

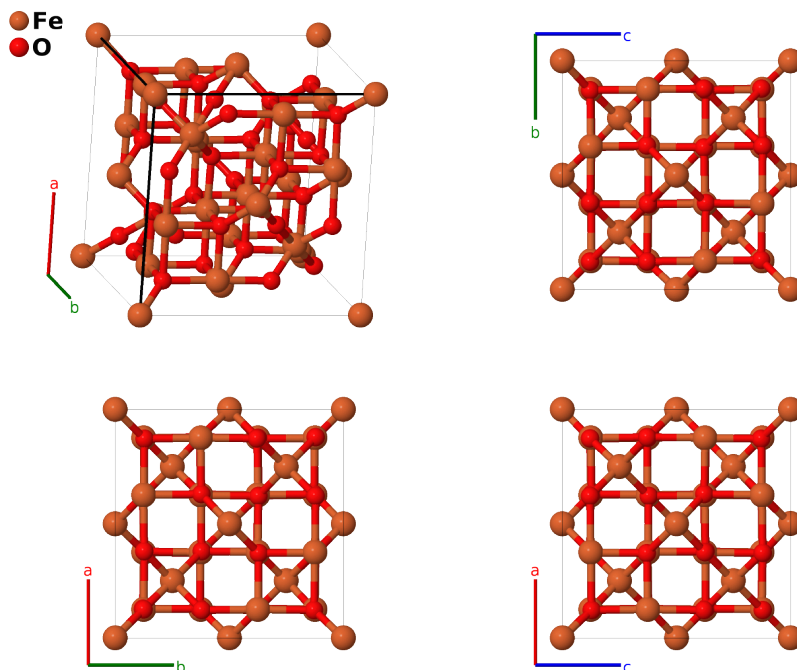
# $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> (*D*5<sub>7</sub>) Structure: A2B3\_cP60\_212\_acd\_bce-001

This structure originally had the label A2B3\_cP60\_212\_bcd\_ace. Calls to that address will be redirected here.

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<https://aflow.org/p/J7V3>

[https://aflow.org/p/A2B3\\_cP60\\_212\\_acd\\_bce-001](https://aflow.org/p/A2B3_cP60_212_acd_bce-001)



<b>Prototype</b>	Fe <sub>2</sub> O <sub>3</sub>
<b>AFLOW prototype label</b>	A2B3_cP60_212_acd_bce-001
<b><i>Strukturbericht</i> designation</b>	<i>D</i> 5 <sub>7</sub>
<b>ICSD</b>	none
<b>Pearson symbol</b>	cP60
<b>Space group number</b>	212
<b>Space group symbol</b>	<i>P</i> 4 <sub>3</sub> 32
<b>AFLOW prototype command</b>	<code>aflow --proto=A2B3_cP60_212_acd_bce-001 --params=a, x<sub>3</sub>, x<sub>4</sub>, y<sub>5</sub>, x<sub>6</sub>, y<sub>6</sub>, z<sub>6</sub></code>

## Other compounds with this structure

$\gamma$ -Al<sub>2</sub>O<sub>3</sub> ( $\gamma$ -corundum)

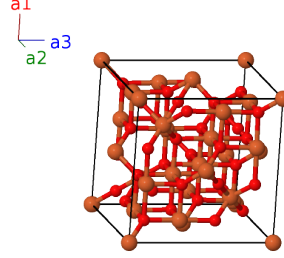
- (Hermann, 1937) gives  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> as the prototype for *Strukturbericht D*5<sub>7</sub>, but states that the data for  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> is more reliable and presents the data for the later compound, which we use as the prototype.

- More information about the  $\text{Al}_2\text{O}_3$  compounds can be found on the corundum ( $D5_1$ ) page.
- This is a rock-salt ( $B1$ ) structure with defects.
- This structure can also be expressed in the enantiomorphic space group  $P4_132$  #213.

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### Simple Cubic primitive vectors

$$\begin{aligned}\mathbf{a}_1 &= a \hat{\mathbf{x}} \\ \mathbf{a}_2 &= a \hat{\mathbf{y}} \\ \mathbf{a}_3 &= a \hat{\mathbf{z}}\end{aligned}$$




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### Basis vectors

	Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B}_1$	$= \frac{1}{8} \mathbf{a}_1 + \frac{1}{8} \mathbf{a}_2 + \frac{1}{8} \mathbf{a}_3$	$=$	$\frac{1}{8} a \hat{\mathbf{x}} + \frac{1}{8} a \hat{\mathbf{y}} + \frac{1}{8} a \hat{\mathbf{z}}$	(4a)	Fe I
$\mathbf{B}_2$	$= \frac{3}{8} \mathbf{a}_1 + \frac{7}{8} \mathbf{a}_2 + \frac{5}{8} \mathbf{a}_3$	$=$	$\frac{3}{8} a \hat{\mathbf{x}} + \frac{7}{8} a \hat{\mathbf{y}} + \frac{5}{8} a \hat{\mathbf{z}}$	(4a)	Fe I
$\mathbf{B}_3$	$= \frac{7}{8} \mathbf{a}_1 + \frac{5}{8} \mathbf{a}_2 + \frac{3}{8} \mathbf{a}_3$	$=$	$\frac{7}{8} a \hat{\mathbf{x}} + \frac{5}{8} a \hat{\mathbf{y}} + \frac{3}{8} a \hat{\mathbf{z}}$	(4a)	Fe I
$\mathbf{B}_4$	$= \frac{5}{8} \mathbf{a}_1 + \frac{3}{8} \mathbf{a}_2 + \frac{7}{8} \mathbf{a}_3$	$=$	$\frac{5}{8} a \hat{\mathbf{x}} + \frac{3}{8} a \hat{\mathbf{y}} + \frac{7}{8} a \hat{\mathbf{z}}$	(4a)	Fe I
$\mathbf{B}_5$	$= \frac{5}{8} \mathbf{a}_1 + \frac{5}{8} \mathbf{a}_2 + \frac{5}{8} \mathbf{a}_3$	$=$	$\frac{5}{8} a \hat{\mathbf{x}} + \frac{5}{8} a \hat{\mathbf{y}} + \frac{5}{8} a \hat{\mathbf{z}}$	(4b)	O I
$\mathbf{B}_6$	$= \frac{7}{8} \mathbf{a}_1 + \frac{3}{8} \mathbf{a}_2 + \frac{1}{8} \mathbf{a}_3$	$=$	$\frac{7}{8} a \hat{\mathbf{x}} + \frac{3}{8} a \hat{\mathbf{y}} + \frac{1}{8} a \hat{\mathbf{z}}$	(4b)	O I
$\mathbf{B}_7$	$= \frac{3}{8} \mathbf{a}_1 + \frac{1}{8} \mathbf{a}_2 + \frac{7}{8} \mathbf{a}_3$	$=$	$\frac{3}{8} a \hat{\mathbf{x}} + \frac{1}{8} a \hat{\mathbf{y}} + \frac{7}{8} a \hat{\mathbf{z}}$	(4b)	O I
$\mathbf{B}_8$	$= \frac{1}{8} \mathbf{a}_1 + \frac{7}{8} \mathbf{a}_2 + \frac{3}{8} \mathbf{a}_3$	$=$	$\frac{1}{8} a \hat{\mathbf{x}} + \frac{7}{8} a \hat{\mathbf{y}} + \frac{3}{8} a \hat{\mathbf{z}}$	(4b)	O I
$\mathbf{B}_9$	$= x_3 \mathbf{a}_1 + x_3 \mathbf{a}_2 + x_3 \mathbf{a}_3$	$=$	$ax_3 \hat{\mathbf{x}} + ax_3 \hat{\mathbf{y}} + ax_3 \hat{\mathbf{z}}$	(8c)	Fe II
$\mathbf{B}_{10}$	$= -\left(x_3 - \frac{1}{2}\right) \mathbf{a}_1 - x_3 \mathbf{a}_2 + \left(x_3 + \frac{1}{2}\right) \mathbf{a}_3$	$=$	$-a\left(x_3 - \frac{1}{2}\right) \hat{\mathbf{x}} - ax_3 \hat{\mathbf{y}} + a\left(x_3 + \frac{1}{2}\right) \hat{\mathbf{z}}$	(8c)	Fe II
$\mathbf{B}_{11}$	$= -x_3 \mathbf{a}_1 + \left(x_3 + \frac{1}{2}\right) \mathbf{a}_2 - \left(x_3 - \frac{1}{2}\right) \mathbf{a}_3$	$=$	$-ax_3 \hat{\mathbf{x}} + a\left(x_3 + \frac{1}{2}\right) \hat{\mathbf{y}} - a\left(x_3 - \frac{1}{2}\right) \hat{\mathbf{z}}$	(8c)	Fe II
$\mathbf{B}_{12}$	$= \left(x_3 + \frac{1}{2}\right) \mathbf{a}_1 - \left(x_3 - \frac{1}{2}\right) \mathbf{a}_2 - x_3 \mathbf{a}_3$	$=$	$a\left(x_3 + \frac{1}{2}\right) \hat{\mathbf{x}} - a\left(x_3 - \frac{1}{2}\right) \hat{\mathbf{y}} - ax_3 \hat{\mathbf{z}}$	(8c)	Fe II
$\mathbf{B}_{13}$	$= \left(x_3 + \frac{1}{4}\right) \mathbf{a}_1 + \left(x_3 + \frac{3}{4}\right) \mathbf{a}_2 - \left(x_3 - \frac{3}{4}\right) \mathbf{a}_3$	$=$	$a\left(x_3 + \frac{1}{4}\right) \hat{\mathbf{x}} + a\left(x_3 + \frac{3}{4}\right) \hat{\mathbf{y}} - a\left(x_3 - \frac{3}{4}\right) \hat{\mathbf{z}}$	(8c)	Fe II
$\mathbf{B}_{14}$	$= -\left(x_3 - \frac{1}{4}\right) \mathbf{a}_1 - \left(x_3 - \frac{1}{4}\right) \mathbf{a}_2 - \left(x_3 - \frac{1}{4}\right) \mathbf{a}_3$	$=$	$-a\left(x_3 - \frac{1}{4}\right) \hat{\mathbf{x}} - a\left(x_3 - \frac{1}{4}\right) \hat{\mathbf{y}} - a\left(x_3 - \frac{1}{4}\right) \hat{\mathbf{z}}$	(8c)	Fe II
$\mathbf{B}_{15}$	$= \left(x_3 + \frac{3}{4}\right) \mathbf{a}_1 - \left(x_3 - \frac{3}{4}\right) \mathbf{a}_2 + \left(x_3 + \frac{1}{4}\right) \mathbf{a}_3$	$=$	$a\left(x_3 + \frac{3}{4}\right) \hat{\mathbf{x}} - a\left(x_3 - \frac{3}{4}\right) \hat{\mathbf{y}} + a\left(x_3 + \frac{1}{4}\right) \hat{\mathbf{z}}$	(8c)	Fe II
$\mathbf{B}_{16}$	$= -\left(x_3 - \frac{3}{4}\right) \mathbf{a}_1 + \left(x_3 + \frac{1}{4}\right) \mathbf{a}_2 + \left(x_3 + \frac{3}{4}\right) \mathbf{a}_3$	$=$	$-a\left(x_3 - \frac{3}{4}\right) \hat{\mathbf{x}} + a\left(x_3 + \frac{1}{4}\right) \hat{\mathbf{y}} + a\left(x_3 + \frac{3}{4}\right) \hat{\mathbf{z}}$	(8c)	Fe II
$\mathbf{B}_{17}$	$= x_4 \mathbf{a}_1 + x_4 \mathbf{a}_2 + x_4 \mathbf{a}_3$	$=$	$ax_4 \hat{\mathbf{x}} + ax_4 \hat{\mathbf{y}} + ax_4 \hat{\mathbf{z}}$	(8c)	O II
$\mathbf{B}_{18}$	$= -\left(x_4 - \frac{1}{2}\right) \mathbf{a}_1 - x_4 \mathbf{a}_2 + \left(x_4 + \frac{1}{2}\right) \mathbf{a}_3$	$=$	$-a\left(x_4 - \frac{1}{2}\right) \hat{\mathbf{x}} - ax_4 \hat{\mathbf{y}} + a\left(x_4 + \frac{1}{2}\right) \hat{\mathbf{z}}$	(8c)	O II
$\mathbf{B}_{19}$	$= -x_4 \mathbf{a}_1 + \left(x_4 + \frac{1}{2}\right) \mathbf{a}_2 - \left(x_4 - \frac{1}{2}\right) \mathbf{a}_3$	$=$	$-ax_4 \hat{\mathbf{x}} + a\left(x_4 + \frac{1}{2}\right) \hat{\mathbf{y}} - a\left(x_4 - \frac{1}{2}\right) \hat{\mathbf{z}}$	(8c)	O II

$$\begin{aligned}
\mathbf{B}_{20} &= (x_4 + \frac{1}{2}) \mathbf{a}_1 - (x_4 - \frac{1}{2}) \mathbf{a}_2 - x_4 \mathbf{a}_3 = a(x_4 + \frac{1}{2}) \hat{\mathbf{x}} - a(x_4 - \frac{1}{2}) \hat{\mathbf{y}} - ax_4 \hat{\mathbf{z}} & (8c) & \quad \text{O II} \\
\mathbf{B}_{21} &= (x_4 + \frac{1}{4}) \mathbf{a}_1 + (x_4 + \frac{3}{4}) \mathbf{a}_2 - (x_4 - \frac{3}{4}) \mathbf{a}_3 = a(x_4 + \frac{1}{4}) \hat{\mathbf{x}} + a(x_4 + \frac{3}{4}) \hat{\mathbf{y}} - a(x_4 - \frac{3}{4}) \hat{\mathbf{z}} & (8c) & \quad \text{O II} \\
\mathbf{B}_{22} &= -(x_4 - \frac{1}{4}) \mathbf{a}_1 - (x_4 - \frac{1}{4}) \mathbf{a}_2 - (x_4 - \frac{1}{4}) \mathbf{a}_3 = -a(x_4 - \frac{1}{4}) \hat{\mathbf{x}} - a(x_4 - \frac{1}{4}) \hat{\mathbf{y}} - a(x_4 - \frac{1}{4}) \hat{\mathbf{z}} & (8c) & \quad \text{O II} \\
\mathbf{B}_{23} &= (x_4 + \frac{3}{4}) \mathbf{a}_1 - (x_4 - \frac{3}{4}) \mathbf{a}_2 + (x_4 + \frac{1}{4}) \mathbf{a}_3 = a(x_4 + \frac{3}{4}) \hat{\mathbf{x}} - a(x_4 - \frac{3}{4}) \hat{\mathbf{y}} + a(x_4 + \frac{1}{4}) \hat{\mathbf{z}} & (8c) & \quad \text{O II} \\
\mathbf{B}_{24} &= -(x_4 - \frac{3}{4}) \mathbf{a}_1 + (x_4 + \frac{1}{4}) \mathbf{a}_2 + (x_4 + \frac{3}{4}) \mathbf{a}_3 = -a(x_4 - \frac{3}{4}) \hat{\mathbf{x}} + a(x_4 + \frac{1}{4}) \hat{\mathbf{y}} + a(x_4 + \frac{3}{4}) \hat{\mathbf{z}} & (8c) & \quad \text{O II} \\
\mathbf{B}_{25} &= \frac{1}{8} \mathbf{a}_1 + y_5 \mathbf{a}_2 - (y_5 - \frac{1}{4}) \mathbf{a}_3 = \frac{1}{8} a \hat{\mathbf{x}} + ay_5 \hat{\mathbf{y}} - a(y_5 - \frac{1}{4}) \hat{\mathbf{z}} & (12d) & \quad \text{Fe III} \\
\mathbf{B}_{26} &= \frac{3}{8} \mathbf{a}_1 - y_5 \mathbf{a}_2 - (y_5 - \frac{3}{4}) \mathbf{a}_3 = \frac{3}{8} a \hat{\mathbf{x}} - ay_5 \hat{\mathbf{y}} - a(y_5 - \frac{3}{4}) \hat{\mathbf{z}} & (12d) & \quad \text{Fe III} \\
\mathbf{B}_{27} &= \frac{7}{8} \mathbf{a}_1 + (y_5 + \frac{1}{2}) \mathbf{a}_2 + (y_5 + \frac{1}{4}) \mathbf{a}_3 = \frac{7}{8} a \hat{\mathbf{x}} + a(y_5 + \frac{1}{2}) \hat{\mathbf{y}} + a(y_5 + \frac{1}{4}) \hat{\mathbf{z}} & (12d) & \quad \text{Fe III} \\
\mathbf{B}_{28} &= \frac{5}{8} \mathbf{a}_1 - (y_5 - \frac{1}{2}) \mathbf{a}_2 + (y_5 + \frac{3}{4}) \mathbf{a}_3 = \frac{5}{8} a \hat{\mathbf{x}} - a(y_5 - \frac{1}{2}) \hat{\mathbf{y}} + a(y_5 + \frac{3}{4}) \hat{\mathbf{z}} & (12d) & \quad \text{Fe III} \\
\mathbf{B}_{29} &= -(y_5 - \frac{1}{4}) \mathbf{a}_1 + \frac{1}{8} \mathbf{a}_2 + y_5 \mathbf{a}_3 = -a(y_5 - \frac{1}{4}) \hat{\mathbf{x}} + \frac{1}{8} a \hat{\mathbf{y}} + ay_5 \hat{\mathbf{z}} & (12d) & \quad \text{Fe III} \\
\mathbf{B}_{30} &= -(y_5 - \frac{3}{4}) \mathbf{a}_1 + \frac{3}{8} \mathbf{a}_2 - y_5 \mathbf{a}_3 = -a(y_5 - \frac{3}{4}) \hat{\mathbf{x}} + \frac{3}{8} a \hat{\mathbf{y}} - ay_5 \hat{\mathbf{z}} & (12d) & \quad \text{Fe III} \\
\mathbf{B}_{31} &= (y_5 + \frac{1}{4}) \mathbf{a}_1 + \frac{7}{8} \mathbf{a}_2 + (y_5 + \frac{1}{2}) \mathbf{a}_3 = a(y_5 + \frac{1}{4}) \hat{\mathbf{x}} + \frac{7}{8} a \hat{\mathbf{y}} + a(y_5 + \frac{1}{2}) \hat{\mathbf{z}} & (12d) & \quad \text{Fe III} \\
\mathbf{B}_{32} &= (y_5 + \frac{3}{4}) \mathbf{a}_1 + \frac{5}{8} \mathbf{a}_2 - (y_5 - \frac{1}{2}) \mathbf{a}_3 = a(y_5 + \frac{3}{4}) \hat{\mathbf{x}} + \frac{5}{8} a \hat{\mathbf{y}} - a(y_5 - \frac{1}{2}) \hat{\mathbf{z}} & (12d) & \quad \text{Fe III} \\
\mathbf{B}_{33} &= y_5 \mathbf{a}_1 - (y_5 - \frac{1}{4}) \mathbf{a}_2 + \frac{1}{8} \mathbf{a}_3 = ay_5 \hat{\mathbf{x}} - a(y_5 - \frac{1}{4}) \hat{\mathbf{y}} + \frac{1}{8} a \hat{\mathbf{z}} & (12d) & \quad \text{Fe III} \\
\mathbf{B}_{34} &= -y_5 \mathbf{a}_1 - (y_5 - \frac{3}{4}) \mathbf{a}_2 + \frac{3}{8} \mathbf{a}_3 = -ay_5 \hat{\mathbf{x}} - a(y_5 - \frac{3}{4}) \hat{\mathbf{y}} + \frac{3}{8} a \hat{\mathbf{z}} & (12d) & \quad \text{Fe III} \\
\mathbf{B}_{35} &= (y_5 + \frac{1}{2}) \mathbf{a}_1 + (y_5 + \frac{1}{4}) \mathbf{a}_2 + \frac{7}{8} \mathbf{a}_3 = a(y_5 + \frac{1}{2}) \hat{\mathbf{x}} + a(y_5 + \frac{1}{4}) \hat{\mathbf{y}} + \frac{7}{8} a \hat{\mathbf{z}} & (12d) & \quad \text{Fe III} \\
\mathbf{B}_{36} &= -(y_5 - \frac{1}{2}) \mathbf{a}_1 + (y_5 + \frac{3}{4}) \mathbf{a}_2 + \frac{5}{8} \mathbf{a}_3 = -a(y_5 - \frac{1}{2}) \hat{\mathbf{x}} + a(y_5 + \frac{3}{4}) \hat{\mathbf{y}} + \frac{5}{8} a \hat{\mathbf{z}} & (12d) & \quad \text{Fe III} \\
\mathbf{B}_{37} &= 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}} + az_6 \hat{\mathbf{z}} & (24e) & \quad \text{O III} \\
\mathbf{B}_{38} &= -(x_6 - \frac{1}{2}) \mathbf{a}_1 - y_6 \mathbf{a}_2 + (z_6 + \frac{1}{2}) \mathbf{a}_3 = -a(x_6 - \frac{1}{2}) \hat{\mathbf{x}} - ay_6 \hat{\mathbf{y}} + a(z_6 + \frac{1}{2}) \hat{\mathbf{z}} & (24e) & \quad \text{O III} \\
\mathbf{B}_{39} &= -x_6 \mathbf{a}_1 + (y_6 + \frac{1}{2}) \mathbf{a}_2 - (z_6 - \frac{1}{2}) \mathbf{a}_3 = -ax_6 \hat{\mathbf{x}} + a(y_6 + \frac{1}{2}) \hat{\mathbf{y}} - a(z_6 - \frac{1}{2}) \hat{\mathbf{z}} & (24e) & \quad \text{O III} \\
\mathbf{B}_{40} &= (x_6 + \frac{1}{2}) \mathbf{a}_1 - (y_6 - \frac{1}{2}) \mathbf{a}_2 - z_6 \mathbf{a}_3 = a(x_6 + \frac{1}{2}) \hat{\mathbf{x}} - a(y_6 - \frac{1}{2}) \hat{\mathbf{y}} - az_6 \hat{\mathbf{z}} & (24e) & \quad \text{O III} \\
\mathbf{B}_{41} &= z_6 \mathbf{a}_1 + x_6 \mathbf{a}_2 + y_6 \mathbf{a}_3 = az_6 \hat{\mathbf{x}} + ax_6 \hat{\mathbf{y}} + ay_6 \hat{\mathbf{z}} & (24e) & \quad \text{O III} \\
\mathbf{B}_{42} &= (z_6 + \frac{1}{2}) \mathbf{a}_1 - (x_6 - \frac{1}{2}) \mathbf{a}_2 - y_6 \mathbf{a}_3 = a(z_6 + \frac{1}{2}) \hat{\mathbf{x}} - a(x_6 - \frac{1}{2}) \hat{\mathbf{y}} - ay_6 \hat{\mathbf{z}} & (24e) & \quad \text{O III} \\
\mathbf{B}_{43} &= -(z_6 - \frac{1}{2}) \mathbf{a}_1 - x_6 \mathbf{a}_2 + (y_6 + \frac{1}{2}) \mathbf{a}_3 = -a(z_6 - \frac{1}{2}) \hat{\mathbf{x}} - ax_6 \hat{\mathbf{y}} + a(y_6 + \frac{1}{2}) \hat{\mathbf{z}} & (24e) & \quad \text{O III} \\
\mathbf{B}_{44} &= -z_6 \mathbf{a}_1 + (x_6 + \frac{1}{2}) \mathbf{a}_2 - (y_6 - \frac{1}{2}) \mathbf{a}_3 = -az_6 \hat{\mathbf{x}} + a(x_6 + \frac{1}{2}) \hat{\mathbf{y}} - a(y_6 - \frac{1}{2}) \hat{\mathbf{z}} & (24e) & \quad \text{O III} \\
\mathbf{B}_{45} &= y_6 \mathbf{a}_1 + z_6 \mathbf{a}_2 + x_6 \mathbf{a}_3 = ay_6 \hat{\mathbf{x}} + az_6 \hat{\mathbf{y}} + ax_6 \hat{\mathbf{z}} & (24e) & \quad \text{O III} \\
\mathbf{B}_{46} &= -y_6 \mathbf{a}_1 + (z_6 + \frac{1}{2}) \mathbf{a}_2 - (x_6 - \frac{1}{2}) \mathbf{a}_3 = -ay_6 \hat{\mathbf{x}} + a(z_6 + \frac{1}{2}) \hat{\mathbf{y}} - a(x_6 - \frac{1}{2}) \hat{\mathbf{z}} & (24e) & \quad \text{O III} \\
\mathbf{B}_{47} &= (y_6 + \frac{1}{2}) \mathbf{a}_1 - (z_6 - \frac{1}{2}) \mathbf{a}_2 - x_6 \mathbf{a}_3 = a(y_6 + \frac{1}{2}) \hat{\mathbf{x}} - a(z_6 - \frac{1}{2}) \hat{\mathbf{y}} - ax_6 \hat{\mathbf{z}} & (24e) & \quad \text{O III} \\
\mathbf{B}_{48} &= -(y_6 - \frac{1}{2}) \mathbf{a}_1 - z_6 \mathbf{a}_2 + (x_6 + \frac{1}{2}) \mathbf{a}_3 = -a(y_6 - \frac{1}{2}) \hat{\mathbf{x}} - az_6 \hat{\mathbf{y}} + a(x_6 + \frac{1}{2}) \hat{\mathbf{z}} & (24e) & \quad \text{O III} \\
\mathbf{B}_{49} &= (y_6 + \frac{1}{4}) \mathbf{a}_1 + (x_6 + \frac{3}{4}) \mathbf{a}_2 - (z_6 - \frac{3}{4}) \mathbf{a}_3 = a(y_6 + \frac{1}{4}) \hat{\mathbf{x}} + a(x_6 + \frac{3}{4}) \hat{\mathbf{y}} - a(z_6 - \frac{3}{4}) \hat{\mathbf{z}} & (24e) & \quad \text{O III} \\
\mathbf{B}_{50} &= -(y_6 - \frac{1}{4}) \mathbf{a}_1 - (x_6 - \frac{1}{4}) \mathbf{a}_2 - (z_6 - \frac{1}{4}) \mathbf{a}_3 = -a(y_6 - \frac{1}{4}) \hat{\mathbf{x}} - a(x_6 - \frac{1}{4}) \hat{\mathbf{y}} - a(z_6 - \frac{1}{4}) \hat{\mathbf{z}} & (24e) & \quad \text{O III}
\end{aligned}$$

$$\begin{aligned}
\mathbf{B}_{51} &= \begin{pmatrix} (y_6 + \frac{3}{4}) \mathbf{a}_1 - (x_6 - \frac{3}{4}) \mathbf{a}_2 + \\ (z_6 + \frac{1}{4}) \mathbf{a}_3 \end{pmatrix} = a \left( y_6 + \frac{3}{4} \right) \hat{\mathbf{x}} - a \left( x_6 - \frac{3}{4} \right) \hat{\mathbf{y}} + a \left( z_6 + \frac{1}{4} \right) \hat{\mathbf{z}} & (24e) & \text{O III} \\
\mathbf{B}_{52} &= \begin{pmatrix} -(y_6 - \frac{3}{4}) \mathbf{a}_1 + (x_6 + \frac{1}{4}) \mathbf{a}_2 + \\ (z_6 + \frac{3}{4}) \mathbf{a}_3 \end{pmatrix} = -a \left( y_6 - \frac{3}{4} \right) \hat{\mathbf{x}} + a \left( x_6 + \frac{1}{4} \right) \hat{\mathbf{y}} + a \left( z_6 + \frac{3}{4} \right) \hat{\mathbf{z}} & (24e) & \text{O III} \\
\mathbf{B}_{53} &= \begin{pmatrix} (x_6 + \frac{1}{4}) \mathbf{a}_1 + (z_6 + \frac{3}{4}) \mathbf{a}_2 - \\ (y_6 - \frac{3}{4}) \mathbf{a}_3 \end{pmatrix} = a \left( x_6 + \frac{1}{4} \right) \hat{\mathbf{x}} + a \left( z_6 + \frac{3}{4} \right) \hat{\mathbf{y}} - a \left( y_6 - \frac{3}{4} \right) \hat{\mathbf{z}} & (24e) & \text{O III} \\
\mathbf{B}_{54} &= \begin{pmatrix} -(x_6 - \frac{3}{4}) \mathbf{a}_1 + (z_6 + \frac{1}{4}) \mathbf{a}_2 + \\ (y_6 + \frac{3}{4}) \mathbf{a}_3 \end{pmatrix} = -a \left( x_6 - \frac{3}{4} \right) \hat{\mathbf{x}} + a \left( z_6 + \frac{1}{4} \right) \hat{\mathbf{y}} + a \left( y_6 + \frac{3}{4} \right) \hat{\mathbf{z}} & (24e) & \text{O III} \\
\mathbf{B}_{55} &= \begin{pmatrix} -(x_6 - \frac{1}{4}) \mathbf{a}_1 - (z_6 - \frac{1}{4}) \mathbf{a}_2 - \\ (y_6 - \frac{1}{4}) \mathbf{a}_3 \end{pmatrix} = -a \left( x_6 - \frac{1}{4} \right) \hat{\mathbf{x}} - a \left( z_6 - \frac{1}{4} \right) \hat{\mathbf{y}} - a \left( y_6 - \frac{1}{4} \right) \hat{\mathbf{z}} & (24e) & \text{O III} \\
\mathbf{B}_{56} &= \begin{pmatrix} (x_6 + \frac{3}{4}) \mathbf{a}_1 - (z_6 - \frac{3}{4}) \mathbf{a}_2 + \\ (y_6 + \frac{1}{4}) \mathbf{a}_3 \end{pmatrix} = a \left( x_6 + \frac{3}{4} \right) \hat{\mathbf{x}} - a \left( z_6 - \frac{3}{4} \right) \hat{\mathbf{y}} + a \left( y_6 + \frac{1}{4} \right) \hat{\mathbf{z}} & (24e) & \text{O III} \\
\mathbf{B}_{57} &= \begin{pmatrix} (z_6 + \frac{1}{4}) \mathbf{a}_1 + (y_6 + \frac{3}{4}) \mathbf{a}_2 - \\ (x_6 - \frac{3}{4}) \mathbf{a}_3 \end{pmatrix} = a \left( z_6 + \frac{1}{4} \right) \hat{\mathbf{x}} + a \left( y_6 + \frac{3}{4} \right) \hat{\mathbf{y}} - a \left( x_6 - \frac{3}{4} \right) \hat{\mathbf{z}} & (24e) & \text{O III} \\
\mathbf{B}_{58} &= \begin{pmatrix} (z_6 + \frac{3}{4}) \mathbf{a}_1 - (y_6 - \frac{3}{4}) \mathbf{a}_2 + \\ (x_6 + \frac{1}{4}) \mathbf{a}_3 \end{pmatrix} = a \left( z_6 + \frac{3}{4} \right) \hat{\mathbf{x}} - a \left( y_6 - \frac{3}{4} \right) \hat{\mathbf{y}} + a \left( x_6 + \frac{1}{4} \right) \hat{\mathbf{z}} & (24e) & \text{O III} \\
\mathbf{B}_{59} &= \begin{pmatrix} -(z_6 - \frac{3}{4}) \mathbf{a}_1 + (y_6 + \frac{1}{4}) \mathbf{a}_2 + \\ (x_6 + \frac{3}{4}) \mathbf{a}_3 \end{pmatrix} = -a \left( z_6 - \frac{3}{4} \right) \hat{\mathbf{x}} + a \left( y_6 + \frac{1}{4} \right) \hat{\mathbf{y}} + a \left( x_6 + \frac{3}{4} \right) \hat{\mathbf{z}} & (24e) & \text{O III} \\
\mathbf{B}_{60} &= \begin{pmatrix} -(z_6 - \frac{1}{4}) \mathbf{a}_1 - (y_6 - \frac{1}{4}) \mathbf{a}_2 - \\ (x_6 - \frac{1}{4}) \mathbf{a}_3 \end{pmatrix} = -a \left( z_6 - \frac{1}{4} \right) \hat{\mathbf{x}} - a \left( y_6 - \frac{1}{4} \right) \hat{\mathbf{y}} - a \left( x_6 - \frac{1}{4} \right) \hat{\mathbf{z}} & (24e) & \text{O III}
\end{aligned}$$

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