$Li_9Al_3(P_2O_7)_3(PO_4)_2$ Structure: A3B9C29D8_hP98_165_f_bdg_df4g_dg-001

https://aflow.org/p/JRX6

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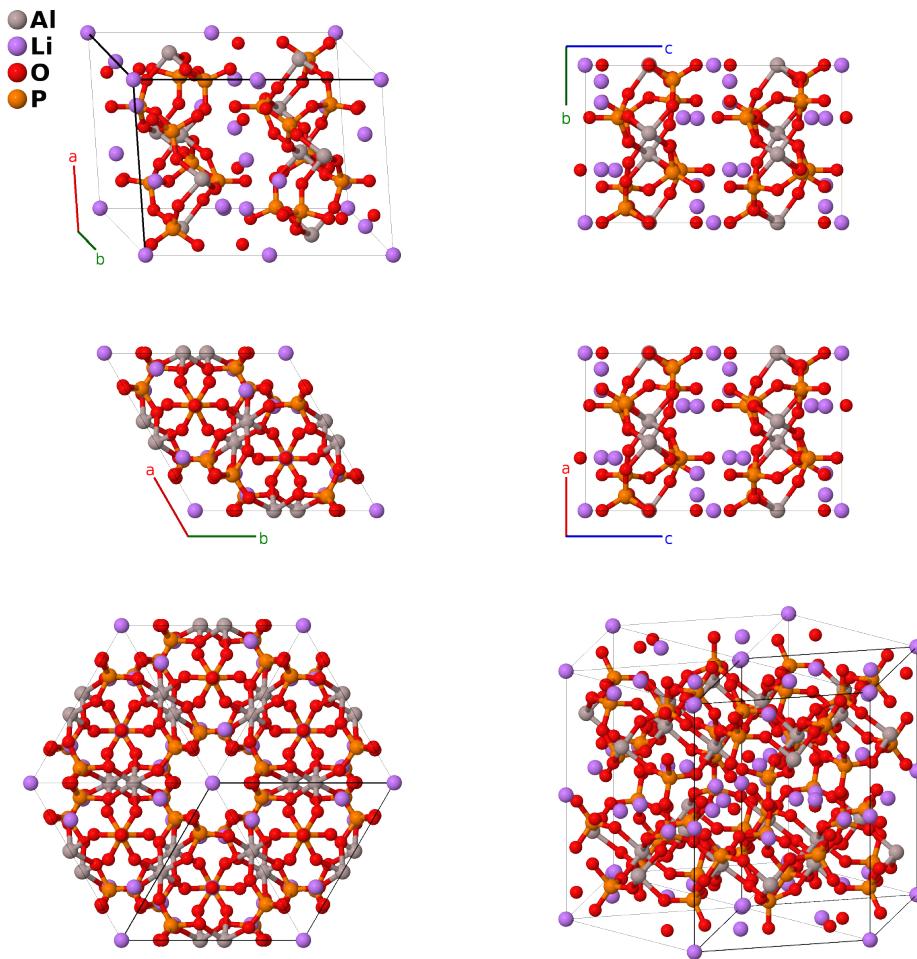
Prototype	$Al_3Li_9O_{29}P_8$
AFLOW prototype label	A3B9C29D8_hP98_165_f_bdg_df4g_dg-001
ICSD	50957
Pearson symbol	hP98
Space group number	165
Space group symbol	$P\bar{3}c1$
AFLOW prototype command	aflow --proto=A3B9C29D8_hP98_165_f_bdg_df4g_dg-001 --params=$a, c/a, z_2, z_3, z_4, x_5, x_6, x_7, y_7, z_7, x_8, y_8, z_8, x_9, y_9, z_9, x_{10}, y_{10}, z_{10}, x_{11}, y_{11},$ $z_{11}, x_{12}, y_{12}, z_{12}$

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Other compounds with this structure

$Li_9Cr_3(P_2O_7)_3(PO_4)_2$, $Li_9Ga_3(P_2O_7)_3(PO_4)_2$, $Li_9Fe_3(P_2O_7)_3(PO_4)_2$

Trigonal (Hexagonal) primitive vectors

$$\mathbf{a_1} = \tfrac{1}{2}a\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}a\,\hat{\mathbf{y}}$$
$$\mathbf{a_2} = \tfrac{1}{2}a\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}a\,\hat{\mathbf{y}}$$
$$\mathbf{a_3} = c\,\hat{\mathbf{z}}$$
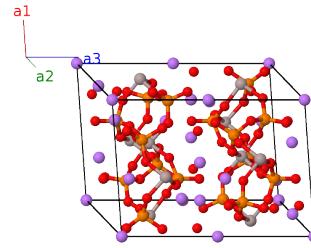
Basis vectors

		Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B_1}$	$=$	0	$=$	0	(2b)	Li I
$\mathbf{B_2}$	$=$	$\tfrac{1}{2}\,\mathbf{a_3}$	$=$	$\tfrac{1}{2}c\,\hat{\mathbf{z}}$	(2b)	Li I
$\mathbf{B_3}$	$=$	$\tfrac{1}{3}\,\mathbf{a_1} + \tfrac{2}{3}\,\mathbf{a_2} + z_2\,\mathbf{a_3}$	$=$	$\tfrac{1}{2}a\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} + cz_2\,\hat{\mathbf{z}}$	(4d)	Li II
$\mathbf{B_4}$	$=$	$\tfrac{2}{3}\,\mathbf{a_1} + \tfrac{1}{3}\,\mathbf{a_2} - \left(z_2 - \tfrac{1}{2}\right)\mathbf{a_3}$	$=$	$\tfrac{1}{2}a\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} - c\left(z_2 - \tfrac{1}{2}\right)\hat{\mathbf{z}}$	(4d)	Li II
$\mathbf{B_5}$	$=$	$\tfrac{2}{3}\,\mathbf{a_1} + \tfrac{1}{3}\,\mathbf{a_2} - z_2\,\mathbf{a_3}$	$=$	$\tfrac{1}{2}a\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} - cz_2\,\hat{\mathbf{z}}$	(4d)	Li II
$\mathbf{B_6}$	$=$	$\tfrac{1}{3}\,\mathbf{a_1} + \tfrac{2}{3}\,\mathbf{a_2} + \left(z_2 + \tfrac{1}{2}\right)\mathbf{a_3}$	$=$	$\tfrac{1}{2}a\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} + c\left(z_2 + \tfrac{1}{2}\right)\hat{\mathbf{z}}$	(4d)	Li II
$\mathbf{B_7}$	$=$	$\tfrac{1}{3}\,\mathbf{a_1} + \tfrac{2}{3}\,\mathbf{a_2} + z_3\,\mathbf{a_3}$	$=$	$\tfrac{1}{2}a\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} + cz_3\,\hat{\mathbf{z}}$	(4d)	O I
$\mathbf{B_8}$	$=$	$\tfrac{2}{3}\,\mathbf{a_1} + \tfrac{1}{3}\,\mathbf{a_2} - \left(z_3 - \tfrac{1}{2}\right)\mathbf{a_3}$	$=$	$\tfrac{1}{2}a\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} - c\left(z_3 - \tfrac{1}{2}\right)\hat{\mathbf{z}}$	(4d)	O I
$\mathbf{B_9}$	$=$	$\tfrac{2}{3}\,\mathbf{a_1} + \tfrac{1}{3}\,\mathbf{a_2} - z_3\,\mathbf{a_3}$	$=$	$\tfrac{1}{2}a\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} - cz_3\,\hat{\mathbf{z}}$	(4d)	O I
$\mathbf{B_{10}}$	$=$	$\tfrac{1}{3}\,\mathbf{a_1} + \tfrac{2}{3}\,\mathbf{a_2} + \left(z_3 + \tfrac{1}{2}\right)\mathbf{a_3}$	$=$	$\tfrac{1}{2}a\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} + c\left(z_3 + \tfrac{1}{2}\right)\hat{\mathbf{z}}$	(4d)	O I
$\mathbf{B_{11}}$	$=$	$\tfrac{1}{3}\,\mathbf{a_1} + \tfrac{2}{3}\,\mathbf{a_2} + z_4\,\mathbf{a_3}$	$=$	$\tfrac{1}{2}a\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} + cz_4\,\hat{\mathbf{z}}$	(4d)	P I
$\mathbf{B_{12}}$	$=$	$\tfrac{2}{3}\,\mathbf{a_1} + \tfrac{1}{3}\,\mathbf{a_2} - \left(z_4 - \tfrac{1}{2}\right)\mathbf{a_3}$	$=$	$\tfrac{1}{2}a\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} - c\left(z_4 - \tfrac{1}{2}\right)\hat{\mathbf{z}}$	(4d)	P I
$\mathbf{B_{13}}$	$=$	$\tfrac{2}{3}\,\mathbf{a_1} + \tfrac{1}{3}\,\mathbf{a_2} - z_4\,\mathbf{a_3}$	$=$	$\tfrac{1}{2}a\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} - cz_4\,\hat{\mathbf{z}}$	(4d)	P I
$\mathbf{B_{14}}$	$=$	$\tfrac{1}{3}\,\mathbf{a_1} + \tfrac{2}{3}\,\mathbf{a_2} + \left(z_4 + \tfrac{1}{2}\right)\mathbf{a_3}$	$=$	$\tfrac{1}{2}a\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} + c\left(z_4 + \tfrac{1}{2}\right)\hat{\mathbf{z}}$	(4d)	P I
$\mathbf{B_{15}}$	$=$	$x_5\,\mathbf{a_1} + \tfrac{1}{4}\,\mathbf{a_3}$	$=$	$\tfrac{1}{2}ax_5\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ax_5\,\hat{\mathbf{y}} + \tfrac{1}{4}c\,\hat{\mathbf{z}}$	(6f)	Al I
$\mathbf{B_{16}}$	$=$	$x_5\,\mathbf{a_2} + \tfrac{1}{4}\,\mathbf{a_3}$	$=$	$\tfrac{1}{2}ax_5\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ax_5\,\hat{\mathbf{y}} + \tfrac{1}{4}c\,\hat{\mathbf{z}}$	(6f)	Al I
$\mathbf{B_{17}}$	$=$	$-x_5\,\mathbf{a_1} - x_5\,\mathbf{a_2} + \tfrac{1}{4}\,\mathbf{a_3}$	$=$	$-ax_5\,\hat{\mathbf{x}} + \tfrac{1}{4}c\,\hat{\mathbf{z}}$	(6f)	Al I
$\mathbf{B_{18}}$	$=$	$-x_5\,\mathbf{a_1} + \tfrac{3}{4}\,\mathbf{a_3}$	$=$	$-\tfrac{1}{2}ax_5\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ax_5\,\hat{\mathbf{y}} + \tfrac{3}{4}c\,\hat{\mathbf{z}}$	(6f)	Al I
$\mathbf{B_{19}}$	$=$	$-x_5\,\mathbf{a_2} + \tfrac{3}{4}\,\mathbf{a_3}$	$=$	$-\tfrac{1}{2}ax_5\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ax_5\,\hat{\mathbf{y}} + \tfrac{3}{4}c\,\hat{\mathbf{z}}$	(6f)	Al I
$\mathbf{B_{20}}$	$=$	$x_5\,\mathbf{a_1} + x_5\,\mathbf{a_2} + \tfrac{3}{4}\,\mathbf{a_3}$	$=$	$ax_5\,\hat{\mathbf{x}} + \tfrac{3}{4}c\,\hat{\mathbf{z}}$	(6f)	Al I
$\mathbf{B_{21}}$	$=$	$x_6\,\mathbf{a_1} + \tfrac{1}{4}\,\mathbf{a_3}$	$=$	$\tfrac{1}{2}ax_6\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ax_6\,\hat{\mathbf{y}} + \tfrac{1}{4}c\,\hat{\mathbf{z}}$	(6f)	O II
$\mathbf{B_{22}}$	$=$	$x_6\,\mathbf{a_2} + \tfrac{1}{4}\,\mathbf{a_3}$	$=$	$\tfrac{1}{2}ax_6\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ax_6\,\hat{\mathbf{y}} + \tfrac{1}{4}c\,\hat{\mathbf{z}}$	(6f)	O II
$\mathbf{B_{23}}$	$=$	$-x_6\,\mathbf{a_1} - x_6\,\mathbf{a_2} + \tfrac{1}{4}\,\mathbf{a_3}$	$=$	$-ax_6\,\hat{\mathbf{x}} + \tfrac{1}{4}c\,\hat{\mathbf{z}}$	(6f)	O II
$\mathbf{B_{24}}$	$=$	$-x_6\,\mathbf{a_1} + \tfrac{3}{4}\,\mathbf{a_3}$	$=$	$-\tfrac{1}{2}ax_6\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ax_6\,\hat{\mathbf{y}} + \tfrac{3}{4}c\,\hat{\mathbf{z}}$	(6f)	O II
$\mathbf{B_{25}}$	$=$	$-x_6\,\mathbf{a_2} + \tfrac{3}{4}\,\mathbf{a_3}$	$=$	$-\tfrac{1}{2}ax_6\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ax_6\,\hat{\mathbf{y}} + \tfrac{3}{4}c\,\hat{\mathbf{z}}$	(6f)	O II
$\mathbf{B_{26}}$	$=$	$x_6\,\mathbf{a_1} + x_6\,\mathbf{a_2} + \tfrac{3}{4}\,\mathbf{a_3}$	$=$	$ax_6\,\hat{\mathbf{x}} + \tfrac{3}{4}c\,\hat{\mathbf{z}}$	(6f)	O II
$\mathbf{B_{27}}$	$=$	$x_7\,\mathbf{a_1} + y_7\,\mathbf{a_2} + z_7\,\mathbf{a_3}$	$=$	$\tfrac{1}{2}a\left(x_7 + y_7\right)\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}a\left(x_7 - y_7\right)\hat{\mathbf{y}} + cz_7\,\hat{\mathbf{z}}$	(12g)	Li III
$\mathbf{B_{28}}$	$=$	$-y_7\,\mathbf{a_1} + \left(x_7 - y_7\right)\mathbf{a_2} + z_7\,\mathbf{a_3}$	$=$	$\tfrac{1}{2}a\left(x_7 - 2y_7\right)\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ax_7\,\hat{\mathbf{y}} + cz_7\,\hat{\mathbf{z}}$	(12g)	Li III

$$\mathbf{B_{29}} = -(x_7 - y_7)\,\mathbf{a_1} - x_7\,\mathbf{a_2} + z_7\,\mathbf{a_3} = -\tfrac{1}{2}a\,(2x_7 - y_7)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ay_7\,\hat{\mathbf{y}} + cz_7\,\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{Li III}$$

$$\mathbf{B_{30}} = y_7\,\mathbf{a_1} + x_7\,\mathbf{a_2} - \left(z_7 - \tfrac{1}{2}\right)\mathbf{a_3} = \tfrac{1}{2}a\,(x_7 + y_7)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}a\,(x_7 - y_7)\,\hat{\mathbf{y}} - c\left(z_7 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{Li III}$$

$$\mathbf{B_{31}} = (x_7 - y_7)\,\mathbf{a_1} - y_7\,\mathbf{a_2} - \left(z_7 - \tfrac{1}{2}\right)\mathbf{a_3} = \tfrac{1}{2}a\,(x_7 - 2y_7)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ax_7\,\hat{\mathbf{y}} - c\left(z_7 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{Li III}$$

$$\mathbf{B_{32}} = -x_7\,\mathbf{a_1} - (x_7 - y_7)\,\mathbf{a_2} - \left(z_7 - \tfrac{1}{2}\right)\mathbf{a_3} = -\tfrac{1}{2}a\,(2x_7 - y_7)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ay_7\,\hat{\mathbf{y}} - c\left(z_7 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{Li III}$$

$$\mathbf{B_{33}} = -x_7\,\mathbf{a_1} - y_7\,\mathbf{a_2} - z_7\,\mathbf{a_3} = -\tfrac{1}{2}a\,(x_7 + y_7)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}a\,(x_7 - y_7)\,\hat{\mathbf{y}} - cz_7\,\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{Li III}$$

$$\mathbf{B_{34}} = y_7\,\mathbf{a_1} - (x_7 - y_7)\,\mathbf{a_2} - z_7\,\mathbf{a_3} = \tfrac{1}{2}a\,(-x_7 + 2y_7)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ax_7\,\hat{\mathbf{y}} - cz_7\,\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{Li III}$$

$$\mathbf{B_{35}} = (x_7 - y_7)\,\mathbf{a_1} + x_7\,\mathbf{a_2} - z_7\,\mathbf{a_3} = \tfrac{1}{2}a\,(2x_7 - y_7)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ay_7\,\hat{\mathbf{y}} - cz_7\,\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{Li III}$$

$$\mathbf{B_{36}} = -y_7\,\mathbf{a_1} - x_7\,\mathbf{a_2} + \left(z_7 + \tfrac{1}{2}\right)\mathbf{a_3} = -\tfrac{1}{2}a\,(x_7 + y_7)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}a\,(x_7 - y_7)\,\hat{\mathbf{y}} + c\left(z_7 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{Li III}$$

$$\mathbf{B_{37}} = -(x_7 - y_7)\,\mathbf{a_1} + y_7\,\mathbf{a_2} + \left(z_7 + \tfrac{1}{2}\right)\mathbf{a_3} = \tfrac{1}{2}a\,(-x_7 + 2y_7)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ax_7\,\hat{\mathbf{y}} + c\left(z_7 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{Li III}$$

$$\mathbf{B_{38}} = x_7\,\mathbf{a_1} + (x_7 - y_7)\,\mathbf{a_2} + \left(z_7 + \tfrac{1}{2}\right)\mathbf{a_3} = \tfrac{1}{2}a\,(2x_7 - y_7)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ay_7\,\hat{\mathbf{y}} + c\left(z_7 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{Li III}$$

$$\mathbf{B_{39}} = x_8\,\mathbf{a_1} + y_8\,\mathbf{a_2} + z_8\,\mathbf{a_3} = \tfrac{1}{2}a\,(x_8 + y_8)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}a\,(x_8 - y_8)\,\hat{\mathbf{y}} + cz_8\,\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O III}$$

$$\mathbf{B_{40}} = -y_8\,\mathbf{a_1} + (x_8 - y_8)\,\mathbf{a_2} + z_8\,\mathbf{a_3} = \tfrac{1}{2}a\,(x_8 - 2y_8)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ax_8\,\hat{\mathbf{y}} + cz_8\,\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O III}$$

$$\mathbf{B_{41}} = -(x_8 - y_8)\,\mathbf{a_1} - x_8\,\mathbf{a_2} + z_8\,\mathbf{a_3} = -\tfrac{1}{2}a\,(2x_8 - y_8)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ay_8\,\hat{\mathbf{y}} + cz_8\,\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O III}$$

$$\mathbf{B_{42}} = y_8\,\mathbf{a_1} + x_8\,\mathbf{a_2} - \left(z_8 - \tfrac{1}{2}\right)\mathbf{a_3} = \tfrac{1}{2}a\,(x_8 + y_8)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}a\,(x_8 - y_8)\,\hat{\mathbf{y}} - c\left(z_8 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O III}$$

$$\mathbf{B_{43}} = (x_8 - y_8)\,\mathbf{a_1} - y_8\,\mathbf{a_2} - \left(z_8 - \tfrac{1}{2}\right)\mathbf{a_3} = \tfrac{1}{2}a\,(x_8 - 2y_8)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ax_8\,\hat{\mathbf{y}} - c\left(z_8 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O III}$$

$$\mathbf{B_{44}} = -x_8\,\mathbf{a_1} - (x_8 - y_8)\,\mathbf{a_2} - \left(z_8 - \tfrac{1}{2}\right)\mathbf{a_3} = -\tfrac{1}{2}a\,(2x_8 - y_8)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ay_8\,\hat{\mathbf{y}} - c\left(z_8 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O III}$$

$$\mathbf{B_{45}} = -x_8\,\mathbf{a_1} - y_8\,\mathbf{a_2} - z_8\,\mathbf{a_3} = -\tfrac{1}{2}a\,(x_8 + y_8)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}a\,(x_8 - y_8)\,\hat{\mathbf{y}} - cz_8\,\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O III}$$

$$\mathbf{B_{46}} = y_8\,\mathbf{a_1} - (x_8 - y_8)\,\mathbf{a_2} - z_8\,\mathbf{a_3} = \tfrac{1}{2}a\,(-x_8 + 2y_8)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ax_8\,\hat{\mathbf{y}} - cz_8\,\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O III}$$

$$\mathbf{B_{47}} = (x_8 - y_8)\,\mathbf{a_1} + x_8\,\mathbf{a_2} - z_8\,\mathbf{a_3} = \tfrac{1}{2}a\,(2x_8 - y_8)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ay_8\,\hat{\mathbf{y}} - cz_8\,\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O III}$$

$$\mathbf{B_{48}} = -y_8\,\mathbf{a_1} - x_8\,\mathbf{a_2} + \left(z_8 + \tfrac{1}{2}\right)\mathbf{a_3} = -\tfrac{1}{2}a\,(x_8 + y_8)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}a\,(x_8 - y_8)\,\hat{\mathbf{y}} + c\left(z_8 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O III}$$

$$\mathbf{B_{49}} = -(x_8 - y_8)\,\mathbf{a_1} + y_8\,\mathbf{a_2} + \left(z_8 + \tfrac{1}{2}\right)\mathbf{a_3} = \tfrac{1}{2}a\,(-x_8 + 2y_8)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ax_8\,\hat{\mathbf{y}} + c\left(z_8 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O III}$$

$$\mathbf{B_{50}} = x_8\,\mathbf{a_1} + (x_8 - y_8)\,\mathbf{a_2} + \left(z_8 + \tfrac{1}{2}\right)\mathbf{a_3} = \tfrac{1}{2}a\,(2x_8 - y_8)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ay_8\,\hat{\mathbf{y}} + c\left(z_8 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O III}$$

$$\mathbf{B_{51}} = x_9\,\mathbf{a_1} + y_9\,\mathbf{a_2} + z_9\,\mathbf{a_3} = \tfrac{1}{2}a\,(x_9 + y_9)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}a\,(x_9 - y_9)\,\hat{\mathbf{y}} + cz_9\,\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O IV}$$

$$\mathbf{B_{52}} = -y_9\,\mathbf{a_1} + (x_9 - y_9)\,\mathbf{a_2} + z_9\,\mathbf{a_3} = \tfrac{1}{2}a\,(x_9 - 2y_9)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} + cz_9\,\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O IV}$$

$$\mathbf{B_{53}} = -(x_9 - y_9)\,\mathbf{a_1} - x_9\,\mathbf{a_2} + z_9\,\mathbf{a_3} = -\tfrac{1}{2}a\,(2x_9 - y_9)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ay_9\,\hat{\mathbf{y}} + cz_9\,\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O IV}$$

$$\mathbf{B_{54}} = y_9\,\mathbf{a_1} + x_9\,\mathbf{a_2} - \left(z_9 - \tfrac{1}{2}\right)\mathbf{a_3} = \tfrac{1}{2}a\,(x_9 + y_9)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}a\,(x_9 - y_9)\,\hat{\mathbf{y}} - c\left(z_9 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O IV}$$

$$\mathbf{B_{55}} = (x_9 - y_9)\,\mathbf{a_1} - y_9\,\mathbf{a_2} - \left(z_9 - \tfrac{1}{2}\right)\mathbf{a_3} = \tfrac{1}{2}a\,(x_9 - 2y_9)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} - c\left(z_9 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O IV}$$

$$\mathbf{B_{56}} = -x_9\,\mathbf{a_1} - (x_9 - y_9)\,\mathbf{a_2} - \left(z_9 - \tfrac{1}{2}\right)\mathbf{a_3} = -\tfrac{1}{2}a\,(2x_9 - y_9)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ay_9\,\hat{\mathbf{y}} - c\left(z_9 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O IV}$$

$$\mathbf{B_{57}} = -x_9\,\mathbf{a_1} - y_9\,\mathbf{a_2} - z_9\,\mathbf{a_3} = -\tfrac{1}{2}a\,(x_9 + y_9)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}a\,(x_9 - y_9)\,\hat{\mathbf{y}} - cz_9\,\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O IV}$$

$$\mathbf{B_{58}} = y_9\,\mathbf{a_1} - (x_9 - y_9)\,\mathbf{a_2} - z_9\,\mathbf{a_3} = \tfrac{1}{2}a\,(-x_9 + 2y_9)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} - cz_9\,\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O IV}$$

$$\mathbf{B_{59}} = (x_9 - y_9)\,\mathbf{a_1} + x_9\,\mathbf{a_2} - z_9\,\mathbf{a_3} = \tfrac{1}{2}a\,(2x_9 - y_9)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ay_9\,\hat{\mathbf{y}} - cz_9\,\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O IV}$$

$$\mathbf{B_{60}} = -y_9\,\mathbf{a_1} - x_9\,\mathbf{a_2} + \left(z_9 + \tfrac{1}{2}\right)\mathbf{a_3} = -\tfrac{1}{2}a\,(x_9 + y_9)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}a\,(x_9 - y_9)\,\hat{\mathbf{y}} + c\left(z_9 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O IV}$$

$$\mathbf{B_{61}} = -(x_9 - y_9)\,\mathbf{a_1} + y_9\,\mathbf{a_2} + \left(z_9 + \tfrac{1}{2}\right)\mathbf{a_3} = \tfrac{1}{2}a\,(-x_9 + 2y_9)\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} + c\left(z_9 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(12g)} \qquad \text{O IV}$$

$$\mathbf{B_{62}} \quad = \quad x_9\,\mathbf{a_1} + (x_9 - y_9)\,\mathbf{a_2} + \left(z_9 + \tfrac{1}{2}\right)\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(2x_9 - y_9)\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ay_9\,\hat{\mathbf{y}} + c\left(z_9 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O IV}$$

$$\mathbf{B_{63}} \quad = \quad x_{10}\,\mathbf{a_1} + y_{10}\,\mathbf{a_2} + z_{10}\,\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(x_{10} + y_{10})\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}a\,(x_{10} - y_{10})\,\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O V}$$

$$\mathbf{B_{64}} \quad = \quad -y_{10}\,\mathbf{a_1} + (x_{10} - y_{10})\,\mathbf{a_2} + z_{10}\,\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(x_{10} - 2y_{10})\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O V}$$

$$\mathbf{B_{65}} \quad = \quad -(x_{10} - y_{10})\,\mathbf{a_1} - x_{10}\,\mathbf{a_2} + z_{10}\,\mathbf{a_3} \quad = \quad -\tfrac{1}{2}a\,(2x_{10} - y_{10})\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ay_{10}\,\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O V}$$

$$\mathbf{B_{66}} \quad = \quad y_{10}\,\mathbf{a_1} + x_{10}\,\mathbf{a_2} - \left(z_{10} - \tfrac{1}{2}\right)\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(x_{10} + y_{10})\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}a\,(x_{10} - y_{10})\,\hat{\mathbf{y}} - c\left(z_{10} - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O V}$$

$$\mathbf{B_{67}} \quad = \quad (x_{10} - y_{10})\,\mathbf{a_1} - y_{10}\,\mathbf{a_2} - \left(z_{10} - \tfrac{1}{2}\right)\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(x_{10} - 2y_{10})\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} - c\left(z_{10} - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O V}$$

$$\mathbf{B_{68}} \quad = \quad -x_{10}\,\mathbf{a_1} - (x_{10} - y_{10})\,\mathbf{a_2} - \left(z_{10} - \tfrac{1}{2}\right)\mathbf{a_3} \quad = \quad -\tfrac{1}{2}a\,(2x_{10} - y_{10})\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ay_{10}\,\hat{\mathbf{y}} - c\left(z_{10} - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O V}$$

$$\mathbf{B_{69}} \quad = \quad -x_{10}\,\mathbf{a_1} - y_{10}\,\mathbf{a_2} - z_{10}\,\mathbf{a_3} \quad = \quad -\tfrac{1}{2}a\,(x_{10} + y_{10})\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}a\,(x_{10} - y_{10})\,\hat{\mathbf{y}} - cz_{10}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O V}$$

$$\mathbf{B_{70}} \quad = \quad y_{10}\,\mathbf{a_1} - (x_{10} - y_{10})\,\mathbf{a_2} - z_{10}\,\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(-x_{10} + 2y_{10})\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} - cz_{10}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O V}$$

$$\mathbf{B_{71}} \quad = \quad (x_{10} - y_{10})\,\mathbf{a_1} + x_{10}\,\mathbf{a_2} - z_{10}\,\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(2x_{10} - y_{10})\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ay_{10}\,\hat{\mathbf{y}} - cz_{10}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O V}$$

$$\mathbf{B_{72}} \quad = \quad -y_{10}\,\mathbf{a_1} - x_{10}\,\mathbf{a_2} + \left(z_{10} + \tfrac{1}{2}\right)\mathbf{a_3} \quad = \quad -\tfrac{1}{2}a\,(x_{10} + y_{10})\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}a\,(x_{10} - y_{10})\,\hat{\mathbf{y}} + c\left(z_{10} + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O V}$$

$$\mathbf{B_{73}} \quad = \quad -(x_{10} - y_{10})\,\mathbf{a_1} + y_{10}\,\mathbf{a_2} + \left(z_{10} + \tfrac{1}{2}\right)\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(-x_{10} + 2y_{10})\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} + c\left(z_{10} + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O V}$$

$$\mathbf{B_{74}} \quad = \quad x_{10}\,\mathbf{a_1} + (x_{10} - y_{10})\,\mathbf{a_2} + \left(z_{10} + \tfrac{1}{2}\right)\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(2x_{10} - y_{10})\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ay_{10}\,\hat{\mathbf{y}} + c\left(z_{10} + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O V}$$

$$\mathbf{B_{75}} \quad = \quad x_{11}\,\mathbf{a_1} + y_{11}\,\mathbf{a_2} + z_{11}\,\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(x_{11} + y_{11})\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}a\,(x_{11} - y_{11})\,\hat{\mathbf{y}} + cz_{11}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O VI}$$

$$\mathbf{B_{76}} \quad = \quad -y_{11}\,\mathbf{a_1} + (x_{11} - y_{11})\,\mathbf{a_2} + z_{11}\,\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(x_{11} - 2y_{11})\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} + cz_{11}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O VI}$$

$$\mathbf{B_{77}} \quad = \quad -(x_{11} - y_{11})\,\mathbf{a_1} - x_{11}\,\mathbf{a_2} + z_{11}\,\mathbf{a_3} \quad = \quad -\tfrac{1}{2}a\,(2x_{11} - y_{11})\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ay_{11}\,\hat{\mathbf{y}} + cz_{11}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O VI}$$

$$\mathbf{B_{78}} \quad = \quad y_{11}\,\mathbf{a_1} + x_{11}\,\mathbf{a_2} - \left(z_{11} - \tfrac{1}{2}\right)\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(x_{11} + y_{11})\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}a\,(x_{11} - y_{11})\,\hat{\mathbf{y}} - c\left(z_{11} - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O VI}$$

$$\mathbf{B_{79}} \quad = \quad (x_{11} - y_{11})\,\mathbf{a_1} - y_{11}\,\mathbf{a_2} - \left(z_{11} - \tfrac{1}{2}\right)\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(x_{11} - 2y_{11})\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} - c\left(z_{11} - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O VI}$$

$$\mathbf{B_{80}} \quad = \quad -x_{11}\,\mathbf{a_1} - (x_{11} - y_{11})\,\mathbf{a_2} - \left(z_{11} - \tfrac{1}{2}\right)\mathbf{a_3} \quad = \quad -\tfrac{1}{2}a\,(2x_{11} - y_{11})\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ay_{11}\,\hat{\mathbf{y}} - c\left(z_{11} - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O VI}$$

$$\mathbf{B_{81}} \quad = \quad -x_{11}\,\mathbf{a_1} - y_{11}\,\mathbf{a_2} - z_{11}\,\mathbf{a_3} \quad = \quad -\tfrac{1}{2}a\,(x_{11} + y_{11})\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}a\,(x_{11} - y_{11})\,\hat{\mathbf{y}} - cz_{11}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O VI}$$

$$\mathbf{B_{82}} \quad = \quad y_{11}\,\mathbf{a_1} - (x_{11} - y_{11})\,\mathbf{a_2} - z_{11}\,\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(-x_{11} + 2y_{11})\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} - cz_{11}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O VI}$$

$$\mathbf{B_{83}} \quad = \quad (x_{11} - y_{11})\,\mathbf{a_1} + x_{11}\,\mathbf{a_2} - z_{11}\,\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(2x_{11} - y_{11})\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ay_{11}\,\hat{\mathbf{y}} - cz_{11}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O VI}$$

$$\mathbf{B_{84}} \quad = \quad -y_{11}\,\mathbf{a_1} - x_{11}\,\mathbf{a_2} + \left(z_{11} + \tfrac{1}{2}\right)\mathbf{a_3} \quad = \quad -\tfrac{1}{2}a\,(x_{11} + y_{11})\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}a\,(x_{11} - y_{11})\,\hat{\mathbf{y}} + c\left(z_{11} + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O VI}$$

$$\mathbf{B_{85}} \quad = \quad -(x_{11} - y_{11})\,\mathbf{a_1} + y_{11}\,\mathbf{a_2} + \left(z_{11} + \tfrac{1}{2}\right)\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(-x_{11} + 2y_{11})\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} + c\left(z_{11} + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O VI}$$

$$\mathbf{B_{86}} \quad = \quad x_{11}\,\mathbf{a_1} + (x_{11} - y_{11})\,\mathbf{a_2} + \left(z_{11} + \tfrac{1}{2}\right)\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(2x_{11} - y_{11})\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ay_{11}\,\hat{\mathbf{y}} + c\left(z_{11} + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{O VI}$$

$$\mathbf{B_{87}} \quad = \quad x_{12}\,\mathbf{a_1} + y_{12}\,\mathbf{a_2} + z_{12}\,\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(x_{12} + y_{12})\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}a\,(x_{12} - y_{12})\,\hat{\mathbf{y}} + cz_{12}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{P II}$$

$$\mathbf{B_{88}} \quad = \quad -y_{12}\,\mathbf{a_1} + (x_{12} - y_{12})\,\mathbf{a_2} + z_{12}\,\mathbf{a_3} \quad = \quad \tfrac{1}{2}a\,(x_{12} - 2y_{12})\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ax_{12}\,\hat{\mathbf{y}} + cz_{12}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{P II}$$

$$\mathbf{B_{89}} \quad = \quad -(x_{12} - y_{12})\,\mathbf{a_1} - x_{12}\,\mathbf{a_2} + z_{12}\,\mathbf{a_3} \quad = \quad -\tfrac{1}{2}a\,(2x_{12} - y_{12})\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ay_{12}\,\hat{\mathbf{y}} + cz_{12}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{P II}$$

$$\mathbf{B}_{90} = y_{12}\,\mathbf{a}_1 + x_{12}\,\mathbf{a}_2 - \left(z_{12} - \tfrac{1}{2}\right)\mathbf{a}_3 = \tfrac{1}{2}a\left(x_{12} + y_{12}\right)\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}a\left(x_{12} - y_{12}\right)\hat{\mathbf{y}} - c\left(z_{12} - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{P II}$$

$$\mathbf{B}_{91} = \left(x_{12} - y_{12}\right)\mathbf{a}_1 - y_{12}\,\mathbf{a}_2 - \left(z_{12} - \tfrac{1}{2}\right)\mathbf{a}_3 = \tfrac{1}{2}a\left(x_{12} - 2y_{12}\right)\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ax_{12}\,\hat{\mathbf{y}} - c\left(z_{12} - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{P II}$$

$$\mathbf{B}_{92} = -x_{12}\,\mathbf{a}_1 - \left(x_{12} - y_{12}\right)\mathbf{a}_2 - \left(z_{12} - \tfrac{1}{2}\right)\mathbf{a}_3 = -\tfrac{1}{2}a\left(2x_{12} - y_{12}\right)\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ay_{12}\,\hat{\mathbf{y}} - c\left(z_{12} - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{P II}$$

$$\mathbf{B}_{93} = -x_{12}\,\mathbf{a}_1 - y_{12}\,\mathbf{a}_2 - z_{12}\,\mathbf{a}_3 = -\tfrac{1}{2}a\left(x_{12} + y_{12}\right)\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}a\left(x_{12} - y_{12}\right)\hat{\mathbf{y}} - cz_{12}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{P II}$$

$$\mathbf{B}_{94} = y_{12}\,\mathbf{a}_1 - \left(x_{12} - y_{12}\right)\mathbf{a}_2 - z_{12}\,\mathbf{a}_3 = \tfrac{1}{2}a\left(-x_{12} + 2y_{12}\right)\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ax_{12}\,\hat{\mathbf{y}} - cz_{12}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{P II}$$

$$\mathbf{B}_{95} = \left(x_{12} - y_{12}\right)\mathbf{a}_1 + x_{12}\,\mathbf{a}_2 - z_{12}\,\mathbf{a}_3 = \tfrac{1}{2}a\left(2x_{12} - y_{12}\right)\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ay_{12}\,\hat{\mathbf{y}} - cz_{12}\,\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{P II}$$

$$\mathbf{B}_{96} = -y_{12}\,\mathbf{a}_1 - x_{12}\,\mathbf{a}_2 + \left(z_{12} + \tfrac{1}{2}\right)\mathbf{a}_3 = -\tfrac{1}{2}a\left(x_{12} + y_{12}\right)\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}a\left(x_{12} - y_{12}\right)\hat{\mathbf{y}} + c\left(z_{12} + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{P II}$$

$$\mathbf{B}_{97} = -\left(x_{12} - y_{12}\right)\mathbf{a}_1 + y_{12}\,\mathbf{a}_2 + \left(z_{12} + \tfrac{1}{2}\right)\mathbf{a}_3 = \tfrac{1}{2}a\left(-x_{12} + 2y_{12}\right)\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}ax_{12}\,\hat{\mathbf{y}} + c\left(z_{12} + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{P II}$$

$$\mathbf{B}_{98} = x_{12}\,\mathbf{a}_1 + \left(x_{12} - y_{12}\right)\mathbf{a}_2 + \left(z_{12} + \tfrac{1}{2}\right)\mathbf{a}_3 = \tfrac{1}{2}a\left(2x_{12} - y_{12}\right)\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}ay_{12}\,\hat{\mathbf{y}} + c\left(z_{12} + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad (12\text{g}) \qquad \text{P II}$$

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