$Nd_4Re_2O_{11}$ Structure: A4B11C2_tP68_86_2g_ab5g_g-001

This structure originally had the label `A4B11C2_tP68_86_2g_ab5g_g`. Calls to that address will be redirected here.

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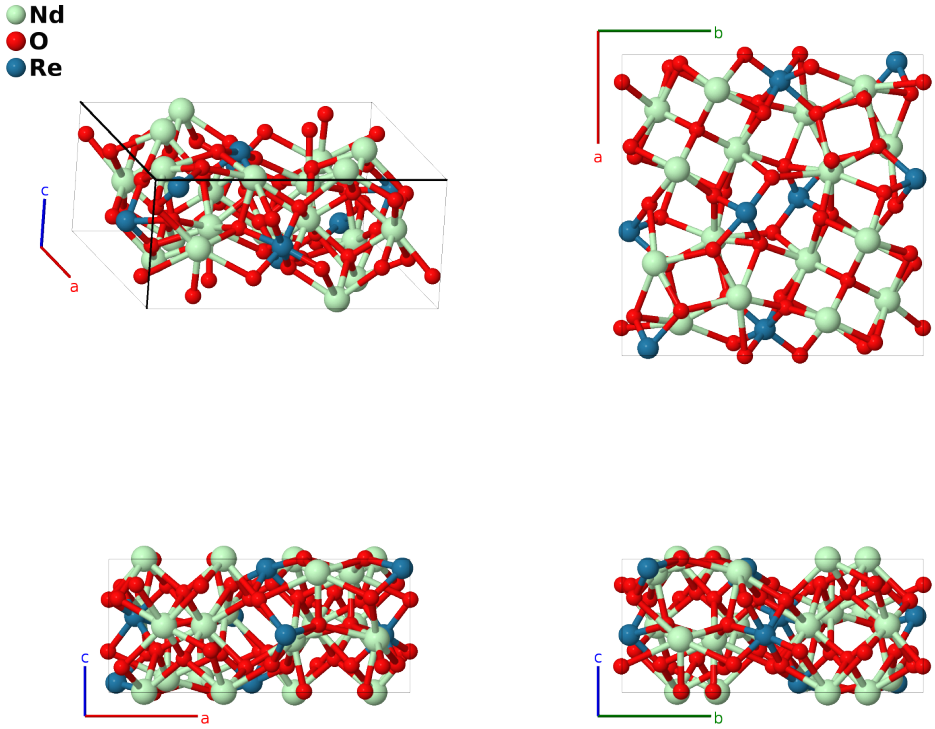
https://aflow.org/p/8MQB

https://aflow.org/p/A4B11C2_tP68_86_2g_ab5g_g-001

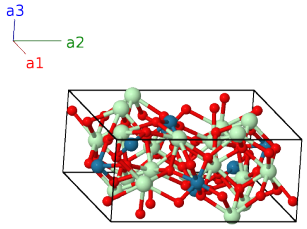


Prototype	$Nd_4O_{11}Re_2$
AFLOW prototype label	A4B11C2_tP68_86_2g_ab5g_g-001
ICSD	15042
Pearson symbol	tP68
Space group number	86
Space group symbol	$P4_2/n$
AFLOW prototype command	`aflow --proto=A4B11C2_tP68_86_2g_ab5g_g-001 --params=`$a, c/a, x_3, y_3, z_3, x_4, y_4, z_4, x_5, y_5, z_5, x_6, y_6, z_6, x_7, y_7, z_7, x_8, y_8, z_8, x_9, y_9, z_9, x_{10}, y_{10}, z_{10}$

- (Wilhelmi, 1970) has a misprint for the Wyckoff position of the Nd-II atom, although the nearest-neighbor distances are correct. (Downs, 2003) corrects the position to be consistent with those distances, and we use their value. The ICSD entry also includes this correction.

Simple Tetragonal primitive vectors

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



Basis vectors

		Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B_1}$	=	$\frac{1}{4}\,\mathbf{a}_1 + \frac{1}{4}\,\mathbf{a}_2 + \frac{1}{4}\,\mathbf{a}_3$	=	$\frac{1}{4}a\,\hat{\mathbf{x}} + \frac{1}{4}a\,\hat{\mathbf{y}} + \frac{1}{4}c\,\hat{\mathbf{z}}$	(2a)	O I
$\mathbf{B_2}$	=	$\frac{3}{4}\,\mathbf{a}_1 + \frac{3}{4}\,\mathbf{a}_2 + \frac{3}{4}\,\mathbf{a}_3$	=	$\frac{3}{4}a\,\hat{\mathbf{x}} + \frac{3}{4}a\,\hat{\mathbf{y}} + \frac{3}{4}c\,\hat{\mathbf{z}}$	(2a)	O I
$\mathbf{B_3}$	=	$\frac{1}{4}\,\mathbf{a}_1 + \frac{1}{4}\,\mathbf{a}_2 + \frac{3}{4}\,\mathbf{a}_3$	=	$\frac{1}{4}a\,\hat{\mathbf{x}} + \frac{1}{4}a\,\hat{\mathbf{y}} + \frac{3}{4}c\,\hat{\mathbf{z}}$	(2b)	O II
$\mathbf{B_4}$	=	$\frac{3}{4}\,\mathbf{a}_1 + \frac{3}{4}\,\mathbf{a}_2 + \frac{1}{4}\,\mathbf{a}_3$	=	$\frac{3}{4}a\,\hat{\mathbf{x}} + \frac{3}{4}a\,\hat{\mathbf{y}} + \frac{1}{4}c\,\hat{\mathbf{z}}$	(2b)	O II
$\mathbf{B_5}$	=	$x_3\,\mathbf{a}_1 + y_3\,\mathbf{a}_2 + z_3\,\mathbf{a}_3$	=	$ax_3\,\hat{\mathbf{x}} + ay_3\,\hat{\mathbf{y}} + cz_3\,\hat{\mathbf{z}}$	(8g)	Nd I
$\mathbf{B_6}$	=	$-\left(x_3 - \frac{1}{2}\right)\,\mathbf{a}_1 - \left(y_3 - \frac{1}{2}\right)\,\mathbf{a}_2 + z_3\,\mathbf{a}_3$	=	$-a\left(x_3 - \frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(y_3 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + cz_3\,\hat{\mathbf{z}}$	(8g)	Nd I
$\mathbf{B_7}$	=	$-y_3\,\mathbf{a}_1 + \left(x_3 + \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_3 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-ay_3\,\hat{\mathbf{x}} + a\left(x_3 + \frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_3 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(8g)	Nd I
$\mathbf{B_8}$	=	$\left(y_3 + \frac{1}{2}\right)\,\mathbf{a}_1 - x_3\,\mathbf{a}_2 + \left(z_3 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$a\left(y_3 + \frac{1}{2}\right)\,\hat{\mathbf{x}} - ax_3\,\hat{\mathbf{y}} + c\left(z_3 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(8g)	Nd I
$\mathbf{B_9}$	=	$-x_3\,\mathbf{a}_1 - y_3\,\mathbf{a}_2 - z_3\,\mathbf{a}_3$	=	$-ax_3\,\hat{\mathbf{x}} - ay_3\,\hat{\mathbf{y}} - cz_3\,\hat{\mathbf{z}}$	(8g)	Nd I
$\mathbf{B_{10}}$	=	$\left(x_3 + \frac{1}{2}\right)\,\mathbf{a}_1 + \left(y_3 + \frac{1}{2}\right)\,\mathbf{a}_2 - z_3\,\mathbf{a}_3$	=	$a\left(x_3 + \frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(y_3 + \frac{1}{2}\right)\,\hat{\mathbf{y}} - cz_3\,\hat{\mathbf{z}}$	(8g)	Nd I
$\mathbf{B_{11}}$	=	$y_3\,\mathbf{a}_1 - \left(x_3 - \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_3 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$ay_3\,\hat{\mathbf{x}} - a\left(x_3 - \frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_3 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(8g)	Nd I
$\mathbf{B_{12}}$	=	$-\left(y_3 - \frac{1}{2}\right)\,\mathbf{a}_1 + x_3\,\mathbf{a}_2 - \left(z_3 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-a\left(y_3 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + ax_3\,\hat{\mathbf{y}} - c\left(z_3 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(8g)	Nd I
$\mathbf{B_{13}}$	=	$x_4\,\mathbf{a}_1 + y_4\,\mathbf{a}_2 + z_4\,\mathbf{a}_3$	=	$ax_4\,\hat{\mathbf{x}} + ay_4\,\hat{\mathbf{y}} + cz_4\,\hat{\mathbf{z}}$	(8g)	Nd II
$\mathbf{B_{14}}$	=	$-\left(x_4 - \frac{1}{2}\right)\,\mathbf{a}_1 - \left(y_4 - \frac{1}{2}\right)\,\mathbf{a}_2 + z_4\,\mathbf{a}_3$	=	$-a\left(x_4 - \frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(y_4 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + cz_4\,\hat{\mathbf{z}}$	(8g)	Nd II
$\mathbf{B_{15}}$	=	$-y_4\,\mathbf{a}_1 + \left(x_4 + \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_4 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-ay_4\,\hat{\mathbf{x}} + a\left(x_4 + \frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_4 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(8g)	Nd II
$\mathbf{B_{16}}$	=	$\left(y_4 + \frac{1}{2}\right)\,\mathbf{a}_1 - x_4\,\mathbf{a}_2 + \left(z_4 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$a\left(y_4 + \frac{1}{2}\right)\,\hat{\mathbf{x}} - ax_4\,\hat{\mathbf{y}} + c\left(z_4 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(8g)	Nd II
$\mathbf{B_{17}}$	=	$-x_4\,\mathbf{a}_1 - y_4\,\mathbf{a}_2 - z_4\,\mathbf{a}_3$	=	$-ax_4\,\hat{\mathbf{x}} - ay_4\,\hat{\mathbf{y}} - cz_4\,\hat{\mathbf{z}}$	(8g)	Nd II
$\mathbf{B_{18}}$	=	$\left(x_4 + \frac{1}{2}\right)\,\mathbf{a}_1 + \left(y_4 + \frac{1}{2}\right)\,\mathbf{a}_2 - z_4\,\mathbf{a}_3$	=	$a\left(x_4 + \frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(y_4 + \frac{1}{2}\right)\,\hat{\mathbf{y}} - cz_4\,\hat{\mathbf{z}}$	(8g)	Nd II
$\mathbf{B_{19}}$	=	$y_4\,\mathbf{a}_1 - \left(x_4 - \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_4 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$ay_4\,\hat{\mathbf{x}} - a\left(x_4 - \frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_4 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(8g)	Nd II
$\mathbf{B_{20}}$	=	$-\left(y_4 - \frac{1}{2}\right)\,\mathbf{a}_1 + x_4\,\mathbf{a}_2 - \left(z_4 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-a\left(y_4 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + ax_4\,\hat{\mathbf{y}} - c\left(z_4 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(8g)	Nd II
$\mathbf{B_{21}}$	=	$x_5\,\mathbf{a}_1 + y_5\,\mathbf{a}_2 + z_5\,\mathbf{a}_3$	=	$ax_5\,\hat{\mathbf{x}} + ay_5\,\hat{\mathbf{y}} + cz_5\,\hat{\mathbf{z}}$	(8g)	O III

$$
\begin{array}{lcccccc}
\mathbf{B_{22}} & = & -\left(x_5-\frac{1}{2}\right)\mathbf{a}_1-\left(y_5-\frac{1}{2}\right)\mathbf{a}_2+z_5\,\mathbf{a}_3 & = & -a\left(x_5-\frac{1}{2}\right)\hat{\mathbf{x}}-a\left(y_5-\frac{1}{2}\right)\hat{\mathbf{y}}+cz_5\,\hat{\mathbf{z}} & (8g) & \text{O III}\\
\mathbf{B_{23}} & = & -y_5\,\mathbf{a}_1+\left(x_5+\frac{1}{2}\right)\mathbf{a}_2+\left(z_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}{2}\right)\hat{\mathbf{z}} & (8g) & \text{O III}\\
\mathbf{B_{24}} & = & \left(y_5+\frac{1}{2}\right)\mathbf{a}_1-x_5\,\mathbf{a}_2+\left(z_5+\frac{1}{2}\right)\mathbf{a}_3 & = & a\left(y_5+\frac{1}{2}\right)\hat{\mathbf{x}}-ax_5\,\hat{\mathbf{y}}+c\left(z_5+\frac{1}{2}\right)\hat{\mathbf{z}} & (8g) & \text{O III}\\
\mathbf{B_{25}} & = & -x_5\,\mathbf{a}_1-y_5\,\mathbf{a}_2-z_5\,\mathbf{a}_3 & = & -ax_5\,\hat{\mathbf{x}}-ay_5\,\hat{\mathbf{y}}-cz_5\,\hat{\mathbf{z}} & (8g) & \text{O III}\\
\mathbf{B_{26}} & = & \left(x_5+\frac{1}{2}\right)\mathbf{a}_1+\left(y_5+\frac{1}{2}\right)\mathbf{a}_2-z_5\,\mathbf{a}_3 & = & a\left(x_5+\frac{1}{2}\right)\hat{\mathbf{x}}+a\left(y_5+\frac{1}{2}\right)\hat{\mathbf{y}}-cz_5\,\hat{\mathbf{z}} & (8g) & \text{O III}\\
\mathbf{B_{27}} & = & y_5\,\mathbf{a}_1-\left(x_5-\frac{1}{2}\right)\mathbf{a}_2-\left(z_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}{2}\right)\hat{\mathbf{z}} & (8g) & \text{O III}\\
\mathbf{B_{28}} & = & -\left(y_5-\frac{1}{2}\right)\mathbf{a}_1+x_5\,\mathbf{a}_2-\left(z_5-\frac{1}{2}\right)\mathbf{a}_3 & = & -a\left(y_5-\frac{1}{2}\right)\hat{\mathbf{x}}+ax_5\,\hat{\mathbf{y}}-c\left(z_5-\frac{1}{2}\right)\hat{\mathbf{z}} & (8g) & \text{O III}\\
\mathbf{B_{29}} & = & x_6\,\mathbf{a}_1+y_6\,\mathbf{a}_2+z_6\,\mathbf{a}_3 & = & ax_6\,\hat{\mathbf{x}}+ay_6\,\hat{\mathbf{y}}+cz_6\,\hat{\mathbf{z}} & (8g) & \text{O IV}\\
\mathbf{B_{30}} & = & -\left(x_6-\frac{1}{2}\right)\mathbf{a}_1-\left(y_6-\frac{1}{2}\right)\mathbf{a}_2+z_6\,\mathbf{a}_3 & = & -a\left(x_6-\frac{1}{2}\right)\hat{\mathbf{x}}-a\left(y_6-\frac{1}{2}\right)\hat{\mathbf{y}}+cz_6\,\hat{\mathbf{z}} & (8g) & \text{O IV}\\
\mathbf{B_{31}} & = & -y_6\,\mathbf{a}_1+\left(x_6+\frac{1}{2}\right)\mathbf{a}_2+\left(z_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}{2}\right)\hat{\mathbf{z}} & (8g) & \text{O IV}\\
\mathbf{B_{32}} & = & \left(y_6+\frac{1}{2}\right)\mathbf{a}_1-x_6\,\mathbf{a}_2+\left(z_6+\frac{1}{2}\right)\mathbf{a}_3 & = & a\left(y_6+\frac{1}{2}\right)\hat{\mathbf{x}}-ax_6\,\hat{\mathbf{y}}+c\left(z_6+\frac{1}{2}\right)\hat{\mathbf{z}} & (8g) & \text{O IV}\\
\mathbf{B_{33}} & = & -x_6\,\mathbf{a}_1-y_6\,\mathbf{a}_2-z_6\,\mathbf{a}_3 & = & -ax_6\,\hat{\mathbf{x}}-ay_6\,\hat{\mathbf{y}}-cz_6\,\hat{\mathbf{z}} & (8g) & \text{O IV}\\
\mathbf{B_{34}} & = & \left(x_6+\frac{1}{2}\right)\mathbf{a}_1+\left(y_6+\frac{1}{2}\right)\mathbf{a}_2-z_6\,\mathbf{a}_3 & = & a\left(x_6+\frac{1}{2}\right)\hat{\mathbf{x}}+a\left(y_6+\frac{1}{2}\right)\hat{\mathbf{y}}-cz_6\,\hat{\mathbf{z}} & (8g) & \text{O IV}\\
\mathbf{B_{35}} & = & y_6\,\mathbf{a}_1-\left(x_6-\frac{1}{2}\right)\mathbf{a}_2-\left(z_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}{2}\right)\hat{\mathbf{z}} & (8g) & \text{O IV}\\
\mathbf{B_{36}} & = & -\left(y_6-\frac{1}{2}\right)\mathbf{a}_1+x_6\,\mathbf{a}_2-\left(z_6-\frac{1}{2}\right)\mathbf{a}_3 & = & -a\left(y_6-\frac{1}{2}\right)\hat{\mathbf{x}}+ax_6\,\hat{\mathbf{y}}-c\left(z_6-\frac{1}{2}\right)\hat{\mathbf{z}} & (8g) & \text{O IV}\\
\mathbf{B_{37}} & = & x_7\,\mathbf{a}_1+y_7\,\mathbf{a}_2+z_7\,\mathbf{a}_3 & = & ax_7\,\hat{\mathbf{x}}+ay_7\,\hat{\mathbf{y}}+cz_7\,\hat{\mathbf{z}} & (8g) & \text{O V}\\
\mathbf{B_{38}} & = & -\left(x_7-\frac{1}{2}\right)\mathbf{a}_1-\left(y_7-\frac{1}{2}\right)\mathbf{a}_2+z_7\,\mathbf{a}_3 & = & -a\left(x_7-\frac{1}{2}\right)\hat{\mathbf{x}}-a\left(y_7-\frac{1}{2}\right)\hat{\mathbf{y}}+cz_7\,\hat{\mathbf{z}} & (8g) & \text{O V}\\
\mathbf{B_{39}} & = & -y_7\,\mathbf{a}_1+\left(x_7+\frac{1}{2}\right)\mathbf{a}_2+\left(z_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}{2}\right)\hat{\mathbf{z}} & (8g) & \text{O V}\\
\mathbf{B_{40}} & = & \left(y_7+\frac{1}{2}\right)\mathbf{a}_1-x_7\,\mathbf{a}_2+\left(z_7+\frac{1}{2}\right)\mathbf{a}_3 & = & a\left(y_7+\frac{1}{2}\right)\hat{\mathbf{x}}-ax_7\,\hat{\mathbf{y}}+c\left(z_7+\frac{1}{2}\right)\hat{\mathbf{z}} & (8g) & \text{O V}\\
\mathbf{B_{41}} & = & -x_7\,\mathbf{a}_1-y_7\,\mathbf{a}_2-z_7\,\mathbf{a}_3 & = & -ax_7\,\hat{\mathbf{x}}-ay_7\,\hat{\mathbf{y}}-cz_7\,\hat{\mathbf{z}} & (8g) & \text{O V}\\
\mathbf{B_{42}} & = & \left(x_7+\frac{1}{2}\right)\mathbf{a}_1+\left(y_7+\frac{1}{2}\right)\mathbf{a}_2-z_7\,\mathbf{a}_3 & = & a\left(x_7+\frac{1}{2}\right)\hat{\mathbf{x}}+a\left(y_7+\frac{1}{2}\right)\hat{\mathbf{y}}-cz_7\,\hat{\mathbf{z}} & (8g) & \text{O V}\\
\mathbf{B_{43}} & = & y_7\,\mathbf{a}_1-\left(x_7-\frac{1}{2}\right)\mathbf{a}_2-\left(z_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}{2}\right)\hat{\mathbf{z}} & (8g) & \text{O V}\\
\mathbf{B_{44}} & = & -\left(y_7-\frac{1}{2}\right)\mathbf{a}_1+x_7\,\mathbf{a}_2-\left(z_7-\frac{1}{2}\right)\mathbf{a}_3 & = & -a\left(y_7-\frac{1}{2}\right)\hat{\mathbf{x}}+ax_7\,\hat{\mathbf{y}}-c\left(z_7-\frac{1}{2}\right)\hat{\mathbf{z}} & (8g) & \text{O V}\\
\mathbf{B_{45}} & = & x_8\,\mathbf{a}_1+y_8\,\mathbf{a}_2+z_8\,\mathbf{a}_3 & = & ax_8\,\hat{\mathbf{x}}+ay_8\,\hat{\mathbf{y}}+cz_8\,\hat{\mathbf{z}} & (8g) & \text{O VI}\\
\mathbf{B_{46}} & = & -\left(x_8-\frac{1}{2}\right)\mathbf{a}_1-\left(y_8-\frac{1}{2}\right)\mathbf{a}_2+z_8\,\mathbf{a}_3 & = & -a\left(x_8-\frac{1}{2}\right)\hat{\mathbf{x}}-a\left(y_8-\frac{1}{2}\right)\hat{\mathbf{y}}+cz_8\,\hat{\mathbf{z}} & (8g) & \text{O VI}\\
\mathbf{B_{47}} & = & -y_8\,\mathbf{a}_1+\left(x_8+\frac{1}{2}\right)\mathbf{a}_2+\left(z_8+\frac{1}{2}\right)\mathbf{a}_3 & = & -ay_8\,\hat{\mathbf{x}}+a\left(x_8+\frac{1}{2}\right)\hat{\mathbf{y}}+c\left(z_8+\frac{1}{2}\right)\hat{\mathbf{z}} & (8g) & \text{O VI}\\
\mathbf{B_{48}} & = & \left(y_8+\frac{1}{2}\right)\mathbf{a}_1-x_8\,\mathbf{a}_2+\left(z_8+\frac{1}{2}\right)\mathbf{a}_3 & = & a\left(y_8+\frac{1}{2}\right)\hat{\mathbf{x}}-ax_8\,\hat{\mathbf{y}}+c\left(z_8+\frac{1}{2}\right)\hat{\mathbf{z}} & (8g) & \text{O VI}\\
\mathbf{B_{49}} & = & -x_8\,\mathbf{a}_1-y_8\,\mathbf{a}_2-z_8\,\mathbf{a}_3 & = & -ax_8\,\hat{\mathbf{x}}-ay_8\,\hat{\mathbf{y}}-cz_8\,\hat{\mathbf{z}} & (8g) & \text{O VI}\\
\mathbf{B_{50}} & = & \left(x_8+\frac{1}{2}\right)\mathbf{a}_1+\left(y_8+\frac{1}{2}\right)\mathbf{a}_2-z_8\,\mathbf{a}_3 & = & a\left(x_8+\frac{1}{2}\right)\hat{\mathbf{x}}+a\left(y_8+\frac{1}{2}\right)\hat{\mathbf{y}}-cz_8\,\hat{\mathbf{z}} & (8g) & \text{O VI}\\
\mathbf{B_{51}} & = & y_8\,\mathbf{a}_1-\left(x_8-\frac{1}{2}\right)\mathbf{a}_2-\left(z_8-\frac{1}{2}\right)\mathbf{a}_3 & = & ay_8\,\hat{\mathbf{x}}-a\left(x_8-\frac{1}{2}\right)\hat{\mathbf{y}}-c\left(z_8-\frac{1}{2}\right)\hat{\mathbf{z}} & (8g) & \text{O VI}\\
\mathbf{B_{52}} & = & -\left(y_8-\frac{1}{2}\right)\mathbf{a}_1+x_8\,\mathbf{a}_2-\left(z_8-\frac{1}{2}\right)\mathbf{a}_3 & = & -a\left(y_8-\frac{1}{2}\right)\hat{\mathbf{x}}+ax_8\,\hat{\mathbf{y}}-c\left(z_8-\frac{1}{2}\right)\hat{\mathbf{z}} & (8g) & \text{O VI}\\
\mathbf{B_{53}} & = & x_9\,\mathbf{a}_1+y_9\,\mathbf{a}_2+z_9\,\mathbf{a}_3 & = & ax_9\,\hat{\mathbf{x}}+ay_9\,\hat{\mathbf{y}}+cz_9\,\hat{\mathbf{z}} & (8g) & \text{O VII}
\end{array}
$$

$$\mathbf{B_{54}} = -\left(x_9 - \tfrac{1}{2}\right)\mathbf{a}_1 - \left(y_9 - \tfrac{1}{2}\right)\mathbf{a}_2 + z_9\,\mathbf{a}_3 = -a\left(x_9 - \tfrac{1}{2}\right)\hat{\mathbf{x}} - a\left(y_9 - \tfrac{1}{2}\right)\hat{\mathbf{y}} + cz_9\,\hat{\mathbf{z}} \quad (8g) \quad \text{O VII}$$

$$\mathbf{B_{55}} = -y_9\,\mathbf{a}_1 + \left(x_9 + \tfrac{1}{2}\right)\mathbf{a}_2 + \left(z_9 + \tfrac{1}{2}\right)\mathbf{a}_3 = -ay_9\,\hat{\mathbf{x}} + a\left(x_9 + \tfrac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_9 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8g) \quad \text{O VII}$$

$$\mathbf{B_{56}} = \left(y_9 + \tfrac{1}{2}\right)\mathbf{a}_1 - x_9\,\mathbf{a}_2 + \left(z_9 + \tfrac{1}{2}\right)\mathbf{a}_3 = a\left(y_9 + \tfrac{1}{2}\right)\hat{\mathbf{x}} - ax_9\,\hat{\mathbf{y}} + c\left(z_9 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8g) \quad \text{O VII}$$

$$\mathbf{B_{57}} = -x_9\,\mathbf{a}_1 - y_9\,\mathbf{a}_2 - z_9\,\mathbf{a}_3 = -ax_9\,\hat{\mathbf{x}} - ay_9\,\hat{\mathbf{y}} - cz_9\,\hat{\mathbf{z}} \quad (8g) \quad \text{O VII}$$

$$\mathbf{B_{58}} = \left(x_9 + \tfrac{1}{2}\right)\mathbf{a}_1 + \left(y_9 + \tfrac{1}{2}\right)\mathbf{a}_2 - z_9\,\mathbf{a}_3 = a\left(x_9 + \tfrac{1}{2}\right)\hat{\mathbf{x}} + a\left(y_9 + \tfrac{1}{2}\right)\hat{\mathbf{y}} - cz_9\,\hat{\mathbf{z}} \quad (8g) \quad \text{O VII}$$

$$\mathbf{B_{59}} = y_9\,\mathbf{a}_1 - \left(x_9 - \tfrac{1}{2}\right)\mathbf{a}_2 - \left(z_9 - \tfrac{1}{2}\right)\mathbf{a}_3 = ay_9\,\hat{\mathbf{x}} - a\left(x_9 - \tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_9 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8g) \quad \text{O VII}$$

$$\mathbf{B_{60}} = -\left(y_9 - \tfrac{1}{2}\right)\mathbf{a}_1 + x_9\,\mathbf{a}_2 - \left(z_9 - \tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(y_9 - \tfrac{1}{2}\right)\hat{\mathbf{x}} + ax_9\,\hat{\mathbf{y}} - c\left(z_9 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8g) \quad \text{O VII}$$

$$\mathbf{B_{61}} = x_{10}\,\mathbf{a}_1 + y_{10}\,\mathbf{a}_2 + z_{10}\,\mathbf{a}_3 = ax_{10}\,\hat{\mathbf{x}} + ay_{10}\,\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}} \quad (8g) \quad \text{Re I}$$

$$\mathbf{B_{62}} = -\left(x_{10} - \tfrac{1}{2}\right)\mathbf{a}_1 - \left(y_{10} - \tfrac{1}{2}\right)\mathbf{a}_2 + z_{10}\,\mathbf{a}_3 = -a\left(x_{10} - \tfrac{1}{2}\right)\hat{\mathbf{x}} - a\left(y_{10} - \tfrac{1}{2}\right)\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}} \quad (8g) \quad \text{Re I}$$

$$\mathbf{B_{63}} = -y_{10}\,\mathbf{a}_1 + \left(x_{10} + \tfrac{1}{2}\right)\mathbf{a}_2 + \left(z_{10} + \tfrac{1}{2}\right)\mathbf{a}_3 = -ay_{10}\,\hat{\mathbf{x}} + a\left(x_{10} + \tfrac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_{10} + \tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8g) \quad \text{Re I}$$

$$\mathbf{B_{64}} = \left(y_{10} + \tfrac{1}{2}\right)\mathbf{a}_1 - x_{10}\,\mathbf{a}_2 + \left(z_{10} + \tfrac{1}{2}\right)\mathbf{a}_3 = a\left(y_{10} + \tfrac{1}{2}\right)\hat{\mathbf{x}} - ax_{10}\,\hat{\mathbf{y}} + c\left(z_{10} + \tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8g) \quad \text{Re I}$$

$$\mathbf{B_{65}} = -x_{10}\,\mathbf{a}_1 - y_{10}\,\mathbf{a}_2 - z_{10}\,\mathbf{a}_3 = -ax_{10}\,\hat{\mathbf{x}} - ay_{10}\,\hat{\mathbf{y}} - cz_{10}\,\hat{\mathbf{z}} \quad (8g) \quad \text{Re I}$$

$$\mathbf{B_{66}} = \left(x_{10} + \tfrac{1}{2}\right)\mathbf{a}_1 + \left(y_{10} + \tfrac{1}{2}\right)\mathbf{a}_2 - z_{10}\,\mathbf{a}_3 = a\left(x_{10} + \tfrac{1}{2}\right)\hat{\mathbf{x}} + a\left(y_{10} + \tfrac{1}{2}\right)\hat{\mathbf{y}} - cz_{10}\,\hat{\mathbf{z}} \quad (8g) \quad \text{Re I}$$

$$\mathbf{B_{67}} = y_{10}\,\mathbf{a}_1 - \left(x_{10} - \tfrac{1}{2}\right)\mathbf{a}_2 - \left(z_{10} - \tfrac{1}{2}\right)\mathbf{a}_3 = ay_{10}\,\hat{\mathbf{x}} - a\left(x_{10} - \tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_{10} - \tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8g) \quad \text{Re I}$$

$$\mathbf{B_{68}} = -\left(y_{10} - \tfrac{1}{2}\right)\mathbf{a}_1 + x_{10}\,\mathbf{a}_2 - \left(z_{10} - \tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(y_{10} - \tfrac{1}{2}\right)\hat{\mathbf{x}} + ax_{10}\,\hat{\mathbf{y}} - c\left(z_{10} - \tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8g) \quad \text{Re I}$$

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