

Al(PO₃)₃ (*G*5₂) Structure: AB9C3_cI208_220_c_3e_e-001

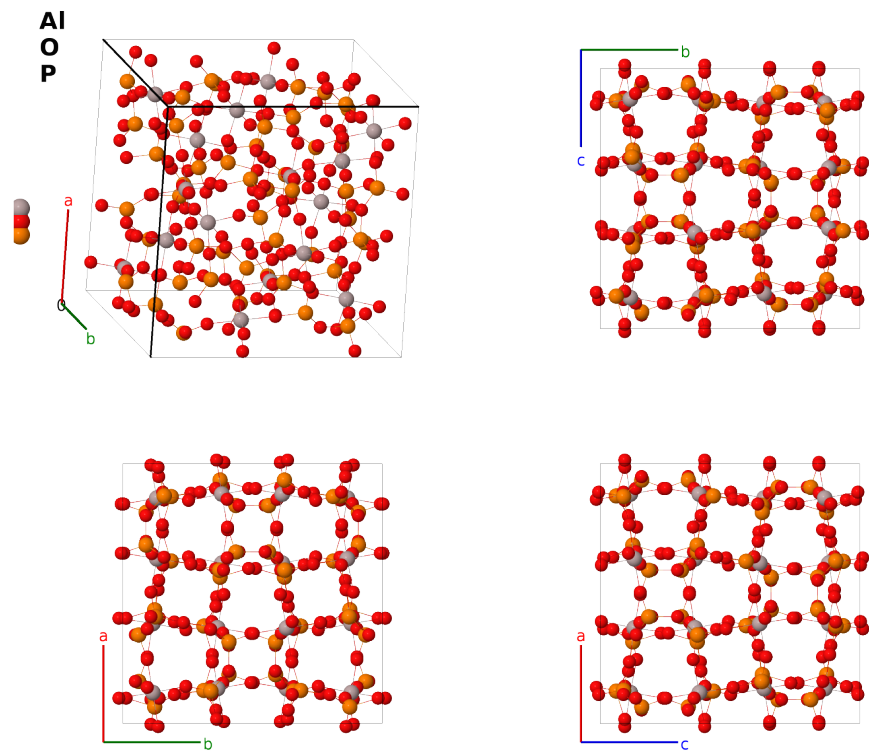
This structure previously used the label(s) **AB9C3_cI208_220_c_3e_e**. Calls to these addresses will be redirected here.

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- 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.

<https://aflow.org/prototype-encyclopedia/2BX1>

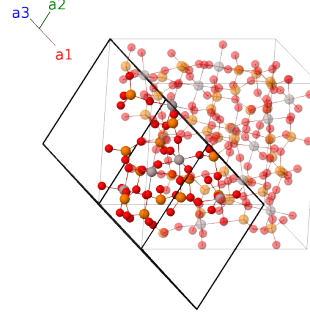
https://aflow.org/prototype-encyclopedia/AB9C3_cI208_220_c_3e_e-001



Prototype	AlO ₉ P ₃
AFLOW prototype label	AB9C3_cI208_220_c_3e_e-001
<i>Strukturbericht</i> designation	<i>G</i> 5 ₂
ICSD	26759
CCDC	1602144
Pearson symbol	cI208
Space group number	220
Space group symbol	<i>I</i> $\bar{4}$ 3 <i>d</i>
AFLOW prototype command	<code>aflow --proto=AB9C3_cI208_220_c_3e_e-001</code> <code>--params=<i>a</i>, <i>x</i>₁, <i>x</i>₂, <i>y</i>₂, <i>z</i>₂, <i>x</i>₃, <i>y</i>₃, <i>z</i>₃, <i>x</i>₄, <i>y</i>₄, <i>z</i>₄, <i>x</i>₅, <i>y</i>₅, <i>z</i>₅</code>

Body-centered Cubic primitive vectors

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



Basis vectors

	Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B}_1$	$= 2x_1 \mathbf{a}_1 + 2x_1 \mathbf{a}_2 + 2x_1 \mathbf{a}_3$	$=$	$ax_1 \hat{\mathbf{x}} + ax_1 \hat{\mathbf{y}} + ax_1 \hat{\mathbf{z}}$	(16c)	Al I
$\mathbf{B}_2$	$= \frac{1}{2} \mathbf{a}_1 - (2x_1 - \frac{1}{2}) \mathbf{a}_3$	$=$	$-ax_1 \hat{\mathbf{x}} - a(x_1 - \frac{1}{2}) \hat{\mathbf{y}} + ax_1 \hat{\mathbf{z}}$	(16c)	Al I
$\mathbf{B}_3$	$= -(2x_1 - \frac{1}{2}) \mathbf{a}_2 + \frac{1}{2} \mathbf{a}_3$	$=$	$-a(x_1 - \frac{1}{2}) \hat{\mathbf{x}} + ax_1 \hat{\mathbf{y}} - ax_1 \hat{\mathbf{z}}$	(16c)	Al I
$\mathbf{B}_4$	$= -(2x_1 - \frac{1}{2}) \mathbf{a}_1 + \frac{1}{2} \mathbf{a}_2$	$=$	$ax_1 \hat{\mathbf{x}} - ax_1 \hat{\mathbf{y}} - a(x_1 - \frac{1}{2}) \hat{\mathbf{z}}$	(16c)	Al I
$\mathbf{B}_5$	$= (2x_1 + \frac{1}{2}) \mathbf{a}_1 + (2x_1 + \frac{1}{2}) \mathbf{a}_2 + (2x_1 + \frac{1}{2}) \mathbf{a}_3$	$=$	$a(x_1 + \frac{1}{4}) \hat{\mathbf{x}} + a(x_1 + \frac{1}{4}) \hat{\mathbf{y}} + a(x_1 + \frac{1}{4}) \hat{\mathbf{z}}$	(16c)	Al I
$\mathbf{B}_6$	$= \frac{1}{2} \mathbf{a}_1 - 2x_1 \mathbf{a}_3$	$=$	$-a(x_1 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_1 - \frac{1}{4}) \hat{\mathbf{y}} + a(x_1 + \frac{1}{4}) \hat{\mathbf{z}}$	(16c)	Al I
$\mathbf{B}_7$	$= -2x_1 \mathbf{a}_1 + \frac{1}{2} \mathbf{a}_2$	$=$	$a(x_1 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_1 + \frac{1}{4}) \hat{\mathbf{y}} - a(x_1 - \frac{1}{4}) \hat{\mathbf{z}}$	(16c)	Al I
$\mathbf{B}_8$	$= -2x_1 \mathbf{a}_2 + \frac{1}{2} \mathbf{a}_3$	$=$	$-a(x_1 - \frac{1}{4}) \hat{\mathbf{x}} + a(x_1 + \frac{1}{4}) \hat{\mathbf{y}} - a(x_1 + \frac{1}{4}) \hat{\mathbf{z}}$	(16c)	Al I
$\mathbf{B}_9$	$= (y_2 + z_2) \mathbf{a}_1 + (x_2 + z_2) \mathbf{a}_2 + (x_2 + y_2) \mathbf{a}_3$	$=$	$ax_2 \hat{\mathbf{x}} + ay_2 \hat{\mathbf{y}} + az_2 \hat{\mathbf{z}}$	(48e)	O I
$\mathbf{B}_{10}$	$= (-y_2 + z_2 + \frac{1}{2}) \mathbf{a}_1 - (x_2 - z_2) \mathbf{a}_2 - (x_2 + y_2 - \frac{1}{2}) \mathbf{a}_3$	$=$	$-ax_2 \hat{\mathbf{x}} - a(y_2 - \frac{1}{2}) \hat{\mathbf{y}} + az_2 \hat{\mathbf{z}}$	(48e)	O I
$\mathbf{B}_{11}$	$= (y_2 - z_2) \mathbf{a}_1 - (x_2 + z_2 - \frac{1}{2}) \mathbf{a}_2 + (-x_2 + y_2 + \frac{1}{2}) \mathbf{a}_3$	$=$	$-a(x_2 - \frac{1}{2}) \hat{\mathbf{x}} + ay_2 \hat{\mathbf{y}} - az_2 \hat{\mathbf{z}}$	(48e)	O I
$\mathbf{B}_{12}$	$= -(y_2 + z_2 - \frac{1}{2}) \mathbf{a}_1 + (x_2 - z_2 + \frac{1}{2}) \mathbf{a}_2 + (x_2 - y_2) \mathbf{a}_3$	$=$	$ax_2 \hat{\mathbf{x}} - ay_2 \hat{\mathbf{y}} - a(z_2 - \frac{1}{2}) \hat{\mathbf{z}}$	(48e)	O I
$\mathbf{B}_{13}$	$= (x_2 + y_2) \mathbf{a}_1 + (y_2 + z_2) \mathbf{a}_2 + (x_2 + z_2) \mathbf{a}_3$	$=$	$az_2 \hat{\mathbf{x}} + ax_2 \hat{\mathbf{y}} + ay_2 \hat{\mathbf{z}}$	(48e)	O I
$\mathbf{B}_{14}$	$= -(x_2 + y_2 - \frac{1}{2}) \mathbf{a}_1 + (-y_2 + z_2 + \frac{1}{2}) \mathbf{a}_2 - (x_2 - z_2) \mathbf{a}_3$	$=$	$az_2 \hat{\mathbf{x}} - ax_2 \hat{\mathbf{y}} - a(y_2 - \frac{1}{2}) \hat{\mathbf{z}}$	(48e)	O I
$\mathbf{B}_{15}$	$= (-x_2 + y_2 + \frac{1}{2}) \mathbf{a}_1 + (y_2 - z_2) \mathbf{a}_2 - (x_2 + z_2 - \frac{1}{2}) \mathbf{a}_3$	$=$	$-az_2 \hat{\mathbf{x}} - a(x_2 - \frac{1}{2}) \hat{\mathbf{y}} + ay_2 \hat{\mathbf{z}}$	(48e)	O I
$\mathbf{B}_{16}$	$= (x_2 - y_2) \mathbf{a}_1 - (y_2 + z_2 - \frac{1}{2}) \mathbf{a}_2 + (x_2 - z_2 + \frac{1}{2}) \mathbf{a}_3$	$=$	$-a(z_2 - \frac{1}{2}) \hat{\mathbf{x}} + ax_2 \hat{\mathbf{y}} - ay_2 \hat{\mathbf{z}}$	(48e)	O I
$\mathbf{B}_{17}$	$= (x_2 + z_2) \mathbf{a}_1 + (x_2 + y_2) \mathbf{a}_2 + (y_2 + z_2) \mathbf{a}_3$	$=$	$ay_2 \hat{\mathbf{x}} + az_2 \hat{\mathbf{y}} + ax_2 \hat{\mathbf{z}}$	(48e)	O I

$$\begin{aligned}
\mathbf{B}_{18} &= \begin{pmatrix} -(x_2 - z_2) \mathbf{a}_1 - \\ (x_2 + y_2 - \frac{1}{2}) \mathbf{a}_2 + \\ (-y_2 + z_2 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a \left(y_2 - \frac{1}{2} \right) \hat{\mathbf{x}} + az_2 \hat{\mathbf{y}} - ax_2 \hat{\mathbf{z}} & (48e) & \text{O I} \\
\mathbf{B}_{19} &= \begin{pmatrix} -(x_2 + z_2 - \frac{1}{2}) \mathbf{a}_1 + \\ (-x_2 + y_2 + \frac{1}{2}) \mathbf{a}_2 + (y_2 - z_2) \mathbf{a}_3 \end{pmatrix} = ay_2 \hat{\mathbf{x}} - az_2 \hat{\mathbf{y}} - a \left(x_2 - \frac{1}{2} \right) \hat{\mathbf{z}} & (48e) & \text{O I} \\
\mathbf{B}_{20} &= \begin{pmatrix} (x_2 - z_2 + \frac{1}{2}) \mathbf{a}_1 + \\ (x_2 - y_2) \mathbf{a}_2 - (y_2 + z_2 - \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -ay_2 \hat{\mathbf{x}} - a \left(z_2 - \frac{1}{2} \right) \hat{\mathbf{y}} + ax_2 \hat{\mathbf{z}} & (48e) & \text{O I} \\
\mathbf{B}_{21} &= \begin{pmatrix} (x_2 + z_2 + \frac{1}{2}) \mathbf{a}_1 + \\ (y_2 + z_2 + \frac{1}{2}) \mathbf{a}_2 + \\ (x_2 + y_2 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a \left(y_2 + \frac{1}{4} \right) \hat{\mathbf{x}} + a \left(x_2 + \frac{1}{4} \right) \hat{\mathbf{y}} + a \left(z_2 + \frac{1}{4} \right) \hat{\mathbf{z}} & (48e) & \text{O I} \\
\mathbf{B}_{22} &= \begin{pmatrix} (-x_2 + z_2 + \frac{1}{2}) \mathbf{a}_1 - \\ (y_2 - z_2) \mathbf{a}_2 - (x_2 + y_2) \mathbf{a}_3 \end{pmatrix} = -a \left(y_2 + \frac{1}{4} \right) \hat{\mathbf{x}} - a \left(x_2 - \frac{1}{4} \right) \hat{\mathbf{y}} + a \left(z_2 + \frac{1}{4} \right) \hat{\mathbf{z}} & (48e) & \text{O I} \\
\mathbf{B}_{23} &= \begin{pmatrix} -(x_2 + z_2) \mathbf{a}_1 + \\ (y_2 - z_2 + \frac{1}{2}) \mathbf{a}_2 - (x_2 - y_2) \mathbf{a}_3 \end{pmatrix} = a \left(y_2 + \frac{1}{4} \right) \hat{\mathbf{x}} - a \left(x_2 + \frac{1}{4} \right) \hat{\mathbf{y}} - a \left(z_2 - \frac{1}{4} \right) \hat{\mathbf{z}} & (48e) & \text{O I} \\
\mathbf{B}_{24} &= \begin{pmatrix} (x_2 - z_2) \mathbf{a}_1 - (y_2 + z_2) \mathbf{a}_2 + \\ (x_2 - y_2 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a \left(y_2 - \frac{1}{4} \right) \hat{\mathbf{x}} + a \left(x_2 + \frac{1}{4} \right) \hat{\mathbf{y}} - a \left(z_2 + \frac{1}{4} \right) \hat{\mathbf{z}} & (48e) & \text{O I} \\
\mathbf{B}_{25} &= \begin{pmatrix} (y_2 + z_2 + \frac{1}{2}) \mathbf{a}_1 + \\ (x_2 + y_2 + \frac{1}{2}) \mathbf{a}_2 + \\ (x_2 + z_2 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a \left(x_2 + \frac{1}{4} \right) \hat{\mathbf{x}} + a \left(z_2 + \frac{1}{4} \right) \hat{\mathbf{y}} + a \left(y_2 + \frac{1}{4} \right) \hat{\mathbf{z}} & (48e) & \text{O I} \\
\mathbf{B}_{26} &= \begin{pmatrix} -(y_2 - z_2) \mathbf{a}_1 - (x_2 + y_2) \mathbf{a}_2 + \\ (-x_2 + z_2 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a \left(x_2 - \frac{1}{4} \right) \hat{\mathbf{x}} + a \left(z_2 + \frac{1}{4} \right) \hat{\mathbf{y}} - a \left(y_2 + \frac{1}{4} \right) \hat{\mathbf{z}} & (48e) & \text{O I} \\
\mathbf{B}_{27} &= \begin{pmatrix} (y_2 - z_2 + \frac{1}{2}) \mathbf{a}_1 - \\ (x_2 - y_2) \mathbf{a}_2 - (x_2 + z_2) \mathbf{a}_3 \end{pmatrix} = -a \left(x_2 + \frac{1}{4} \right) \hat{\mathbf{x}} - a \left(z_2 - \frac{1}{4} \right) \hat{\mathbf{y}} + a \left(y_2 + \frac{1}{4} \right) \hat{\mathbf{z}} & (48e) & \text{O I} \\
\mathbf{B}_{28} &= \begin{pmatrix} -(y_2 + z_2) \mathbf{a}_1 + \\ (x_2 - y_2 + \frac{1}{2}) \mathbf{a}_2 + (x_2 - z_2) \mathbf{a}_3 \end{pmatrix} = a \left(x_2 + \frac{1}{4} \right) \hat{\mathbf{x}} - a \left(z_2 + \frac{1}{4} \right) \hat{\mathbf{y}} - a \left(y_2 - \frac{1}{4} \right) \hat{\mathbf{z}} & (48e) & \text{O I} \\
\mathbf{B}_{29} &= \begin{pmatrix} (x_2 + y_2 + \frac{1}{2}) \mathbf{a}_1 + \\ (x_2 + z_2 + \frac{1}{2}) \mathbf{a}_2 + \\ (y_2 + z_2 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a \left(z_2 + \frac{1}{4} \right) \hat{\mathbf{x}} + a \left(y_2 + \frac{1}{4} \right) \hat{\mathbf{y}} + a \left(x_2 + \frac{1}{4} \right) \hat{\mathbf{z}} & (48e) & \text{O I} \\
\mathbf{B}_{30} &= \begin{pmatrix} -(x_2 + y_2) \mathbf{a}_1 + \\ (-x_2 + z_2 + \frac{1}{2}) \mathbf{a}_2 - (y_2 - z_2) \mathbf{a}_3 \end{pmatrix} = a \left(z_2 + \frac{1}{4} \right) \hat{\mathbf{x}} - a \left(y_2 + \frac{1}{4} \right) \hat{\mathbf{y}} - a \left(x_2 - \frac{1}{4} \right) \hat{\mathbf{z}} & (48e) & \text{O I} \\
\mathbf{B}_{31} &= \begin{pmatrix} -(x_2 - y_2) \mathbf{a}_1 - (x_2 + z_2) \mathbf{a}_2 + \\ (y_2 - z_2 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a \left(z_2 - \frac{1}{4} \right) \hat{\mathbf{x}} + a \left(y_2 + \frac{1}{4} \right) \hat{\mathbf{y}} - a \left(x_2 + \frac{1}{4} \right) \hat{\mathbf{z}} & (48e) & \text{O I} \\
\mathbf{B}_{32} &= \begin{pmatrix} (x_2 - y_2 + \frac{1}{2}) \mathbf{a}_1 + \\ (x_2 - z_2) \mathbf{a}_2 - (y_2 + z_2) \mathbf{a}_3 \end{pmatrix} = -a \left(z_2 + \frac{1}{4} \right) \hat{\mathbf{x}} - a \left(y_2 - \frac{1}{4} \right) \hat{\mathbf{y}} + a \left(x_2 + \frac{1}{4} \right) \hat{\mathbf{z}} & (48e) & \text{O I} \\
\mathbf{B}_{33} &= \begin{pmatrix} (y_3 + z_3) \mathbf{a}_1 + (x_3 + z_3) \mathbf{a}_2 + \\ (x_3 + y_3) \mathbf{a}_3 \end{pmatrix} = ax_3 \hat{\mathbf{x}} + ay_3 \hat{\mathbf{y}} + az_3 \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{34} &= \begin{pmatrix} (-y_3 + z_3 + \frac{1}{2}) \mathbf{a}_1 - \\ (x_3 - z_3) \mathbf{a}_2 - (x_3 + y_3 - \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -ax_3 \hat{\mathbf{x}} - a \left(y_3 - \frac{1}{2} \right) \hat{\mathbf{y}} + az_3 \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{35} &= \begin{pmatrix} (y_3 - z_3) \mathbf{a}_1 - (x_3 + z_3 - \frac{1}{2}) \mathbf{a}_2 + \\ (-x_3 + y_3 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a \left(x_3 - \frac{1}{2} \right) \hat{\mathbf{x}} + ay_3 \hat{\mathbf{y}} - az_3 \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{36} &= \begin{pmatrix} -(y_3 + z_3 - \frac{1}{2}) \mathbf{a}_1 + \\ (x_3 - z_3 + \frac{1}{2}) \mathbf{a}_2 + (x_3 - y_3) \mathbf{a}_3 \end{pmatrix} = ax_3 \hat{\mathbf{x}} - ay_3 \hat{\mathbf{y}} - a \left(z_3 - \frac{1}{2} \right) \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{37} &= \begin{pmatrix} (x_3 + y_3) \mathbf{a}_1 + (y_3 + z_3) \mathbf{a}_2 + \\ (x_3 + z_3) \mathbf{a}_3 \end{pmatrix} = az_3 \hat{\mathbf{x}} + ax_3 \hat{\mathbf{y}} + ay_3 \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{38} &= \begin{pmatrix} -(x_3 + y_3 - \frac{1}{2}) \mathbf{a}_1 + \\ (-y_3 + z_3 + \frac{1}{2}) \mathbf{a}_2 - (x_3 - z_3) \mathbf{a}_3 \end{pmatrix} = az_3 \hat{\mathbf{x}} - ax_3 \hat{\mathbf{y}} - a \left(y_3 - \frac{1}{2} \right) \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{39} &= \begin{pmatrix} (-x_3 + y_3 + \frac{1}{2}) \mathbf{a}_1 + \\ (y_3 - z_3) \mathbf{a}_2 - (x_3 + z_3 - \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -az_3 \hat{\mathbf{x}} - a \left(x_3 - \frac{1}{2} \right) \hat{\mathbf{y}} + ay_3 \hat{\mathbf{z}} & (48e) & \text{O II}
\end{aligned}$$

$$\begin{aligned}
\mathbf{B}_{40} &= (x_3 - y_3) \mathbf{a}_1 - (y_3 + z_3 - \frac{1}{2}) \mathbf{a}_2 + (x_3 - z_3 + \frac{1}{2}) \mathbf{a}_3 = -a(z_3 - \frac{1}{2}) \hat{\mathbf{x}} + ax_3 \hat{\mathbf{y}} - ay_3 \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{41} &= (x_3 + z_3) \mathbf{a}_1 + (x_3 + y_3) \mathbf{a}_2 + (y_3 + z_3) \mathbf{a}_3 = ay_3 \hat{\mathbf{x}} + az_3 \hat{\mathbf{y}} + ax_3 \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{42} &= -(x_3 - z_3) \mathbf{a}_1 - (x_3 + y_3 - \frac{1}{2}) \mathbf{a}_2 + (-y_3 + z_3 + \frac{1}{2}) \mathbf{a}_3 = -a(y_3 - \frac{1}{2}) \hat{\mathbf{x}} + az_3 \hat{\mathbf{y}} - ax_3 \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{43} &= -(x_3 + z_3 - \frac{1}{2}) \mathbf{a}_1 + (-x_3 + y_3 + \frac{1}{2}) \mathbf{a}_2 + (y_3 - z_3) \mathbf{a}_3 = ay_3 \hat{\mathbf{x}} - az_3 \hat{\mathbf{y}} - a(x_3 - \frac{1}{2}) \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{44} &= (x_3 - z_3 + \frac{1}{2}) \mathbf{a}_1 + (x_3 - y_3) \mathbf{a}_2 - (y_3 + z_3 - \frac{1}{2}) \mathbf{a}_3 = -ay_3 \hat{\mathbf{x}} - a(z_3 - \frac{1}{2}) \hat{\mathbf{y}} + ax_3 \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{45} &= (x_3 + z_3 + \frac{1}{2}) \mathbf{a}_1 + (y_3 + z_3 + \frac{1}{2}) \mathbf{a}_2 + (x_3 + y_3 + \frac{1}{2}) \mathbf{a}_3 = a(y_3 + \frac{1}{4}) \hat{\mathbf{x}} + a(x_3 + \frac{1}{4}) \hat{\mathbf{y}} + a(z_3 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{46} &= (-x_3 + z_3 + \frac{1}{2}) \mathbf{a}_1 - (y_3 - z_3) \mathbf{a}_2 - (x_3 + y_3) \mathbf{a}_3 = -a(y_3 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_3 - \frac{1}{4}) \hat{\mathbf{y}} + a(z_3 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{47} &= -(x_3 + z_3) \mathbf{a}_1 + (y_3 - z_3 + \frac{1}{2}) \mathbf{a}_2 - (x_3 - y_3) \mathbf{a}_3 = a(y_3 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_3 + \frac{1}{4}) \hat{\mathbf{y}} - a(z_3 - \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{48} &= (x_3 - z_3) \mathbf{a}_1 - (y_3 + z_3) \mathbf{a}_2 + (x_3 - y_3 + \frac{1}{2}) \mathbf{a}_3 = -a(y_3 - \frac{1}{4}) \hat{\mathbf{x}} + a(x_3 + \frac{1}{4}) \hat{\mathbf{y}} - a(z_3 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{49} &= (y_3 + z_3 + \frac{1}{2}) \mathbf{a}_1 + (x_3 + y_3 + \frac{1}{2}) \mathbf{a}_2 + (x_3 + z_3 + \frac{1}{2}) \mathbf{a}_3 = a(x_3 + \frac{1}{4}) \hat{\mathbf{x}} + a(z_3 + \frac{1}{4}) \hat{\mathbf{y}} + a(y_3 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{50} &= -(y_3 - z_3) \mathbf{a}_1 - (x_3 + y_3) \mathbf{a}_2 + (-x_3 + z_3 + \frac{1}{2}) \mathbf{a}_3 = -a(x_3 - \frac{1}{4}) \hat{\mathbf{x}} + a(z_3 + \frac{1}{4}) \hat{\mathbf{y}} - a(y_3 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{51} &= (y_3 - z_3 + \frac{1}{2}) \mathbf{a}_1 - (x_3 - y_3) \mathbf{a}_2 - (x_3 + z_3) \mathbf{a}_3 = -a(x_3 + \frac{1}{4}) \hat{\mathbf{x}} - a(z_3 - \frac{1}{4}) \hat{\mathbf{y}} + a(y_3 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{52} &= -(y_3 + z_3) \mathbf{a}_1 + (x_3 - y_3 + \frac{1}{2}) \mathbf{a}_2 + (x_3 - z_3) \mathbf{a}_3 = a(x_3 + \frac{1}{4}) \hat{\mathbf{x}} - a(z_3 + \frac{1}{4}) \hat{\mathbf{y}} - a(y_3 - \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{53} &= (x_3 + y_3 + \frac{1}{2}) \mathbf{a}_1 + (x_3 + z_3 + \frac{1}{2}) \mathbf{a}_2 + (y_3 + z_3 + \frac{1}{2}) \mathbf{a}_3 = a(z_3 + \frac{1}{4}) \hat{\mathbf{x}} + a(y_3 + \frac{1}{4}) \hat{\mathbf{y}} + a(x_3 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{54} &= -(x_3 + y_3) \mathbf{a}_1 + (-x_3 + z_3 + \frac{1}{2}) \mathbf{a}_2 - (y_3 - z_3) \mathbf{a}_3 = a(z_3 + \frac{1}{4}) \hat{\mathbf{x}} - a(y_3 + \frac{1}{4}) \hat{\mathbf{y}} - a(x_3 - \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{55} &= -(x_3 - y_3) \mathbf{a}_1 - (x_3 + z_3) \mathbf{a}_2 + (y_3 - z_3 + \frac{1}{2}) \mathbf{a}_3 = -a(z_3 - \frac{1}{4}) \hat{\mathbf{x}} + a(y_3 + \frac{1}{4}) \hat{\mathbf{y}} - a(x_3 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{56} &= (x_3 - y_3 + \frac{1}{2}) \mathbf{a}_1 + (x_3 - z_3) \mathbf{a}_2 - (y_3 + z_3) \mathbf{a}_3 = -a(z_3 + \frac{1}{4}) \hat{\mathbf{x}} - a(y_3 - \frac{1}{4}) \hat{\mathbf{y}} + a(x_3 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O II} \\
\mathbf{B}_{57} &= (y_4 + z_4) \mathbf{a}_1 + (x_4 + z_4) \mathbf{a}_2 + (x_4 + y_4) \mathbf{a}_3 = ax_4 \hat{\mathbf{x}} + ay_4 \hat{\mathbf{y}} + az_4 \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{58} &= (-y_4 + z_4 + \frac{1}{2}) \mathbf{a}_1 - (x_4 - z_4) \mathbf{a}_2 - (x_4 + y_4 - \frac{1}{2}) \mathbf{a}_3 = -ax_4 \hat{\mathbf{x}} - a(y_4 - \frac{1}{2}) \hat{\mathbf{y}} + az_4 \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{59} &= (y_4 - z_4) \mathbf{a}_1 - (x_4 + z_4 - \frac{1}{2}) \mathbf{a}_2 + (-x_4 + y_4 + \frac{1}{2}) \mathbf{a}_3 = -a(x_4 - \frac{1}{2}) \hat{\mathbf{x}} + ay_4 \hat{\mathbf{y}} - az_4 \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{60} &= -(y_4 + z_4 - \frac{1}{2}) \mathbf{a}_1 + (x_4 - z_4 + \frac{1}{2}) \mathbf{a}_2 + (x_4 - y_4) \mathbf{a}_3 = ax_4 \hat{\mathbf{x}} - ay_4 \hat{\mathbf{y}} - a(z_4 - \frac{1}{2}) \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{61} &= (x_4 + y_4) \mathbf{a}_1 + (y_4 + z_4) \mathbf{a}_2 + (x_4 + z_4) \mathbf{a}_3 = az_4 \hat{\mathbf{x}} + ax_4 \hat{\mathbf{y}} + ay_4 \hat{\mathbf{z}} & (48e) & \text{O III}
\end{aligned}$$

$$\begin{aligned}
\mathbf{B}_{62} &= \begin{pmatrix} -(x_4 + y_4 - \frac{1}{2}) \mathbf{a}_1 + \\ (-y_4 + z_4 + \frac{1}{2}) \mathbf{a}_2 - (x_4 - z_4) \mathbf{a}_3 \end{pmatrix} = az_4 \hat{\mathbf{x}} - ax_4 \hat{\mathbf{y}} - a(y_4 - \frac{1}{2}) \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{63} &= \begin{pmatrix} (-x_4 + y_4 + \frac{1}{2}) \mathbf{a}_1 + \\ (y_4 - z_4) \mathbf{a}_2 - (x_4 + z_4 - \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -az_4 \hat{\mathbf{x}} - a(x_4 - \frac{1}{2}) \hat{\mathbf{y}} + ay_4 \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{64} &= \begin{pmatrix} (x_4 - y_4) \mathbf{a}_1 - (y_4 + z_4 - \frac{1}{2}) \mathbf{a}_2 + \\ (x_4 - z_4 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a(z_4 - \frac{1}{2}) \hat{\mathbf{x}} + ax_4 \hat{\mathbf{y}} - ay_4 \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{65} &= \begin{pmatrix} (x_4 + z_4) \mathbf{a}_1 + (x_4 + y_4) \mathbf{a}_2 + \\ (y_4 + z_4) \mathbf{a}_3 \end{pmatrix} = ay_4 \hat{\mathbf{x}} + az_4 \hat{\mathbf{y}} + ax_4 \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{66} &= \begin{pmatrix} -(x_4 - z_4) \mathbf{a}_1 - \\ (x_4 + y_4 - \frac{1}{2}) \mathbf{a}_2 + \\ (-y_4 + z_4 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a(y_4 - \frac{1}{2}) \hat{\mathbf{x}} + az_4 \hat{\mathbf{y}} - ax_4 \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{67} &= \begin{pmatrix} -(x_4 + z_4 - \frac{1}{2}) \mathbf{a}_1 + \\ (-x_4 + y_4 + \frac{1}{2}) \mathbf{a}_2 + (y_4 - z_4) \mathbf{a}_3 \end{pmatrix} = ay_4 \hat{\mathbf{x}} - az_4 \hat{\mathbf{y}} - a(x_4 - \frac{1}{2}) \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{68} &= \begin{pmatrix} (x_4 - z_4 + \frac{1}{2}) \mathbf{a}_1 + \\ (x_4 - y_4) \mathbf{a}_2 - (y_4 + z_4 - \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -ay_4 \hat{\mathbf{x}} - a(z_4 - \frac{1}{2}) \hat{\mathbf{y}} + ax_4 \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{69} &= \begin{pmatrix} (x_4 + z_4 + \frac{1}{2}) \mathbf{a}_1 + \\ (y_4 + z_4 + \frac{1}{2}) \mathbf{a}_2 + \\ (x_4 + y_4 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a(y_4 + \frac{1}{4}) \hat{\mathbf{x}} + a(x_4 + \frac{1}{4}) \hat{\mathbf{y}} + a(z_4 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{70} &= \begin{pmatrix} (-x_4 + z_4 + \frac{1}{2}) \mathbf{a}_1 - \\ (y_4 - z_4) \mathbf{a}_2 - (x_4 + y_4) \mathbf{a}_3 \end{pmatrix} = -a(y_4 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_4 - \frac{1}{4}) \hat{\mathbf{y}} + a(z_4 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{71} &= \begin{pmatrix} -(x_4 + z_4) \mathbf{a}_1 + \\ (y_4 - z_4 + \frac{1}{2}) \mathbf{a}_2 - (x_4 - y_4) \mathbf{a}_3 \end{pmatrix} = a(y_4 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_4 + \frac{1}{4}) \hat{\mathbf{y}} - a(z_4 - \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{72} &= \begin{pmatrix} (x_4 - z_4) \mathbf{a}_1 - (y_4 + z_4) \mathbf{a}_2 + \\ (x_4 - y_4 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a(y_4 - \frac{1}{4}) \hat{\mathbf{x}} + a(x_4 + \frac{1}{4}) \hat{\mathbf{y}} - a(z_4 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{73} &= \begin{pmatrix} (y_4 + z_4 + \frac{1}{2}) \mathbf{a}_1 + \\ (x_4 + y_4 + \frac{1}{2}) \mathbf{a}_2 + \\ (x_4 + z_4 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a(x_4 + \frac{1}{4}) \hat{\mathbf{x}} + a(z_4 + \frac{1}{4}) \hat{\mathbf{y}} + a(y_4 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{74} &= \begin{pmatrix} -(y_4 - z_4) \mathbf{a}_1 - (x_4 + y_4) \mathbf{a}_2 + \\ (-x_4 + z_4 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a(x_4 - \frac{1}{4}) \hat{\mathbf{x}} + a(z_4 + \frac{1}{4}) \hat{\mathbf{y}} - a(y_4 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{75} &= \begin{pmatrix} (y_4 - z_4 + \frac{1}{2}) \mathbf{a}_1 - \\ (x_4 - y_4) \mathbf{a}_2 - (x_4 + z_4) \mathbf{a}_3 \end{pmatrix} = -a(x_4 + \frac{1}{4}) \hat{\mathbf{x}} - a(z_4 - \frac{1}{4}) \hat{\mathbf{y}} + a(y_4 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{76} &= \begin{pmatrix} -(y_4 + z_4) \mathbf{a}_1 + \\ (x_4 - y_4 + \frac{1}{2}) \mathbf{a}_2 + (x_4 - z_4) \mathbf{a}_3 \end{pmatrix} = a(x_4 + \frac{1}{4}) \hat{\mathbf{x}} - a(z_4 + \frac{1}{4}) \hat{\mathbf{y}} - a(y_4 - \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{77} &= \begin{pmatrix} (x_4 + y_4 + \frac{1}{2}) \mathbf{a}_1 + \\ (x_4 + z_4 + \frac{1}{2}) \mathbf{a}_2 + \\ (y_4 + z_4 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a(z_4 + \frac{1}{4}) \hat{\mathbf{x}} + a(y_4 + \frac{1}{4}) \hat{\mathbf{y}} + a(x_4 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{78} &= \begin{pmatrix} -(x_4 + y_4) \mathbf{a}_1 + \\ (-x_4 + z_4 + \frac{1}{2}) \mathbf{a}_2 - (y_4 - z_4) \mathbf{a}_3 \end{pmatrix} = a(z_4 + \frac{1}{4}) \hat{\mathbf{x}} - a(y_4 + \frac{1}{4}) \hat{\mathbf{y}} - a(x_4 - \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{79} &= \begin{pmatrix} -(x_4 - y_4) \mathbf{a}_1 - (x_4 + z_4) \mathbf{a}_2 + \\ (y_4 - z_4 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a(z_4 - \frac{1}{4}) \hat{\mathbf{x}} + a(y_4 + \frac{1}{4}) \hat{\mathbf{y}} - a(x_4 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{80} &= \begin{pmatrix} (x_4 - y_4 + \frac{1}{2}) \mathbf{a}_1 + \\ (x_4 - z_4) \mathbf{a}_2 - (y_4 + z_4) \mathbf{a}_3 \end{pmatrix} = -a(z_4 + \frac{1}{4}) \hat{\mathbf{x}} - a(y_4 - \frac{1}{4}) \hat{\mathbf{y}} + a(x_4 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{O III} \\
\mathbf{B}_{81} &= \begin{pmatrix} (y_5 + z_5) \mathbf{a}_1 + (x_5 + z_5) \mathbf{a}_2 + \\ (x_5 + y_5) \mathbf{a}_3 \end{pmatrix} = ax_5 \hat{\mathbf{x}} + ay_5 \hat{\mathbf{y}} + az_5 \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{82} &= \begin{pmatrix} (-y_5 + z_5 + \frac{1}{2}) \mathbf{a}_1 - \\ (x_5 - z_5) \mathbf{a}_2 - (x_5 + y_5 - \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -ax_5 \hat{\mathbf{x}} - a(y_5 - \frac{1}{2}) \hat{\mathbf{y}} + az_5 \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{83} &= \begin{pmatrix} (y_5 - z_5) \mathbf{a}_1 - (x_5 + z_5 - \frac{1}{2}) \mathbf{a}_2 + \\ (-x_5 + y_5 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a(x_5 - \frac{1}{2}) \hat{\mathbf{x}} + ay_5 \hat{\mathbf{y}} - az_5 \hat{\mathbf{z}} & (48e) & \text{P I}
\end{aligned}$$

$$\begin{aligned}
\mathbf{B}_{84} &= \begin{pmatrix} -(y_5 + z_5 - \frac{1}{2}) \mathbf{a}_1 + \\ (x_5 - z_5 + \frac{1}{2}) \mathbf{a}_2 + (x_5 - y_5) \mathbf{a}_3 \end{pmatrix} = ax_5 \hat{\mathbf{x}} - ay_5 \hat{\mathbf{y}} - a(z_5 - \frac{1}{2}) \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{85} &= \begin{pmatrix} (x_5 + y_5) \mathbf{a}_1 + (y_5 + z_5) \mathbf{a}_2 + \\ (x_5 + z_5) \mathbf{a}_3 \end{pmatrix} = az_5 \hat{\mathbf{x}} + ax_5 \hat{\mathbf{y}} + ay_5 \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{86} &= \begin{pmatrix} -(x_5 + y_5 - \frac{1}{2}) \mathbf{a}_1 + \\ (-y_5 + z_5 + \frac{1}{2}) \mathbf{a}_2 - (x_5 - z_5) \mathbf{a}_3 \end{pmatrix} = az_5 \hat{\mathbf{x}} - ax_5 \hat{\mathbf{y}} - a(y_5 - \frac{1}{2}) \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{87} &= \begin{pmatrix} (-x_5 + y_5 + \frac{1}{2}) \mathbf{a}_1 + \\ (y_5 - z_5) \mathbf{a}_2 - (x_5 + z_5 - \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -az_5 \hat{\mathbf{x}} - a(x_5 - \frac{1}{2}) \hat{\mathbf{y}} + ay_5 \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{88} &= \begin{pmatrix} (x_5 - y_5) \mathbf{a}_1 - (y_5 + z_5 - \frac{1}{2}) \mathbf{a}_2 + \\ (x_5 - z_5 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a(z_5 - \frac{1}{2}) \hat{\mathbf{x}} + ax_5 \hat{\mathbf{y}} - ay_5 \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{89} &= \begin{pmatrix} (x_5 + z_5) \mathbf{a}_1 + (x_5 + y_5) \mathbf{a}_2 + \\ (y_5 + z_5) \mathbf{a}_3 \end{pmatrix} = ay_5 \hat{\mathbf{x}} + az_5 \hat{\mathbf{y}} + ax_5 \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{90} &= \begin{pmatrix} -(x_5 - z_5) \mathbf{a}_1 - \\ (x_5 + y_5 - \frac{1}{2}) \mathbf{a}_2 + \\ (-y_5 + z_5 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a(y_5 - \frac{1}{2}) \hat{\mathbf{x}} + az_5 \hat{\mathbf{y}} - ax_5 \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{91} &= \begin{pmatrix} -(x_5 + z_5 - \frac{1}{2}) \mathbf{a}_1 + \\ (-x_5 + y_5 + \frac{1}{2}) \mathbf{a}_2 + (y_5 - z_5) \mathbf{a}_3 \end{pmatrix} = ay_5 \hat{\mathbf{x}} - az_5 \hat{\mathbf{y}} - a(x_5 - \frac{1}{2}) \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{92} &= \begin{pmatrix} (x_5 - z_5 + \frac{1}{2}) \mathbf{a}_1 + \\ (x_5 - y_5) \mathbf{a}_2 - (y_5 + z_5 - \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -ay_5 \hat{\mathbf{x}} - a(z_5 - \frac{1}{2}) \hat{\mathbf{y}} + ax_5 \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{93} &= \begin{pmatrix} (x_5 + z_5 + \frac{1}{2}) \mathbf{a}_1 + \\ (y_5 + z_5 + \frac{1}{2}) \mathbf{a}_2 + \\ (x_5 + y_5 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a(y_5 + \frac{1}{4}) \hat{\mathbf{x}} + a(x_5 + \frac{1}{4}) \hat{\mathbf{y}} + a(z_5 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{94} &= \begin{pmatrix} (-x_5 + z_5 + \frac{1}{2}) \mathbf{a}_1 - \\ (y_5 - z_5) \mathbf{a}_2 - (x_5 + y_5) \mathbf{a}_3 \end{pmatrix} = -a(y_5 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_5 - \frac{1}{4}) \hat{\mathbf{y}} + a(z_5 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{95} &= \begin{pmatrix} -(x_5 + z_5) \mathbf{a}_1 + \\ (y_5 - z_5 + \frac{1}{2}) \mathbf{a}_2 - (x_5 - y_5) \mathbf{a}_3 \end{pmatrix} = a(y_5 + \frac{1}{4}) \hat{\mathbf{x}} - a(x_5 + \frac{1}{4}) \hat{\mathbf{y}} - a(z_5 - \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{96} &= \begin{pmatrix} (x_5 - z_5) \mathbf{a}_1 - (y_5 + z_5) \mathbf{a}_2 + \\ (x_5 - y_5 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a(y_5 - \frac{1}{4}) \hat{\mathbf{x}} + a(x_5 + \frac{1}{4}) \hat{\mathbf{y}} - a(z_5 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{97} &= \begin{pmatrix} (y_5 + z_5 + \frac{1}{2}) \mathbf{a}_1 + \\ (x_5 + y_5 + \frac{1}{2}) \mathbf{a}_2 + \\ (x_5 + z_5 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a(x_5 + \frac{1}{4}) \hat{\mathbf{x}} + a(z_5 + \frac{1}{4}) \hat{\mathbf{y}} + a(y_5 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{98} &= \begin{pmatrix} -(y_5 - z_5) \mathbf{a}_1 - (x_5 + y_5) \mathbf{a}_2 + \\ (-x_5 + z_5 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a(x_5 - \frac{1}{4}) \hat{\mathbf{x}} + a(z_5 + \frac{1}{4}) \hat{\mathbf{y}} - a(y_5 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{99} &= \begin{pmatrix} (y_5 - z_5 + \frac{1}{2}) \mathbf{a}_1 - \\ (x_5 - y_5) \mathbf{a}_2 - (x_5 + z_5) \mathbf{a}_3 \end{pmatrix} = -a(x_5 + \frac{1}{4}) \hat{\mathbf{x}} - a(z_5 - \frac{1}{4}) \hat{\mathbf{y}} + a(y_5 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{100} &= \begin{pmatrix} -(y_5 + z_5) \mathbf{a}_1 + \\ (x_5 - y_5 + \frac{1}{2}) \mathbf{a}_2 + (x_5 - z_5) \mathbf{a}_3 \end{pmatrix} = a(x_5 + \frac{1}{4}) \hat{\mathbf{x}} - a(z_5 + \frac{1}{4}) \hat{\mathbf{y}} - a(y_5 - \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{101} &= \begin{pmatrix} (x_5 + y_5 + \frac{1}{2}) \mathbf{a}_1 + \\ (x_5 + z_5 + \frac{1}{2}) \mathbf{a}_2 + \\ (y_5 + z_5 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a(z_5 + \frac{1}{4}) \hat{\mathbf{x}} + a(y_5 + \frac{1}{4}) \hat{\mathbf{y}} + a(x_5 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{102} &= \begin{pmatrix} -(x_5 + y_5) \mathbf{a}_1 + \\ (-x_5 + z_5 + \frac{1}{2}) \mathbf{a}_2 - (y_5 - z_5) \mathbf{a}_3 \end{pmatrix} = a(z_5 + \frac{1}{4}) \hat{\mathbf{x}} - a(y_5 + \frac{1}{4}) \hat{\mathbf{y}} - a(x_5 - \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{103} &= \begin{pmatrix} -(x_5 - y_5) \mathbf{a}_1 - (x_5 + z_5) \mathbf{a}_2 + \\ (y_5 - z_5 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = -a(z_5 - \frac{1}{4}) \hat{\mathbf{x}} + a(y_5 + \frac{1}{4}) \hat{\mathbf{y}} - a(x_5 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{P I} \\
\mathbf{B}_{104} &= \begin{pmatrix} (x_5 - y_5 + \frac{1}{2}) \mathbf{a}_1 + \\ (x_5 - z_5) \mathbf{a}_2 - (y_5 + z_5) \mathbf{a}_3 \end{pmatrix} = -a(z_5 + \frac{1}{4}) \hat{\mathbf{x}} - a(y_5 - \frac{1}{4}) \hat{\mathbf{y}} + a(x_5 + \frac{1}{4}) \hat{\mathbf{z}} & (48e) & \text{P I}
\end{aligned}$$

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