,\mathbf{a}_3$	=	$\frac{1}{4}a\,\hat{\mathbf{x}} + a\left(x_4 + \frac{1}{2}\right)\,\hat{\mathbf{y}} + \frac{3}{8}c\,\hat{\mathbf{z}}$	(8d)	Li II
$\mathbf{B_{15}}$	=	$(y_5 + z_5)\,\mathbf{a}_1 + (x_5 + z_5)\,\mathbf{a}_2 + (x_5 + y_5)\,\mathbf{a}_3$	=	$ax_5\,\hat{\mathbf{x}} + ay_5\,\hat{\mathbf{y}} + cz_5\,\hat{\mathbf{z}}$	(16e)	Ba III
$\mathbf{B_{16}}$	=	$-(y_5 - z_5)\,\mathbf{a}_1 - (x_5 - z_5)\,\mathbf{a}_2 - (x_5 + y_5)\,\mathbf{a}_3$	=	$-ax_5\,\hat{\mathbf{x}} - ay_5\,\hat{\mathbf{y}} + cz_5\,\hat{\mathbf{z}}$	(16e)	Ba III
$\mathbf{B_{17}}$	=	$-(x_5 + z_5)\,\mathbf{a}_1 + (y_5 - z_5)\,\mathbf{a}_2 - (x_5 - y_5)\,\mathbf{a}_3$	=	$ay_5\,\hat{\mathbf{x}} - ax_5\,\hat{\mathbf{y}} - cz_5\,\hat{\mathbf{z}}$	(16e)	Ba III
$\mathbf{B_{18}}$	=	$(x_5 - z_5)\,\mathbf{a}_1 - (y_5 + z_5)\,\mathbf{a}_2 + (x_5 - y_5)\,\mathbf{a}_3$	=	$-ay_5\,\hat{\mathbf{x}} + ax_5\,\hat{\mathbf{y}} - cz_5\,\hat{\mathbf{z}}$	(16e)	Ba III
$\mathbf{B_{19}}$	=	$\left(y_5 - z_5 + \frac{3}{4}\right)\,\mathbf{a}_1 - \left(x_5 + z_5 - \frac{1}{4}\right)\,\mathbf{a}_2 + \left(-x_5 + y_5 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-ax_5\,\hat{\mathbf{x}} + a\left(y_5 + \frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_5 - \frac{1}{4}\right)\,\hat{\mathbf{z}}$	(16e)	Ba III
$\mathbf{B_{20}}$	=	$-\left(y_5 + z_5 - \frac{3}{4}\right)\,\mathbf{a}_1 + \left(x_5 - z_5 + \frac{1}{4}\right)\,\mathbf{a}_2 + \left(x_5 - y_5 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$ax_5\,\hat{\mathbf{x}} - a\left(y_5 - \frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_5 - \frac{1}{4}\right)\,\hat{\mathbf{z}}$	(16e)	Ba III
$\mathbf{B_{21}}$	=	$\left(-x_5 + z_5 + \frac{3}{4}\right)\,\mathbf{a}_1 + \left(-y_5 + z_5 + \frac{1}{4}\right)\,\mathbf{a}_2 - \left(x_5 + y_5 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-ay_5\,\hat{\mathbf{x}} - a\left(x_5 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_5 + \frac{1}{4}\right)\,\hat{\mathbf{z}}$	(16e)	Ba III
$\mathbf{B_{22}}$	=	$\left(x_5 + z_5 + \frac{3}{4}\right)\,\mathbf{a}_1 + \left(y_5 + z_5 + \frac{1}{4}\right)\,\mathbf{a}_2 + \left(x_5 + y_5 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$ay_5\,\hat{\mathbf{x}} + a\left(x_5 + \frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_5 + \frac{1}{4}\right)\,\hat{\mathbf{z}}$	(16e)	Ba III
$\mathbf{B_{23}}$	=	$(y_6 + z_6)\,\mathbf{a}_1 + (x_6 + z_6)\,\mathbf{a}_2 + (x_6 + y_6)\,\mathbf{a}_3$	=	$ax_6\,\hat{\mathbf{x}} + ay_6\,\hat{\mathbf{y}} + cz_6\,\hat{\mathbf{z}}$	(16e)	Ba IV
$\mathbf{B_{24}}$	=	$-(y_6 - z_6)\,\mathbf{a}_1 - (x_6 - z_6)\,\mathbf{a}_2 - (x_6 + y_6)\,\mathbf{a}_3$	=	$-ax_6\,\hat{\mathbf{x}} - ay_6\,\hat{\mathbf{y}} + cz_6\,\hat{\mathbf{z}}$	(16e)	Ba IV
$\mathbf{B_{25}}$	=	$-(x_6 + z_6)\,\mathbf{a}_1 + (y_6 - z_6)\,\mathbf{a}_2 - (x_6 - y_6)\,\mathbf{a}_3$	=	$ay_6\,\hat{\mathbf{x}} - ax_6\,\hat{\mathbf{y}} - cz_6\,\hat{\mathbf{z}}$	(16e)	Ba IV

$\mathbf{B_{26}}$	$=$	$(x_6 - z_6)\,\mathbf{a}_1 - (y_6 + z_6)\,\mathbf{a}_2 + (x_6 - y_6)\,\mathbf{a}_3$	$=$	$-ay_6\,\hat{\mathbf{x}} + ax_6\,\hat{\mathbf{y}} - cz_6\,\hat{\mathbf{z}}$	(16e)	Ba IV
$\mathbf{B_{27}}$	$=$	$\left(y_6 - z_6 + \frac{3}{4}\right)\mathbf{a}_1 - \left(x_6 + z_6 - \frac{1}{4}\right)\mathbf{a}_2 + \left(-x_6 + y_6 + \frac{1}{2}\right)\mathbf{a}_3$	$=$	$-ax_6\,\hat{\mathbf{x}} + a\left(y_6 + \frac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_6 - \frac{1}{4}\right)\hat{\mathbf{z}}$	(16e)	Ba IV
$\mathbf{B_{28}}$	$=$	$-\left(y_6 + z_6 - \frac{3}{4}\right)\mathbf{a}_1 + \left(x_6 - z_6 + \frac{1}{4}\right)\mathbf{a}_2 + \left(x_6 - y_6 + \frac{1}{2}\right)\mathbf{a}_3$	$=$	$ax_6\,\hat{\mathbf{x}} - a\left(y_6 - \frac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_6 - \frac{1}{4}\right)\hat{\mathbf{z}}$	(16e)	Ba IV
$\mathbf{B_{29}}$	$=$	$\left(-x_6 + z_6 + \frac{3}{4}\right)\mathbf{a}_1 + \left(-y_6 + z_6 + \frac{1}{4}\right)\mathbf{a}_2 - \left(x_6 + y_6 - \frac{1}{2}\right)\mathbf{a}_3$	$=$	$-ay_6\,\hat{\mathbf{x}} - a\left(x_6 - \frac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_6 + \frac{1}{4}\right)\hat{\mathbf{z}}$	(16e)	Ba IV
$\mathbf{B_{30}}$	$=$	$\left(x_6 + z_6 + \frac{3}{4}\right)\mathbf{a}_1 + \left(y_6 + z_6 + \frac{1}{4}\right)\mathbf{a}_2 + \left(x_6 + y_6 + \frac{1}{2}\right)\mathbf{a}_3$	$=$	$ay_6\,\hat{\mathbf{x}} + a\left(x_6 + \frac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_6 + \frac{1}{4}\right)\hat{\mathbf{z}}$	(16e)	Ba IV
$\mathbf{B_{31}}$	$=$	$(y_7 + z_7)\,\mathbf{a}_1 + (x_7 + z_7)\,\mathbf{a}_2 + (x_7 + y_7)\,\mathbf{a}_3$	$=$	$ax_7\,\hat{\mathbf{x}} + ay_7\,\hat{\mathbf{y}} + cz_7\,\hat{\mathbf{z}}$	(16e)	Ba V
$\mathbf{B_{32}}$	$=$	$-(y_7 - z_7)\,\mathbf{a}_1 - (x_7 - z_7)\,\mathbf{a}_2 - (x_7 + y_7)\,\mathbf{a}_3$	$=$	$-ax_7\,\hat{\mathbf{x}} - ay_7\,\hat{\mathbf{y}} + cz_7\,\hat{\mathbf{z}}$	(16e)	Ba V
$\mathbf{B_{33}}$	$=$	$-(x_7 + z_7)\,\mathbf{a}_1 + (y_7 - z_7)\,\mathbf{a}_2 - (x_7 - y_7)\,\mathbf{a}_3$	$=$	$ay_7\,\hat{\mathbf{x}} - ax_7\,\hat{\mathbf{y}} - cz_7\,\hat{\mathbf{z}}$	(16e)	Ba V
$\mathbf{B_{34}}$	$=$	$(x_7 - z_7)\,\mathbf{a}_1 - (y_7 + z_7)\,\mathbf{a}_2 + (x_7 - y_7)\,\mathbf{a}_3$	$=$	$-ay_7\,\hat{\mathbf{x}} + ax_7\,\hat{\mathbf{y}} - cz_7\,\hat{\mathbf{z}}$	(16e)	Ba V
$\mathbf{B_{35}}$	$=$	$\left(y_7 - z_7 + \frac{3}{4}\right)\mathbf{a}_1 - \left(x_7 + z_7 - \frac{1}{4}\right)\mathbf{a}_2 + \left(-x_7 + y_7 + \frac{1}{2}\right)\mathbf{a}_3$	$=$	$-ax_7\,\hat{\mathbf{x}} + a\left(y_7 + \frac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_7 - \frac{1}{4}\right)\hat{\mathbf{z}}$	(16e)	Ba V
$\mathbf{B_{36}}$	$=$	$-\left(y_7 + z_7 - \frac{3}{4}\right)\mathbf{a}_1 + \left(x_7 - z_7 + \frac{1}{4}\right)\mathbf{a}_2 + \left(x_7 - y_7 + \frac{1}{2}\right)\mathbf{a}_3$	$=$	$ax_7\,\hat{\mathbf{x}} - a\left(y_7 - \frac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_7 - \frac{1}{4}\right)\hat{\mathbf{z}}$	(16e)	Ba V
$\mathbf{B_{37}}$	$=$	$\left(-x_7 + z_7 + \frac{3}{4}\right)\mathbf{a}_1 + \left(-y_7 + z_7 + \frac{1}{4}\right)\mathbf{a}_2 - \left(x_7 + y_7 - \frac{1}{2}\right)\mathbf{a}_3$	$=$	$-ay_7\,\hat{\mathbf{x}} - a\left(x_7 - \frac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_7 + \frac{1}{4}\right)\hat{\mathbf{z}}$	(16e)	Ba V
$\mathbf{B_{38}}$	$=$	$\left(x_7 + z_7 + \frac{3}{4}\right)\mathbf{a}_1 + \left(y_7 + z_7 + \frac{1}{4}\right)\mathbf{a}_2 + \left(x_7 + y_7 + \frac{1}{2}\right)\mathbf{a}_3$	$=$	$ay_7\,\hat{\mathbf{x}} + a\left(x_7 + \frac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_7 + \frac{1}{4}\right)\hat{\mathbf{z}}$	(16e)	Ba V
$\mathbf{B_{39}}$	$=$	$(y_8 + z_8)\,\mathbf{a}_1 + (x_8 + z_8)\,\mathbf{a}_2 + (x_8 + y_8)\,\mathbf{a}_3$	$=$	$ax_8\,\hat{\mathbf{x}} + ay_8\,\hat{\mathbf{y}} + cz_8\,\hat{\mathbf{z}}$	(16e)	Ba VI
$\mathbf{B_{40}}$	$=$	$-(y_8 - z_8)\,\mathbf{a}_1 - (x_8 - z_8)\,\mathbf{a}_2 - (x_8 + y_8)\,\mathbf{a}_3$	$=$	$-ax_8\,\hat{\mathbf{x}} - ay_8\,\hat{\mathbf{y}} + cz_8\,\hat{\mathbf{z}}$	(16e)	Ba VI
$\mathbf{B_{41}}$	$=$	$-(x_8 + z_8)\,\mathbf{a}_1 + (y_8 - z_8)\,\mathbf{a}_2 - (x_8 - y_8)\,\mathbf{a}_3$	$=$	$ay_8\,\hat{\mathbf{x}} - ax_8\,\hat{\mathbf{y}} - cz_8\,\hat{\mathbf{z}}$	(16e)	Ba VI
$\mathbf{B_{42}}$	$=$	$(x_8 - z_8)\,\mathbf{a}_1 - (y_8 + z_8)\,\mathbf{a}_2 + (x_8 - y_8)\,\mathbf{a}_3$	$=$	$-ay_8\,\hat{\mathbf{x}} + ax_8\,\hat{\mathbf{y}} - cz_8\,\hat{\mathbf{z}}$	(16e)	Ba VI
$\mathbf{B_{43}}$	$=$	$\left(y_8 - z_8 + \frac{3}{4}\right)\mathbf{a}_1 - \left(x_8 + z_8 - \frac{1}{4}\right)\mathbf{a}_2 + \left(-x_8 + y_8 + \frac{1}{2}\right)\mathbf{a}_3$	$=$	$-ax_8\,\hat{\mathbf{x}} + a\left(y_8 + \frac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_8 - \frac{1}{4}\right)\hat{\mathbf{z}}$	(16e)	Ba VI
$\mathbf{B_{44}}$	$=$	$-\left(y_8 + z_8 - \frac{3}{4}\right)\mathbf{a}_1 + \left(x_8 - z_8 + \frac{1}{4}\right)\mathbf{a}_2 + \left(x_8 - y_8 + \frac{1}{2}\right)\mathbf{a}_3$	$=$	$ax_8\,\hat{\mathbf{x}} - a\left(y_8 - \frac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_8 - \frac{1}{4}\right)\hat{\mathbf{z}}$	(16e)	Ba VI

$$\mathbf{B_{45}} = \begin{array}{c}\left(-x_8+z_8+\frac{3}{4}\right)\mathbf{a}_1+\\ \left(-y_8+z_8+\frac{1}{4}\right)\mathbf{a}_2-\\ \left(x_8+y_8-\frac{1}{2}\right)\mathbf{a}_3\end{array} = -ay_8\,\hat{\mathbf{x}}-a\left(x_8-\tfrac{1}{2}\right)\hat{\mathbf{y}}+c\left(z_8+\tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Ba VI}$$

$$\mathbf{B_{46}} = \begin{array}{c}\left(x_8+z_8+\frac{3}{4}\right)\mathbf{a}_1+\\ \left(y_8+z_8+\frac{1}{4}\right)\mathbf{a}_2+\\ \left(x_8+y_8+\frac{1}{2}\right)\mathbf{a}_3\end{array} = ay_8\,\hat{\mathbf{x}}+a\left(x_8+\tfrac{1}{2}\right)\hat{\mathbf{y}}+c\left(z_8+\tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Ba VI}$$

$$\mathbf{B_{47}} = \begin{array}{c}\left(y_9+z_9\right)\mathbf{a}_1+\left(x_9+z_9\right)\mathbf{a}_2+\\ \left(x_9+y_9\right)\mathbf{a}_3\end{array} = ax_9\,\hat{\mathbf{x}}+ay_9\,\hat{\mathbf{y}}+cz_9\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li III}$$

$$\mathbf{B_{48}} = \begin{array}{c}-\left(y_9-z_9\right)\mathbf{a}_1-\left(x_9-z_9\right)\mathbf{a}_2-\\ \left(x_9+y_9\right)\mathbf{a}_3\end{array} = -ax_9\,\hat{\mathbf{x}}-ay_9\,\hat{\mathbf{y}}+cz_9\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li III}$$

$$\mathbf{B_{49}} = \begin{array}{c}-\left(x_9+z_9\right)\mathbf{a}_1+\left(y_9-z_9\right)\mathbf{a}_2-\\ \left(x_9-y_9\right)\mathbf{a}_3\end{array} = ay_9\,\hat{\mathbf{x}}-ax_9\,\hat{\mathbf{y}}-cz_9\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li III}$$

$$\mathbf{B_{50}} = \begin{array}{c}\left(x_9-z_9\right)\mathbf{a}_1-\left(y_9+z_9\right)\mathbf{a}_2+\\ \left(x_9-y_9\right)\mathbf{a}_3\end{array} = -ay_9\,\hat{\mathbf{x}}+ax_9\,\hat{\mathbf{y}}-cz_9\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li III}$$

$$\mathbf{B_{51}} = \begin{array}{c}\left(y_9-z_9+\frac{3}{4}\right)\mathbf{a}_1-\\ \left(x_9+z_9-\frac{1}{4}\right)\mathbf{a}_2+\\ \left(-x_9+y_9+\frac{1}{2}\right)\mathbf{a}_3\end{array} = -ax_9\,\hat{\mathbf{x}}+a\left(y_9+\tfrac{1}{2}\right)\hat{\mathbf{y}}-c\left(z_9-\tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li III}$$

$$\mathbf{B_{52}} = \begin{array}{c}-\left(y_9+z_9-\frac{3}{4}\right)\mathbf{a}_1+\\ \left(x_9-z_9+\frac{1}{4}\right)\mathbf{a}_2+\\ \left(x_9-y_9+\frac{1}{2}\right)\mathbf{a}_3\end{array} = ax_9\,\hat{\mathbf{x}}-a\left(y_9-\tfrac{1}{2}\right)\hat{\mathbf{y}}-c\left(z_9-\tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li III}$$

$$\mathbf{B_{53}} = \begin{array}{c}\left(-x_9+z_9+\frac{3}{4}\right)\mathbf{a}_1+\\ \left(-y_9+z_9+\frac{1}{4}\right)\mathbf{a}_2-\\ \left(x_9+y_9-\frac{1}{2}\right)\mathbf{a}_3\end{array} = -ay_9\,\hat{\mathbf{x}}-a\left(x_9-\tfrac{1}{2}\right)\hat{\mathbf{y}}+c\left(z_9+\tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li III}$$

$$\mathbf{B_{54}} = \begin{array}{c}\left(x_9+z_9+\frac{3}{4}\right)\mathbf{a}_1+\\ \left(y_9+z_9+\frac{1}{4}\right)\mathbf{a}_2+\\ \left(x_9+y_9+\frac{1}{2}\right)\mathbf{a}_3\end{array} = ay_9\,\hat{\mathbf{x}}+a\left(x_9+\tfrac{1}{2}\right)\hat{\mathbf{y}}+c\left(z_9+\tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li III}$$

$$\mathbf{B_{55}} = \begin{array}{c}\left(y_{10}+z_{10}\right)\mathbf{a}_1+\left(x_{10}+z_{10}\right)\mathbf{a}_2+\\ \left(x_{10}+y_{10}\right)\mathbf{a}_3\end{array} = ax_{10}\,\hat{\mathbf{x}}+ay_{10}\,\hat{\mathbf{y}}+cz_{10}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li IV}$$

$$\mathbf{B_{56}} = \begin{array}{c}-\left(y_{10}-z_{10}\right)\mathbf{a}_1-\\ \left(x_{10}-z_{10}\right)\mathbf{a}_2-\left(x_{10}+y_{10}\right)\mathbf{a}_3\end{array} = -ax_{10}\,\hat{\mathbf{x}}-ay_{10}\,\hat{\mathbf{y}}+cz_{10}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li IV}$$

$$\mathbf{B_{57}} = \begin{array}{c}-\left(x_{10}+z_{10}\right)\mathbf{a}_1+\\ \left(y_{10}-z_{10}\right)\mathbf{a}_2-\left(x_{10}-y_{10}\right)\mathbf{a}_3\end{array} = ay_{10}\,\hat{\mathbf{x}}-ax_{10}\,\hat{\mathbf{y}}-cz_{10}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li IV}$$

$$\mathbf{B_{58}} = \begin{array}{c}\left(x_{10}-z_{10}\right)\mathbf{a}_1-\left(y_{10}+z_{10}\right)\mathbf{a}_2+\\ \left(x_{10}-y_{10}\right)\mathbf{a}_3\end{array} = -ay_{10}\,\hat{\mathbf{x}}+ax_{10}\,\hat{\mathbf{y}}-cz_{10}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li IV}$$

$$\mathbf{B_{59}} = \begin{array}{c}\left(y_{10}-z_{10}+\frac{3}{4}\right)\mathbf{a}_1-\\ \left(x_{10}+z_{10}-\frac{1}{4}\right)\mathbf{a}_2+\\ \left(-x_{10}+y_{10}+\frac{1}{2}\right)\mathbf{a}_3\end{array} = -ax_{10}\,\hat{\mathbf{x}}+a\left(y_{10}+\tfrac{1}{2}\right)\hat{\mathbf{y}}-c\left(z_{10}-\tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li IV}$$

$$\mathbf{B_{60}} = \begin{array}{c}-\left(y_{10}+z_{10}-\frac{3}{4}\right)\mathbf{a}_1+\\ \left(x_{10}-z_{10}+\frac{1}{4}\right)\mathbf{a}_2+\\ \left(x_{10}-y_{10}+\frac{1}{2}\right)\mathbf{a}_3\end{array} = ax_{10}\,\hat{\mathbf{x}}-a\left(y_{10}-\tfrac{1}{2}\right)\hat{\mathbf{y}}-c\left(z_{10}-\tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li IV}$$

$$\mathbf{B_{61}} = \begin{array}{c}\left(-x_{10}+z_{10}+\frac{3}{4}\right)\mathbf{a}_1+\\ \left(-y_{10}+z_{10}+\frac{1}{4}\right)\mathbf{a}_2-\\ \left(x_{10}+y_{10}-\frac{1}{2}\right)\mathbf{a}_3\end{array} = -ay_{10}\,\hat{\mathbf{x}}-a\left(x_{10}-\tfrac{1}{2}\right)\hat{\mathbf{y}}+c\left(z_{10}+\tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li IV}$$

$$\mathbf{B_{62}} = \begin{array}{c}\left(x_{10}+z_{10}+\frac{3}{4}\right)\mathbf{a}_1+\\ \left(y_{10}+z_{10}+\frac{1}{4}\right)\mathbf{a}_2+\\ \left(x_{10}+y_{10}+\frac{1}{2}\right)\mathbf{a}_3\end{array} = ay_{10}\,\hat{\mathbf{x}}+a\left(x_{10}+\tfrac{1}{2}\right)\hat{\mathbf{y}}+c\left(z_{10}+\tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li IV}$$

$$\mathbf{B_{63}} = \begin{array}{c}\left(y_{11}+z_{11}\right)\mathbf{a}_1+\left(x_{11}+z_{11}\right)\mathbf{a}_2+\\ \left(x_{11}+y_{11}\right)\mathbf{a}_3\end{array} = ax_{11}\,\hat{\mathbf{x}}+ay_{11}\,\hat{\mathbf{y}}+cz_{11}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li V}$$

$\mathbf{B_{64}}$	=	$-(y_{11}-z_{11})\,\mathbf{a}_1-(x_{11}-z_{11})\,\mathbf{a}_2-(x_{11}+y_{11})\,\mathbf{a}_3$	=	$-ax_{11}\,\hat{\mathbf{x}}-ay_{11}\,\hat{\mathbf{y}}+cz_{11}\,\hat{\mathbf{z}}$	(16e)	Li V
$\mathbf{B_{65}}$	=	$-(x_{11}+z_{11})\,\mathbf{a}_1+(y_{11}-z_{11})\,\mathbf{a}_2-(x_{11}-y_{11})\,\mathbf{a}_3$	=	$ay_{11}\,\hat{\mathbf{x}}-ax_{11}\,\hat{\mathbf{y}}-cz_{11}\,\hat{\mathbf{z}}$	(16e)	Li V
$\mathbf{B_{66}}$	=	$(x_{11}-z_{11})\,\mathbf{a}_1-(y_{11}+z_{11})\,\mathbf{a}_2+(x_{11}-y_{11})\,\mathbf{a}_3$	=	$-ay_{11}\,\hat{\mathbf{x}}+ax_{11}\,\hat{\mathbf{y}}-cz_{11}\,\hat{\mathbf{z}}$	(16e)	Li V
$\mathbf{B_{67}}$	=	$\left(y_{11}-z_{11}+\frac{3}{4}\right)\mathbf{a}_1+\left(x_{11}+z_{11}-\frac{1}{4}\right)\mathbf{a}_2+\left(-x_{11}+y_{11}+\frac{1}{2}\right)\mathbf{a}_3$	=	$-ax_{11}\,\hat{\mathbf{x}}+a\left(y_{11}+\frac{1}{2}\right)\,\hat{\mathbf{y}}-c\left(z_{11}-\frac{1}{4}\right)\,\hat{\mathbf{z}}$	(16e)	Li V
$\mathbf{B_{68}}$	=	$-\left(y_{11}+z_{11}-\frac{3}{4}\right)\mathbf{a}_1+\left(x_{11}-z_{11}+\frac{1}{4}\right)\mathbf{a}_2+\left(x_{11}-y_{11}+\frac{1}{2}\right)\mathbf{a}_3$	=	$ax_{11}\,\hat{\mathbf{x}}-a\left(y_{11}-\frac{1}{2}\right)\,\hat{\mathbf{y}}-c\left(z_{11}-\frac{1}{4}\right)\,\hat{\mathbf{z}}$	(16e)	Li V
$\mathbf{B_{69}}$	=	$\left(-x_{11}+z_{11}+\frac{3}{4}\right)\mathbf{a}_1+\left(-y_{11}+z_{11}+\frac{1}{4}\right)\mathbf{a}_2-\left(x_{11}+y_{11}-\frac{1}{2}\right)\mathbf{a}_3$	=	$-ay_{11}\,\hat{\mathbf{x}}-a\left(x_{11}-\frac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_{11}+\frac{1}{4}\right)\,\hat{\mathbf{z}}$	(16e)	Li V
$\mathbf{B_{70}}$	=	$\left(x_{11}+z_{11}+\frac{3}{4}\right)\mathbf{a}_1+\left(y_{11}+z_{11}+\frac{1}{4}\right)\mathbf{a}_2+\left(x_{11}+y_{11}+\frac{1}{2}\right)\mathbf{a}_3$	=	$ay_{11}\,\hat{\mathbf{x}}+a\left(x_{11}+\frac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_{11}+\frac{1}{4}\right)\,\hat{\mathbf{z}}$	(16e)	Li V
$\mathbf{B_{71}}$	=	$(y_{12}+z_{12})\,\mathbf{a}_1+(x_{12}+z_{12})\,\mathbf{a}_2+(x_{12}+y_{12})\,\mathbf{a}_3$	=	$ax_{12}\,\hat{\mathbf{x}}+ay_{12}\,\hat{\mathbf{y}}+cz_{12}\,\hat{\mathbf{z}}$	(16e)	Li VI
$\mathbf{B_{72}}$	=	$-(y_{12}-z_{12})\,\mathbf{a}_1-(x_{12}-z_{12})\,\mathbf{a}_2-(x_{12}+y_{12})\,\mathbf{a}_3$	=	$-ax_{12}\,\hat{\mathbf{x}}-ay_{12}\,\hat{\mathbf{y}}+cz_{12}\,\hat{\mathbf{z}}$	(16e)	Li VI
$\mathbf{B_{73}}$	=	$-(x_{12}+z_{12})\,\mathbf{a}_1+(y_{12}-z_{12})\,\mathbf{a}_2-(x_{12}-y_{12})\,\mathbf{a}_3$	=	$ay_{12}\,\hat{\mathbf{x}}-ax_{12}\,\hat{\mathbf{y}}-cz_{12}\,\hat{\mathbf{z}}$	(16e)	Li VI
$\mathbf{B_{74}}$	=	$(x_{12}-z_{12})\,\mathbf{a}_1-(y_{12}+z_{12})\,\mathbf{a}_2+(x_{12}-y_{12})\,\mathbf{a}_3$	=	$-ay_{12}\,\hat{\mathbf{x}}+ax_{12}\,\hat{\mathbf{y}}-cz_{12}\,\hat{\mathbf{z}}$	(16e)	Li VI
$\mathbf{B_{75}}$	=	$\left(y_{12}-z_{12}+\frac{3}{4}\right)\mathbf{a}_1+\left(x_{12}+z_{12}-\frac{1}{4}\right)\mathbf{a}_2+\left(-x_{12}+y_{12}+\frac{1}{2}\right)\mathbf{a}_3$	=	$-ax_{12}\,\hat{\mathbf{x}}+a\left(y_{12}+\frac{1}{2}\right)\,\hat{\mathbf{y}}-c\left(z_{12}-\frac{1}{4}\right)\,\hat{\mathbf{z}}$	(16e)	Li VI
$\mathbf{B_{76}}$	=	$-\left(y_{12}+z_{12}-\frac{3}{4}\right)\mathbf{a}_1+\left(x_{12}-z_{12}+\frac{1}{4}\right)\mathbf{a}_2+\left(x_{12}-y_{12}+\frac{1}{2}\right)\mathbf{a}_3$	=	$ax_{12}\,\hat{\mathbf{x}}-a\left(y_{12}-\frac{1}{2}\right)\,\hat{\mathbf{y}}-c\left(z_{12}-\frac{1}{4}\right)\,\hat{\mathbf{z}}$	(16e)	Li VI
$\mathbf{B_{77}}$	=	$\left(-x_{12}+z_{12}+\frac{3}{4}\right)\mathbf{a}_1+\left(-y_{12}+z_{12}+\frac{1}{4}\right)\mathbf{a}_2-\left(x_{12}+y_{12}-\frac{1}{2}\right)\mathbf{a}_3$	=	$-ay_{12}\,\hat{\mathbf{x}}-a\left(x_{12}-\frac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_{12}+\frac{1}{4}\right)\,\hat{\mathbf{z}}$	(16e)	Li VI
$\mathbf{B_{78}}$	=	$\left(x_{12}+z_{12}+\frac{3}{4}\right)\mathbf{a}_1+\left(y_{12}+z_{12}+\frac{1}{4}\right)\mathbf{a}_2+\left(x_{12}+y_{12}+\frac{1}{2}\right)\mathbf{a}_3$	=	$ay_{12}\,\hat{\mathbf{x}}+a\left(x_{12}+\frac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_{12}+\frac{1}{4}\right)\,\hat{\mathbf{z}}$	(16e)	Li VI
$\mathbf{B_{79}}$	=	$(y_{13}+z_{13})\,\mathbf{a}_1+(x_{13}+z_{13})\,\mathbf{a}_2+(x_{13}+y_{13})\,\mathbf{a}_3$	=	$ax_{13}\,\hat{\mathbf{x}}+ay_{13}\,\hat{\mathbf{y}}+cz_{13}\,\hat{\mathbf{z}}$	(16e)	Li VII
$\mathbf{B_{80}}$	=	$-(y_{13}-z_{13})\,\mathbf{a}_1-(x_{13}-z_{13})\,\mathbf{a}_2-(x_{13}+y_{13})\,\mathbf{a}_3$	=	$-ax_{13}\,\hat{\mathbf{x}}-ay_{13}\,\hat{\mathbf{y}}+cz_{13}\,\hat{\mathbf{z}}$	(16e)	Li VII
$\mathbf{B_{81}}$	=	$-(x_{13}+z_{13})\,\mathbf{a}_1+(y_{13}-z_{13})\,\mathbf{a}_2-(x_{13}-y_{13})\,\mathbf{a}_3$	=	$ay_{13}\,\hat{\mathbf{x}}-ax_{13}\,\hat{\mathbf{y}}-cz_{13}\,\hat{\mathbf{z}}$	(16e)	Li VII
$\mathbf{B_{82}}$	=	$(x_{13}-z_{13})\,\mathbf{a}_1-(y_{13}+z_{13})\,\mathbf{a}_2+(x_{13}-y_{13})\,\mathbf{a}_3$	=	$-ay_{13}\,\hat{\mathbf{x}}+ax_{13}\,\hat{\mathbf{y}}-cz_{13}\,\hat{\mathbf{z}}$	(16e)	Li VII

$$\mathbf{B_{83}} = \left(y_{13} - z_{13} + \tfrac{3}{4}\right)\mathbf{a}_1 - \left(x_{13} + z_{13} - \tfrac{1}{4}\right)\mathbf{a}_2 + \left(-x_{13} + y_{13} + \tfrac{1}{2}\right)\mathbf{a}_3 = -ax_{13}\,\hat{\mathbf{x}} + a\left(y_{13} + \tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_{13} - \tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li VII}$$

$$\mathbf{B_{84}} = -\left(y_{13} + z_{13} - \tfrac{3}{4}\right)\mathbf{a}_1 + \left(x_{13} - z_{13} + \tfrac{1}{4}\right)\mathbf{a}_2 + \left(x_{13} - y_{13} + \tfrac{1}{2}\right)\mathbf{a}_3 = ax_{13}\,\hat{\mathbf{x}} - a\left(y_{13} - \tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_{13} - \tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li VII}$$

$$\mathbf{B_{85}} = \left(-x_{13} + z_{13} + \tfrac{3}{4}\right)\mathbf{a}_1 + \left(-y_{13} + z_{13} + \tfrac{1}{4}\right)\mathbf{a}_2 - \left(x_{13} + y_{13} - \tfrac{1}{2}\right)\mathbf{a}_3 = -ay_{13}\,\hat{\mathbf{x}} - a\left(x_{13} - \tfrac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_{13} + \tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li VII}$$

$$\mathbf{B_{86}} = \left(x_{13} + z_{13} + \tfrac{3}{4}\right)\mathbf{a}_1 + \left(y_{13} + z_{13} + \tfrac{1}{4}\right)\mathbf{a}_2 + \left(x_{13} + y_{13} + \tfrac{1}{2}\right)\mathbf{a}_3 = ay_{13}\,\hat{\mathbf{x}} + a\left(x_{13} + \tfrac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_{13} + \tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li VII}$$

$$\mathbf{B_{87}} = \left(y_{14} + z_{14}\right)\mathbf{a}_1 + \left(x_{14} + z_{14}\right)\mathbf{a}_2 + \left(x_{14} + y_{14}\right)\mathbf{a}_3 = ax_{14}\,\hat{\mathbf{x}} + ay_{14}\,\hat{\mathbf{y}} + cz_{14}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li VIII}$$

$$\mathbf{B_{88}} = -\left(y_{14} - z_{14}\right)\mathbf{a}_1 - \left(x_{14} - z_{14}\right)\mathbf{a}_2 - \left(x_{14} + y_{14}\right)\mathbf{a}_3 = -ax_{14}\,\hat{\mathbf{x}} - ay_{14}\,\hat{\mathbf{y}} + cz_{14}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li VIII}$$

$$\mathbf{B_{89}} = -\left(x_{14} + z_{14}\right)\mathbf{a}_1 + \left(y_{14} - z_{14}\right)\mathbf{a}_2 - \left(x_{14} - y_{14}\right)\mathbf{a}_3 = ay_{14}\,\hat{\mathbf{x}} - ax_{14}\,\hat{\mathbf{y}} - cz_{14}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li VIII}$$

$$\mathbf{B_{90}} = \left(x_{14} - z_{14}\right)\mathbf{a}_1 - \left(y_{14} + z_{14}\right)\mathbf{a}_2 + \left(x_{14} - y_{14}\right)\mathbf{a}_3 = -ay_{14}\,\hat{\mathbf{x}} + ax_{14}\,\hat{\mathbf{y}} - cz_{14}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li VIII}$$

$$\mathbf{B_{91}} = \left(y_{14} - z_{14} + \tfrac{3}{4}\right)\mathbf{a}_1 - \left(x_{14} + z_{14} - \tfrac{1}{4}\right)\mathbf{a}_2 + \left(-x_{14} + y_{14} + \tfrac{1}{2}\right)\mathbf{a}_3 = -ax_{14}\,\hat{\mathbf{x}} + a\left(y_{14} + \tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_{14} - \tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li VIII}$$

$$\mathbf{B_{92}} = -\left(y_{14} + z_{14} - \tfrac{3}{4}\right)\mathbf{a}_1 + \left(x_{14} - z_{14} + \tfrac{1}{4}\right)\mathbf{a}_2 + \left(x_{14} - y_{14} + \tfrac{1}{2}\right)\mathbf{a}_3 = ax_{14}\,\hat{\mathbf{x}} - a\left(y_{14} - \tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_{14} - \tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li VIII}$$

$$\mathbf{B_{93}} = \left(-x_{14} + z_{14} + \tfrac{3}{4}\right)\mathbf{a}_1 + \left(-y_{14} + z_{14} + \tfrac{1}{4}\right)\mathbf{a}_2 - \left(x_{14} + y_{14} - \tfrac{1}{2}\right)\mathbf{a}_3 = -ay_{14}\,\hat{\mathbf{x}} - a\left(x_{14} - \tfrac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_{14} + \tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li VIII}$$

$$\mathbf{B_{94}} = \left(x_{14} + z_{14} + \tfrac{3}{4}\right)\mathbf{a}_1 + \left(y_{14} + z_{14} + \tfrac{1}{4}\right)\mathbf{a}_2 + \left(x_{14} + y_{14} + \tfrac{1}{2}\right)\mathbf{a}_3 = ay_{14}\,\hat{\mathbf{x}} + a\left(x_{14} + \tfrac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_{14} + \tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li VIII}$$

$$\mathbf{B_{95}} = \left(y_{15} + z_{15}\right)\mathbf{a}_1 + \left(x_{15} + z_{15}\right)\mathbf{a}_2 + \left(x_{15} + y_{15}\right)\mathbf{a}_3 = ax_{15}\,\hat{\mathbf{x}} + ay_{15}\,\hat{\mathbf{y}} + cz_{15}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li IX}$$

$$\mathbf{B_{96}} = -\left(y_{15} - z_{15}\right)\mathbf{a}_1 - \left(x_{15} - z_{15}\right)\mathbf{a}_2 - \left(x_{15} + y_{15}\right)\mathbf{a}_3 = -ax_{15}\,\hat{\mathbf{x}} - ay_{15}\,\hat{\mathbf{y}} + cz_{15}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li IX}$$

$$\mathbf{B_{97}} = -\left(x_{15} + z_{15}\right)\mathbf{a}_1 + \left(y_{15} - z_{15}\right)\mathbf{a}_2 - \left(x_{15} - y_{15}\right)\mathbf{a}_3 = ay_{15}\,\hat{\mathbf{x}} - ax_{15}\,\hat{\mathbf{y}} - cz_{15}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li IX}$$

$$\mathbf{B_{98}} = \left(x_{15} - z_{15}\right)\mathbf{a}_1 - \left(y_{15} + z_{15}\right)\mathbf{a}_2 + \left(x_{15} - y_{15}\right)\mathbf{a}_3 = -ay_{15}\,\hat{\mathbf{x}} + ax_{15}\,\hat{\mathbf{y}} - cz_{15}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li IX}$$

$$\mathbf{B_{99}} = \left(y_{15} - z_{15} + \tfrac{3}{4}\right)\mathbf{a}_1 - \left(x_{15} + z_{15} - \tfrac{1}{4}\right)\mathbf{a}_2 + \left(-x_{15} + y_{15} + \tfrac{1}{2}\right)\mathbf{a}_3 = -ax_{15}\,\hat{\mathbf{x}} + a\left(y_{15} + \tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_{15} - \tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li IX}$$

$$\mathbf{B_{100}} = -\left(y_{15} + z_{15} - \tfrac{3}{4}\right)\mathbf{a}_1 + \left(x_{15} - z_{15} + \tfrac{1}{4}\right)\mathbf{a}_2 + \left(x_{15} - y_{15} + \tfrac{1}{2}\right)\mathbf{a}_3 = ax_{15}\,\hat{\mathbf{x}} - a\left(y_{15} - \tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_{15} - \tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (16e) \quad \text{Li IX}$$

$$\mathbf{B_{101}} = \begin{array}{c}\left(-x_{15}+z_{15}+\frac{3}{4}\right)\mathbf{a}_1+\\ \left(-y_{15}+z_{15}+\frac{1}{4}\right)\mathbf{a}_2-\\ \left(x_{15}+y_{15}-\frac{1}{2}\right)\mathbf{a}_3\end{array} = -ay_{15}\,\hat{\mathbf{x}}-a\left(x_{15}-\tfrac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_{15}+\tfrac{1}{4}\right)\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li IX}$$

$$\mathbf{B_{102}} = \begin{array}{c}\left(x_{15}+z_{15}+\frac{3}{4}\right)\mathbf{a}_1+\\ \left(y_{15}+z_{15}+\frac{1}{4}\right)\mathbf{a}_2+\\ \left(x_{15}+y_{15}+\frac{1}{2}\right)\mathbf{a}_3\end{array} = ay_{15}\,\hat{\mathbf{x}}+a\left(x_{15}+\tfrac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_{15}+\tfrac{1}{4}\right)\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li IX}$$

$$\mathbf{B_{103}} = \begin{array}{c}\left(y_{16}+z_{16}\right)\mathbf{a}_1+\left(x_{16}+z_{16}\right)\mathbf{a}_2+\\ \left(x_{16}+y_{16}\right)\mathbf{a}_3\end{array} = ax_{16}\,\hat{\mathbf{x}}+ay_{16}\,\hat{\mathbf{y}}+cz_{16}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li X}$$

$$\mathbf{B_{104}} = \begin{array}{c}-\left(y_{16}-z_{16}\right)\mathbf{a}_1-\\ \left(x_{16}-z_{16}\right)\mathbf{a}_2-\left(x_{16}+y_{16}\right)\mathbf{a}_3\end{array} = -ax_{16}\,\hat{\mathbf{x}}-ay_{16}\,\hat{\mathbf{y}}+cz_{16}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li X}$$

$$\mathbf{B_{105}} = \begin{array}{c}-\left(x_{16}+z_{16}\right)\mathbf{a}_1+\\ \left(y_{16}-z_{16}\right)\mathbf{a}_2-\left(x_{16}-y_{16}\right)\mathbf{a}_3\end{array} = ay_{16}\,\hat{\mathbf{x}}-ax_{16}\,\hat{\mathbf{y}}-cz_{16}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li X}$$

$$\mathbf{B_{106}} = \begin{array}{c}\left(x_{16}-z_{16}\right)\mathbf{a}_1-\left(y_{16}+z_{16}\right)\mathbf{a}_2+\\ \left(x_{16}-y_{16}\right)\mathbf{a}_3\end{array} = -ay_{16}\,\hat{\mathbf{x}}+ax_{16}\,\hat{\mathbf{y}}-cz_{16}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li X}$$

$$\mathbf{B_{107}} = \begin{array}{c}\left(y_{16}-z_{16}+\frac{3}{4}\right)\mathbf{a}_1-\\ \left(x_{16}+z_{16}-\frac{1}{4}\right)\mathbf{a}_2+\\ \left(-x_{16}+y_{16}+\frac{1}{2}\right)\mathbf{a}_3\end{array} = -ax_{16}\,\hat{\mathbf{x}}+a\left(y_{16}+\tfrac{1}{2}\right)\,\hat{\mathbf{y}}-c\left(z_{16}-\tfrac{1}{4}\right)\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li X}$$

$$\mathbf{B_{108}} = \begin{array}{c}-\left(y_{16}+z_{16}-\frac{3}{4}\right)\mathbf{a}_1+\\ \left(x_{16}-z_{16}+\frac{1}{4}\right)\mathbf{a}_2+\\ \left(x_{16}-y_{16}+\frac{1}{2}\right)\mathbf{a}_3\end{array} = ax_{16}\,\hat{\mathbf{x}}-a\left(y_{16}-\tfrac{1}{2}\right)\,\hat{\mathbf{y}}-c\left(z_{16}-\tfrac{1}{4}\right)\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li X}$$

$$\mathbf{B_{109}} = \begin{array}{c}\left(-x_{16}+z_{16}+\frac{3}{4}\right)\mathbf{a}_1+\\ \left(-y_{16}+z_{16}+\frac{1}{4}\right)\mathbf{a}_2-\\ \left(x_{16}+y_{16}-\frac{1}{2}\right)\mathbf{a}_3\end{array} = -ay_{16}\,\hat{\mathbf{x}}-a\left(x_{16}-\tfrac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_{16}+\tfrac{1}{4}\right)\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li X}$$

$$\mathbf{B_{110}} = \begin{array}{c}\left(x_{16}+z_{16}+\frac{3}{4}\right)\mathbf{a}_1+\\ \left(y_{16}+z_{16}+\frac{1}{4}\right)\mathbf{a}_2+\\ \left(x_{16}+y_{16}+\frac{1}{2}\right)\mathbf{a}_3\end{array} = ay_{16}\,\hat{\mathbf{x}}+a\left(x_{16}+\tfrac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_{16}+\tfrac{1}{4}\right)\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li X}$$

$$\mathbf{B_{111}} = \begin{array}{c}\left(y_{17}+z_{17}\right)\mathbf{a}_1+\left(x_{17}+z_{17}\right)\mathbf{a}_2+\\ \left(x_{17}+y_{17}\right)\mathbf{a}_3\end{array} = ax_{17}\,\hat{\mathbf{x}}+ay_{17}\,\hat{\mathbf{y}}+cz_{17}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li XI}$$

$$\mathbf{B_{112}} = \begin{array}{c}-\left(y_{17}-z_{17}\right)\mathbf{a}_1-\\ \left(x_{17}-z_{17}\right)\mathbf{a}_2-\left(x_{17}+y_{17}\right)\mathbf{a}_3\end{array} = -ax_{17}\,\hat{\mathbf{x}}-ay_{17}\,\hat{\mathbf{y}}+cz_{17}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li XI}$$

$$\mathbf{B_{113}} = \begin{array}{c}-\left(x_{17}+z_{17}\right)\mathbf{a}_1+\\ \left(y_{17}-z_{17}\right)\mathbf{a}_2-\left(x_{17}-y_{17}\right)\mathbf{a}_3\end{array} = ay_{17}\,\hat{\mathbf{x}}-ax_{17}\,\hat{\mathbf{y}}-cz_{17}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li XI}$$

$$\mathbf{B_{114}} = \begin{array}{c}\left(x_{17}-z_{17}\right)\mathbf{a}_1-\left(y_{17}+z_{17}\right)\mathbf{a}_2+\\ \left(x_{17}-y_{17}\right)\mathbf{a}_3\end{array} = -ay_{17}\,\hat{\mathbf{x}}+ax_{17}\,\hat{\mathbf{y}}-cz_{17}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li XI}$$

$$\mathbf{B_{115}} = \begin{array}{c}\left(y_{17}-z_{17}+\frac{3}{4}\right)\mathbf{a}_1-\\ \left(x_{17}+z_{17}-\frac{1}{4}\right)\mathbf{a}_2+\\ \left(-x_{17}+y_{17}+\frac{1}{2}\right)\mathbf{a}_3\end{array} = -ax_{17}\,\hat{\mathbf{x}}+a\left(y_{17}+\tfrac{1}{2}\right)\,\hat{\mathbf{y}}-c\left(z_{17}-\tfrac{1}{4}\right)\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li XI}$$

$$\mathbf{B_{116}} = \begin{array}{c}-\left(y_{17}+z_{17}-\frac{3}{4}\right)\mathbf{a}_1+\\ \left(x_{17}-z_{17}+\frac{1}{4}\right)\mathbf{a}_2+\\ \left(x_{17}-y_{17}+\frac{1}{2}\right)\mathbf{a}_3\end{array} = ax_{17}\,\hat{\mathbf{x}}-a\left(y_{17}-\tfrac{1}{2}\right)\,\hat{\mathbf{y}}-c\left(z_{17}-\tfrac{1}{4}\right)\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li XI}$$

$$\mathbf{B_{117}} = \begin{array}{c}\left(-x_{17}+z_{17}+\frac{3}{4}\right)\mathbf{a}_1+\\ \left(-y_{17}+z_{17}+\frac{1}{4}\right)\mathbf{a}_2-\\ \left(x_{17}+y_{17}-\frac{1}{2}\right)\mathbf{a}_3\end{array} = -ay_{17}\,\hat{\mathbf{x}}-a\left(x_{17}-\tfrac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_{17}+\tfrac{1}{4}\right)\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li XI}$$

$$\mathbf{B_{118}} = \begin{array}{c}\left(x_{17}+z_{17}+\frac{3}{4}\right)\mathbf{a}_1+\\ \left(y_{17}+z_{17}+\frac{1}{4}\right)\mathbf{a}_2+\\ \left(x_{17}+y_{17}+\frac{1}{2}\right)\mathbf{a}_3\end{array} = ay_{17}\,\hat{\mathbf{x}}+a\left(x_{17}+\tfrac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_{17}+\tfrac{1}{4}\right)\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li XI}$$

$$\mathbf{B_{119}} = \begin{array}{c}\left(y_{18}+z_{18}\right)\mathbf{a}_1+\left(x_{18}+z_{18}\right)\mathbf{a}_2+\\ \left(x_{18}+y_{18}\right)\mathbf{a}_3\end{array} = ax_{18}\,\hat{\mathbf{x}}+ay_{18}\,\hat{\mathbf{y}}+cz_{18}\,\hat{\mathbf{z}} \quad (16e) \quad \text{Li XII}$$

$\mathbf{B_{120}} =$	$-\left(y_{18}-z_{18}\right)\,\mathbf{a}_1 - \left(x_{18}-z_{18}\right)\,\mathbf{a}_2 - \left(x_{18}+y_{18}\right)\,\mathbf{a}_3$	$=$	$-ax_{18}\,\hat{\mathbf{x}} - ay_{18}\,\hat{\mathbf{y}} + cz_{18}\,\hat{\mathbf{z}}$	(16e)	Li XII
$\mathbf{B_{121}} =$	$-\left(x_{18}+z_{18}\right)\,\mathbf{a}_1 + \left(y_{18}-z_{18}\right)\,\mathbf{a}_2 - \left(x_{18}-y_{18}\right)\,\mathbf{a}_3$	$=$	$ay_{18}\,\hat{\mathbf{x}} - ax_{18}\,\hat{\mathbf{y}} - cz_{18}\,\hat{\mathbf{z}}$	(16e)	Li XII
$\mathbf{B_{122}} =$	$\left(x_{18}-z_{18}\right)\,\mathbf{a}_1 - \left(y_{18}+z_{18}\right)\,\mathbf{a}_2 + \left(x_{18}-y_{18}\right)\,\mathbf{a}_3$	$=$	$-ay_{18}\,\hat{\mathbf{x}} + ax_{18}\,\hat{\mathbf{y}} - cz_{18}\,\hat{\mathbf{z}}$	(16e)	Li XII
$\mathbf{B_{123}} =$	$\left(y_{18}-z_{18}+\frac{3}{4}\right)\,\mathbf{a}_1 - \left(x_{18}+z_{18}-\frac{1}{4}\right)\,\mathbf{a}_2 + \left(-x_{18}+y_{18}+\frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$-ax_{18}\,\hat{\mathbf{x}} + a\left(y_{18}+\frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_{18}-\frac{1}{4}\right)\,\hat{\mathbf{z}}$	(16e)	Li XII
$\mathbf{B_{124}} =$	$-\left(y_{18}+z_{18}-\frac{3}{4}\right)\,\mathbf{a}_1 + \left(x_{18}-z_{18}+\frac{1}{4}\right)\,\mathbf{a}_2 + \left(x_{18}-y_{18}+\frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$ax_{18}\,\hat{\mathbf{x}} - a\left(y_{18}-\frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_{18}-\frac{1}{4}\right)\,\hat{\mathbf{z}}$	(16e)	Li XII
$\mathbf{B_{125}} =$	$\left(-x_{18}+z_{18}+\frac{3}{4}\right)\,\mathbf{a}_1 + \left(-y_{18}+z_{18}+\frac{1}{4}\right)\,\mathbf{a}_2 - \left(x_{18}+y_{18}-\frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$-ay_{18}\,\hat{\mathbf{x}} - a\left(x_{18}-\frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_{18}+\frac{1}{4}\right)\,\hat{\mathbf{z}}$	(16e)	Li XII
$\mathbf{B_{126}} =$	$\left(x_{18}+z_{18}+\frac{3}{4}\right)\,\mathbf{a}_1 + \left(y_{18}+z_{18}+\frac{1}{4}\right)\,\mathbf{a}_2 + \left(x_{18}+y_{18}+\frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$ay_{18}\,\hat{\mathbf{x}} + a\left(x_{18}+\frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_{18}+\frac{1}{4}\right)\,\hat{\mathbf{z}}$	(16e)	Li XII

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