Retgersite (α-$NiSO_4 \cdot 6H_2O$, $H4_5$) Structure: A12BC10D_tP96_92_6b_a_5b_a-001

This structure originally had the label `A12BC10D_tP96_92_6b_a_5b_a`. Calls to that address will be redirected here.

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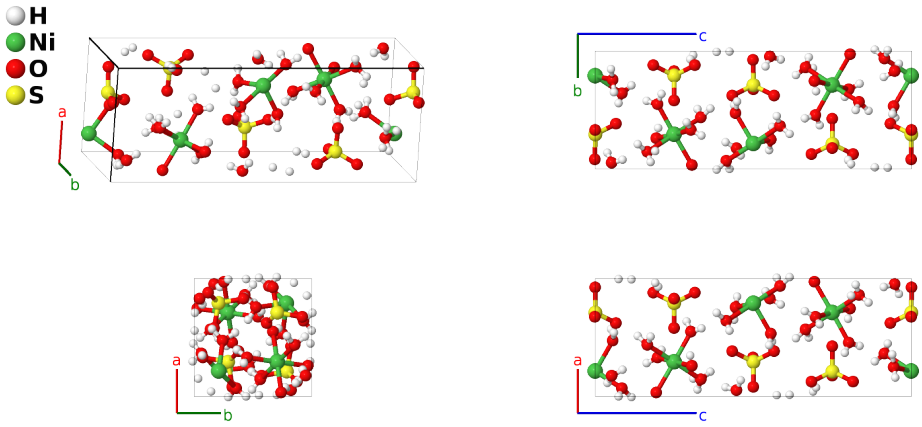
https://aflow.org/p/JAKV

https://aflow.org/p/A12BC10D_tP96_92_6b_a_5b_a-001

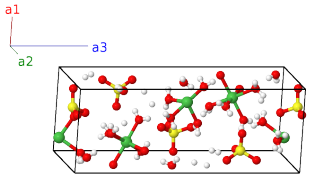


Prototype	$H_{12}NiO_{10}S$
AFLOW prototype label	A12BC10D_tP96_92_6b_a_5b_a-001
***Strukturbericht* designation**	$H4_5$
Mineral name	retgersite
ICSD	62051
Pearson symbol	tP96
Space group number	92
Space group symbol	$P4_12_12$
AFLOW prototype command	`aflow --proto=A12BC10D_tP96_92_6b_a_5b_a-001 --params=`$a, c/a, x_1, x_2, x_3, y_3, z_3, x_4, y_4, z_4, x_5, y_5, z_5, x_6, y_6, z_6, x_7, y_7, z_7, x_8, y_8, z_8, x_9, y_9, z_9, x_{10}, y_{10}, z_{10}, x_{11}, y_{11}, z_{11}, x_{12}, y_{12}, z_{12}, x_{13}, y_{13}, z_{13}$

- This structure is nearly identical to the one presented in (Hermann, 1937) as $H4_5$, but now includes the positions of the hydrogen atoms.
- This compound can also be found in the enantiomorphic space group $P4_32_12$ #98.

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
$\mathbf{B_1}$	=	$x_1\,\mathbf{a}_1 + x_1\,\mathbf{a}_2$	=	$ax_1\,\hat{\mathbf{x}} + ax_1\,\hat{\mathbf{y}}$	(4a)	Ni I
$\mathbf{B_2}$	=	$-x_1\,\mathbf{a}_1 - x_1\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3$	=	$-ax_1\,\hat{\mathbf{x}} - ax_1\,\hat{\mathbf{y}} + \frac{1}{2}c\,\hat{\mathbf{z}}$	(4a)	Ni I
$\mathbf{B_3}$	=	$-\left(x_1 - \frac{1}{2}\right)\,\mathbf{a}_1 + \left(x_1 + \frac{1}{2}\right)\,\mathbf{a}_2 + \frac{1}{4}\,\mathbf{a}_3$	=	$-a\left(x_1 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(x_1 + \frac{1}{2}\right)\,\hat{\mathbf{y}} + \frac{1}{4}c\,\hat{\mathbf{z}}$	(4a)	Ni I
$\mathbf{B_4}$	=	$\left(x_1 + \frac{1}{2}\right)\,\mathbf{a}_1 - \left(x_1 - \frac{1}{2}\right)\,\mathbf{a}_2 + \frac{3}{4}\,\mathbf{a}_3$	=	$a\left(x_1 + \frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(x_1 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + \frac{3}{4}c\,\hat{\mathbf{z}}$	(4a)	Ni I
$\mathbf{B_5}$	=	$x_2\,\mathbf{a}_1 + x_2\,\mathbf{a}_2$	=	$ax_2\,\hat{\mathbf{x}} + ax_2\,\hat{\mathbf{y}}$	(4a)	S I
$\mathbf{B_6}$	=	$-x_2\,\mathbf{a}_1 - x_2\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3$	=	$-ax_2\,\hat{\mathbf{x}} - ax_2\,\hat{\mathbf{y}} + \frac{1}{2}c\,\hat{\mathbf{z}}$	(4a)	S I
$\mathbf{B_7}$	=	$-\left(x_2 - \frac{1}{2}\right)\,\mathbf{a}_1 + \left(x_2 + \frac{1}{2}\right)\,\mathbf{a}_2 + \frac{1}{4}\,\mathbf{a}_3$	=	$-a\left(x_2 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(x_2 + \frac{1}{2}\right)\,\hat{\mathbf{y}} + \frac{1}{4}c\,\hat{\mathbf{z}}$	(4a)	S I
$\mathbf{B_8}$	=	$\left(x_2 + \frac{1}{2}\right)\,\mathbf{a}_1 - \left(x_2 - \frac{1}{2}\right)\,\mathbf{a}_2 + \frac{3}{4}\,\mathbf{a}_3$	=	$a\left(x_2 + \frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(x_2 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + \frac{3}{4}c\,\hat{\mathbf{z}}$	(4a)	S I
$\mathbf{B_9}$	=	$x_3\,\mathbf{a}_1 + y_3\,\mathbf{a}_2 + z_3\,\mathbf{a}_3$	=	$ax_3\,\hat{\mathbf{x}} + ay_3\,\hat{\mathbf{y}} + cz_3\,\hat{\mathbf{z}}$	(8b)	H I
$\mathbf{B_{10}}$	=	$-x_3\,\mathbf{a}_1 - y_3\,\mathbf{a}_2 + \left(z_3 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-ax_3\,\hat{\mathbf{x}} - ay_3\,\hat{\mathbf{y}} + c\left(z_3 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(8b)	H I
$\mathbf{B_{11}}$	=	$-\left(y_3 - \frac{1}{2}\right)\,\mathbf{a}_1 + \left(x_3 + \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_3 + \frac{1}{4}\right)\,\mathbf{a}_3$	=	$-a\left(y_3 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(x_3 + \frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_3 + \frac{1}{4}\right)\,\hat{\mathbf{z}}$	(8b)	H I
$\mathbf{B_{12}}$	=	$\left(y_3 + \frac{1}{2}\right)\,\mathbf{a}_1 - \left(x_3 - \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_3 + \frac{3}{4}\right)\,\mathbf{a}_3$	=	$a\left(y_3 + \frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(x_3 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_3 + \frac{3}{4}\right)\,\hat{\mathbf{z}}$	(8b)	H I
$\mathbf{B_{13}}$	=	$-\left(x_3 - \frac{1}{2}\right)\,\mathbf{a}_1 + \left(y_3 + \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_3 - \frac{1}{4}\right)\,\mathbf{a}_3$	=	$-a\left(x_3 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(y_3 + \frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_3 - \frac{1}{4}\right)\,\hat{\mathbf{z}}$	(8b)	H I
$\mathbf{B_{14}}$	=	$\left(x_3 + \frac{1}{2}\right)\,\mathbf{a}_1 - \left(y_3 - \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_3 - \frac{3}{4}\right)\,\mathbf{a}_3$	=	$a\left(x_3 + \frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(y_3 - \frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_3 - \frac{3}{4}\right)\,\hat{\mathbf{z}}$	(8b)	H I
$\mathbf{B_{15}}$	=	$y_3\,\mathbf{a}_1 + x_3\,\mathbf{a}_2 - z_3\,\mathbf{a}_3$	=	$ay_3\,\hat{\mathbf{x}} + ax_3\,\hat{\mathbf{y}} - cz_3\,\hat{\mathbf{z}}$	(8b)	H I
$\mathbf{B_{16}}$	=	$-y_3\,\mathbf{a}_1 - x_3\,\mathbf{a}_2 - \left(z_3 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-ay_3\,\hat{\mathbf{x}} - ax_3\,\hat{\mathbf{y}} - c\left(z_3 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(8b)	H I
$\mathbf{B_{17}}$	=	$x_4\,\mathbf{a}_1 + y_4\,\mathbf{a}_2 + z_4\,\mathbf{a}_3$	=	$ax_4\,\hat{\mathbf{x}} + ay_4\,\hat{\mathbf{y}} + cz_4\,\hat{\mathbf{z}}$	(8b)	H II
$\mathbf{B_{18}}$	=	$-x_4\,\mathbf{a}_1 - y_4\,\mathbf{a}_2 + \left(z_4 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-ax_4\,\hat{\mathbf{x}} - ay_4\,\hat{\mathbf{y}} + c\left(z_4 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(8b)	H II
$\mathbf{B_{19}}$	=	$-\left(y_4 - \frac{1}{2}\right)\,\mathbf{a}_1 + \left(x_4 + \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_4 + \frac{1}{4}\right)\,\mathbf{a}_3$	=	$-a\left(y_4 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(x_4 + \frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_4 + \frac{1}{4}\right)\,\hat{\mathbf{z}}$	(8b)	H II
$\mathbf{B_{20}}$	=	$\left(y_4 + \frac{1}{2}\right)\,\mathbf{a}_1 - \left(x_4 - \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_4 + \frac{3}{4}\right)\,\mathbf{a}_3$	=	$a\left(y_4 + \frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(x_4 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_4 + \frac{3}{4}\right)\,\hat{\mathbf{z}}$	(8b)	H II
$\mathbf{B_{21}}$	=	$-\left(x_4 - \frac{1}{2}\right)\,\mathbf{a}_1 + \left(y_4 + \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_4 - \frac{1}{4}\right)\,\mathbf{a}_3$	=	$-a\left(x_4 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(y_4 + \frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_4 - \frac{1}{4}\right)\,\hat{\mathbf{z}}$	(8b)	H II
$\mathbf{B_{22}}$	=	$\left(x_4 + \frac{1}{2}\right)\,\mathbf{a}_1 - \left(y_4 - \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_4 - \frac{3}{4}\right)\,\mathbf{a}_3$	=	$a\left(x_4 + \frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(y_4 - \frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_4 - \frac{3}{4}\right)\,\hat{\mathbf{z}}$	(8b)	H II
$\mathbf{B_{23}}$	=	$y_4\,\mathbf{a}_1 + x_4\,\mathbf{a}_2 - z_4\,\mathbf{a}_3$	=	$ay_4\,\hat{\mathbf{x}} + ax_4\,\hat{\mathbf{y}} - cz_4\,\hat{\mathbf{z}}$	(8b)	H II
$\mathbf{B_{24}}$	=	$-y_4\,\mathbf{a}_1 - x_4\,\mathbf{a}_2 - \left(z_4 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-ay_4\,\hat{\mathbf{x}} - ax_4\,\hat{\mathbf{y}} - c\left(z_4 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(8b)	H II
$\mathbf{B_{25}}$	=	$x_5\,\mathbf{a}_1 + y_5\,\mathbf{a}_2 + z_5\,\mathbf{a}_3$	=	$ax_5\,\hat{\mathbf{x}} + ay_5\,\hat{\mathbf{y}} + cz_5\,\hat{\mathbf{z}}$	(8b)	H III

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\begin{array}{lcccccl}
\mathbf{B_{26}} & = & -x_5\,\mathbf{a}_1 - y_5\,\mathbf{a}_2 + \left(z_5+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -ax_5\,\hat{\mathbf{x}} - ay_5\,\hat{\mathbf{y}} + c\left(z_5+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H III} \\
\mathbf{B_{27}} & = & -\left(y_5-\frac{1}{2}\right)\,\mathbf{a}_1 + \left(x_5+\frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_5+\frac{1}{4}\right)\,\mathbf{a}_3 & = & -a\left(y_5-\frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(x_5+\frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_5+\frac{1}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H III} \\
\mathbf{B_{28}} & = & \left(y_5+\frac{1}{2}\right)\,\mathbf{a}_1 - \left(x_5-\frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_5+\frac{3}{4}\right)\,\mathbf{a}_3 & = & a\left(y_5+\frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(x_5-\frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_5+\frac{3}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H III} \\
\mathbf{B_{29}} & = & -\left(x_5-\frac{1}{2}\right)\,\mathbf{a}_1 + \left(y_5+\frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_5-\frac{1}{4}\right)\,\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}} - c\left(z_5-\frac{1}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H III} \\
\mathbf{B_{30}} & = & \left(x_5+\frac{1}{2}\right)\,\mathbf{a}_1 - \left(y_5-\frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_5-\frac{3}{4}\right)\,\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}} - c\left(z_5-\frac{3}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H III} \\
\mathbf{B_{31}} & = & y_5\,\mathbf{a}_1 + x_5\,\mathbf{a}_2 - z_5\,\mathbf{a}_3 & = & ay_5\,\hat{\mathbf{x}} + ax_5\,\hat{\mathbf{y}} - cz_5\,\hat{\mathbf{z}} & \text{(8b)} & \text{H III} \\
\mathbf{B_{32}} & = & -y_5\,\mathbf{a}_1 - x_5\,\mathbf{a}_2 - \left(z_5-\frac{1}{2}\right)\,\mathbf{a}_3 & = & -ay_5\,\hat{\mathbf{x}} - ax_5\,\hat{\mathbf{y}} - c\left(z_5-\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H III} \\
\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}} & \text{(8b)} & \text{H IV} \\
\mathbf{B_{34}} & = & -x_6\,\mathbf{a}_1 - y_6\,\mathbf{a}_2 + \left(z_6+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -ax_6\,\hat{\mathbf{x}} - ay_6\,\hat{\mathbf{y}} + c\left(z_6+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H IV} \\
\mathbf{B_{35}} & = & -\left(y_6-\frac{1}{2}\right)\,\mathbf{a}_1 + \left(x_6+\frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_6+\frac{1}{4}\right)\,\mathbf{a}_3 & = & -a\left(y_6-\frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(x_6+\frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_6+\frac{1}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H IV} \\
\mathbf{B_{36}} & = & \left(y_6+\frac{1}{2}\right)\,\mathbf{a}_1 - \left(x_6-\frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_6+\frac{3}{4}\right)\,\mathbf{a}_3 & = & a\left(y_6+\frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(x_6-\frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_6+\frac{3}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H IV} \\
\mathbf{B_{37}} & = & -\left(x_6-\frac{1}{2}\right)\,\mathbf{a}_1 + \left(y_6+\frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_6-\frac{1}{4}\right)\,\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}} - c\left(z_6-\frac{1}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H IV} \\
\mathbf{B_{38}} & = & \left(x_6+\frac{1}{2}\right)\,\mathbf{a}_1 - \left(y_6-\frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_6-\frac{3}{4}\right)\,\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}} - c\left(z_6-\frac{3}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H IV} \\
\mathbf{B_{39}} & = & y_6\,\mathbf{a}_1 + x_6\,\mathbf{a}_2 - z_6\,\mathbf{a}_3 & = & ay_6\,\hat{\mathbf{x}} + ax_6\,\hat{\mathbf{y}} - cz_6\,\hat{\mathbf{z}} & \text{(8b)} & \text{H IV} \\
\mathbf{B_{40}} & = & -y_6\,\mathbf{a}_1 - x_6\,\mathbf{a}_2 - \left(z_6-\frac{1}{2}\right)\,\mathbf{a}_3 & = & -ay_6\,\hat{\mathbf{x}} - ax_6\,\hat{\mathbf{y}} - c\left(z_6-\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H IV} \\
\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}} & \text{(8b)} & \text{H V} \\
\mathbf{B_{42}} & = & -x_7\,\mathbf{a}_1 - y_7\,\mathbf{a}_2 + \left(z_7+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -ax_7\,\hat{\mathbf{x}} - ay_7\,\hat{\mathbf{y}} + c\left(z_7+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H V} \\
\mathbf{B_{43}} & = & -\left(y_7-\frac{1}{2}\right)\,\mathbf{a}_1 + \left(x_7+\frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_7+\frac{1}{4}\right)\,\mathbf{a}_3 & = & -a\left(y_7-\frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(x_7+\frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_7+\frac{1}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H V} \\
\mathbf{B_{44}} & = & \left(y_7+\frac{1}{2}\right)\,\mathbf{a}_1 - \left(x_7-\frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_7+\frac{3}{4}\right)\,\mathbf{a}_3 & = & a\left(y_7+\frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(x_7-\frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_7+\frac{3}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H V} \\
\mathbf{B_{45}} & = & -\left(x_7-\frac{1}{2}\right)\,\mathbf{a}_1 + \left(y_7+\frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_7-\frac{1}{4}\right)\,\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}} - c\left(z_7-\frac{1}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H V} \\
\mathbf{B_{46}} & = & \left(x_7+\frac{1}{2}\right)\,\mathbf{a}_1 - \left(y_7-\frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_7-\frac{3}{4}\right)\,\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}} - c\left(z_7-\frac{3}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H V} \\
\mathbf{B_{47}} & = & y_7\,\mathbf{a}_1 + x_7\,\mathbf{a}_2 - z_7\,\mathbf{a}_3 & = & ay_7\,\hat{\mathbf{x}} + ax_7\,\hat{\mathbf{y}} - cz_7\,\hat{\mathbf{z}} & \text{(8b)} & \text{H V} \\
\mathbf{B_{48}} & = & -y_7\,\mathbf{a}_1 - x_7\,\mathbf{a}_2 - \left(z_7-\frac{1}{2}\right)\,\mathbf{a}_3 & = & -ay_7\,\hat{\mathbf{x}} - ax_7\,\hat{\mathbf{y}} - c\left(z_7-\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H V} \\
\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}} & \text{(8b)} & \text{H VI} \\
\mathbf{B_{50}} & = & -x_8\,\mathbf{a}_1 - y_8\,\mathbf{a}_2 + \left(z_8+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -ax_8\,\hat{\mathbf{x}} - ay_8\,\hat{\mathbf{y}} + c\left(z_8+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H VI} \\
\mathbf{B_{51}} & = & -\left(y_8-\frac{1}{2}\right)\,\mathbf{a}_1 + \left(x_8+\frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_8+\frac{1}{4}\right)\,\mathbf{a}_3 & = & -a\left(y_8-\frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(x_8+\frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_8+\frac{1}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H VI} \\
\mathbf{B_{52}} & = & \left(y_8+\frac{1}{2}\right)\,\mathbf{a}_1 - \left(x_8-\frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_8+\frac{3}{4}\right)\,\mathbf{a}_3 & = & a\left(y_8+\frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(x_8-\frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_8+\frac{3}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H VI} \\
\mathbf{B_{53}} & = & -\left(x_8-\frac{1}{2}\right)\,\mathbf{a}_1 + \left(y_8+\frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_8-\frac{1}{4}\right)\,\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}} - c\left(z_8-\frac{1}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H VI} \\
\mathbf{B_{54}} & = & \left(x_8+\frac{1}{2}\right)\,\mathbf{a}_1 - \left(y_8-\frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_8-\frac{3}{4}\right)\,\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}} - c\left(z_8-\frac{3}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H VI}
\end{array}
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\begin{array}{lcccccl}
\mathbf{B_{55}} & = & y_8\,\mathbf{a}_1 + x_8\,\mathbf{a}_2 - z_8\,\mathbf{a}_3 & = & a y_8\,\hat{\mathbf{x}} + a x_8\,\hat{\mathbf{y}} - c z_8\,\hat{\mathbf{z}} & \text{(8b)} & \text{H VI} \\
\mathbf{B_{56}} & = & -y_8\,\mathbf{a}_1 - x_8\,\mathbf{a}_2 - \left(z_8 - \tfrac{1}{2}\right)\,\mathbf{a}_3 & = & -a y_8\,\hat{\mathbf{x}} - a x_8\,\hat{\mathbf{y}} - c\left(z_8 - \tfrac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{H VI} \\
\mathbf{B_{57}} & = & x_9\,\mathbf{a}_1 + y_9\,\mathbf{a}_2 + z_9\,\mathbf{a}_3 & = & a x_9\,\hat{\mathbf{x}} + a y_9\,\hat{\mathbf{y}} + c z_9\,\hat{\mathbf{z}} & \text{(8b)} & \text{O I} \\
\mathbf{B_{58}} & = & -x_9\,\mathbf{a}_1 - y_9\,\mathbf{a}_2 + \left(z_9 + \tfrac{1}{2}\right)\,\mathbf{a}_3 & = & -a x_9\,\hat{\mathbf{x}} - a y_9\,\hat{\mathbf{y}} + c\left(z_9 + \tfrac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O I} \\
\mathbf{B_{59}} & = & -\left(y_9 - \tfrac{1}{2}\right)\,\mathbf{a}_1 + \left(x_9 + \tfrac{1}{2}\right)\,\mathbf{a}_2 + \left(z_9 + \tfrac{1}{4}\right)\,\mathbf{a}_3 & = & -a\left(y_9 - \tfrac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(x_9 + \tfrac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_9 + \tfrac{1}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O I} \\
\mathbf{B_{60}} & = & \left(y_9 + \tfrac{1}{2}\right)\,\mathbf{a}_1 - \left(x_9 - \tfrac{1}{2}\right)\,\mathbf{a}_2 + \left(z_9 + \tfrac{3}{4}\right)\,\mathbf{a}_3 & = & a\left(y_9 + \tfrac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(x_9 - \tfrac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_9 + \tfrac{3}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O I} \\
\mathbf{B_{61}} & = & -\left(x_9 - \tfrac{1}{2}\right)\,\mathbf{a}_1 + \left(y_9 + \tfrac{1}{2}\right)\,\mathbf{a}_2 - \left(z_9 - \tfrac{1}{4}\right)\,\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}} - c\left(z_9 - \tfrac{1}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O I} \\
\mathbf{B_{62}} & = & \left(x_9 + \tfrac{1}{2}\right)\,\mathbf{a}_1 - \left(y_9 - \tfrac{1}{2}\right)\,\mathbf{a}_2 - \left(z_9 - \tfrac{3}{4}\right)\,\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}} - c\left(z_9 - \tfrac{3}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O I} \\
\mathbf{B_{63}} & = & y_9\,\mathbf{a}_1 + x_9\,\mathbf{a}_2 - z_9\,\mathbf{a}_3 & = & a y_9\,\hat{\mathbf{x}} + a x_9\,\hat{\mathbf{y}} - c z_9\,\hat{\mathbf{z}} & \text{(8b)} & \text{O I} \\
\mathbf{B_{64}} & = & -y_9\,\mathbf{a}_1 - x_9\,\mathbf{a}_2 - \left(z_9 - \tfrac{1}{2}\right)\,\mathbf{a}_3 & = & -a y_9\,\hat{\mathbf{x}} - a x_9\,\hat{\mathbf{y}} - c\left(z_9 - \tfrac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O I} \\
\mathbf{B_{65}} & = & x_{10}\,\mathbf{a}_1 + y_{10}\,\mathbf{a}_2 + z_{10}\,\mathbf{a}_3 & = & a x_{10}\,\hat{\mathbf{x}} + a y_{10}\,\hat{\mathbf{y}} + c z_{10}\,\hat{\mathbf{z}} & \text{(8b)} & \text{O II} \\
\mathbf{B_{66}} & = & -x_{10}\,\mathbf{a}_1 - y_{10}\,\mathbf{a}_2 + \left(z_{10} + \tfrac{1}{2}\right)\,\mathbf{a}_3 & = & -a x_{10}\,\hat{\mathbf{x}} - a y_{10}\,\hat{\mathbf{y}} + c\left(z_{10} + \tfrac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O II} \\
\mathbf{B_{67}} & = & -\left(y_{10} - \tfrac{1}{2}\right)\,\mathbf{a}_1 + \left(x_{10} + \tfrac{1}{2}\right)\,\mathbf{a}_2 + \left(z_{10} + \tfrac{1}{4}\right)\,\mathbf{a}_3 & = & -a\left(y_{10} - \tfrac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(x_{10} + \tfrac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_{10} + \tfrac{1}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O II} \\
\mathbf{B_{68}} & = & \left(y_{10} + \tfrac{1}{2}\right)\,\mathbf{a}_1 - \left(x_{10} - \tfrac{1}{2}\right)\,\mathbf{a}_2 + \left(z_{10} + \tfrac{3}{4}\right)\,\mathbf{a}_3 & = & a\left(y_{10} + \tfrac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(x_{10} - \tfrac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_{10} + \tfrac{3}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O II} \\
\mathbf{B_{69}} & = & -\left(x_{10} - \tfrac{1}{2}\right)\,\mathbf{a}_1 + \left(y_{10} + \tfrac{1}{2}\right)\,\mathbf{a}_2 - \left(z_{10} - \tfrac{1}{4}\right)\,\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}} - c\left(z_{10} - \tfrac{1}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O II} \\
\mathbf{B_{70}} & = & \left(x_{10} + \tfrac{1}{2}\right)\,\mathbf{a}_1 - \left(y_{10} - \tfrac{1}{2}\right)\,\mathbf{a}_2 - \left(z_{10} - \tfrac{3}{4}\right)\,\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}} - c\left(z_{10} - \tfrac{3}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O II} \\
\mathbf{B_{71}} & = & y_{10}\,\mathbf{a}_1 + x_{10}\,\mathbf{a}_2 - z_{10}\,\mathbf{a}_3 & = & a y_{10}\,\hat{\mathbf{x}} + a x_{10}\,\hat{\mathbf{y}} - c z_{10}\,\hat{\mathbf{z}} & \text{(8b)} & \text{O II} \\
\mathbf{B_{72}} & = & -y_{10}\,\mathbf{a}_1 - x_{10}\,\mathbf{a}_2 - \left(z_{10} - \tfrac{1}{2}\right)\,\mathbf{a}_3 & = & -a y_{10}\,\hat{\mathbf{x}} - a x_{10}\,\hat{\mathbf{y}} - c\left(z_{10} - \tfrac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O II} \\
\mathbf{B_{73}} & = & x_{11}\,\mathbf{a}_1 + y_{11}\,\mathbf{a}_2 + z_{11}\,\mathbf{a}_3 & = & a x_{11}\,\hat{\mathbf{x}} + a y_{11}\,\hat{\mathbf{y}} + c z_{11}\,\hat{\mathbf{z}} & \text{(8b)} & \text{O III} \\
\mathbf{B_{74}} & = & -x_{11}\,\mathbf{a}_1 - y_{11}\,\mathbf{a}_2 + \left(z_{11} + \tfrac{1}{2}\right)\,\mathbf{a}_3 & = & -a x_{11}\,\hat{\mathbf{x}} - a y_{11}\,\hat{\mathbf{y}} + c\left(z_{11} + \tfrac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O III} \\
\mathbf{B_{75}} & = & -\left(y_{11} - \tfrac{1}{2}\right)\,\mathbf{a}_1 + \left(x_{11} + \tfrac{1}{2}\right)\,\mathbf{a}_2 + \left(z_{11} + \tfrac{1}{4}\right)\,\mathbf{a}_3 & = & -a\left(y_{11} - \tfrac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(x_{11} + \tfrac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_{11} + \tfrac{1}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O III} \\
\mathbf{B_{76}} & = & \left(y_{11} + \tfrac{1}{2}\right)\,\mathbf{a}_1 - \left(x_{11} - \tfrac{1}{2}\right)\,\mathbf{a}_2 + \left(z_{11} + \tfrac{3}{4}\right)\,\mathbf{a}_3 & = & a\left(y_{11} + \tfrac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(x_{11} - \tfrac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_{11} + \tfrac{3}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O III} \\
\mathbf{B_{77}} & = & -\left(x_{11} - \tfrac{1}{2}\right)\,\mathbf{a}_1 + \left(y_{11} + \tfrac{1}{2}\right)\,\mathbf{a}_2 - \left(z_{11} - \tfrac{1}{4}\right)\,\mathbf{a}_3 & = & -a\left(x_{11} - \tfrac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(y_{11} + \tfrac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_{11} - \tfrac{1}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O III} \\
\mathbf{B_{78}} & = & \left(x_{11} + \tfrac{1}{2}\right)\,\mathbf{a}_1 - \left(y_{11} - \tfrac{1}{2}\right)\,\mathbf{a}_2 - \left(z_{11} - \tfrac{3}{4}\right)\,\mathbf{a}_3 & = & a\left(x_{11} + \tfrac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(y_{11} - \tfrac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_{11} - \tfrac{3}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O III} \\
\mathbf{B_{79}} & = & y_{11}\,\mathbf{a}_1 + x_{11}\,\mathbf{a}_2 - z_{11}\,\mathbf{a}_3 & = & a y_{11}\,\hat{\mathbf{x}} + a x_{11}\,\hat{\mathbf{y}} - c z_{11}\,\hat{\mathbf{z}} & \text{(8b)} & \text{O III} \\
\mathbf{B_{80}} & = & -y_{11}\,\mathbf{a}_1 - x_{11}\,\mathbf{a}_2 - \left(z_{11} - \tfrac{1}{2}\right)\,\mathbf{a}_3 & = & -a y_{11}\,\hat{\mathbf{x}} - a x_{11}\,\hat{\mathbf{y}} - c\left(z_{11} - \tfrac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O III} \\
\mathbf{B_{81}} & = & x_{12}\,\mathbf{a}_1 + y_{12}\,\mathbf{a}_2 + z_{12}\,\mathbf{a}_3 & = & a x_{12}\,\hat{\mathbf{x}} + a y_{12}\,\hat{\mathbf{y}} + c z_{12}\,\hat{\mathbf{z}} & \text{(8b)} & \text{O IV} \\
\mathbf{B_{82}} & = & -x_{12}\,\mathbf{a}_1 - y_{12}\,\mathbf{a}_2 + \left(z_{12} + \tfrac{1}{2}\right)\,\mathbf{a}_3 & = & -a x_{12}\,\hat{\mathbf{x}} - a y_{12}\,\hat{\mathbf{y}} + c\left(z_{12} + \tfrac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O IV} \\
\mathbf{B_{83}} & = & -\left(y_{12} - \tfrac{1}{2}\right)\,\mathbf{a}_1 + \left(x_{12} + \tfrac{1}{2}\right)\,\mathbf{a}_2 + \left(z_{12} + \tfrac{1}{4}\right)\,\mathbf{a}_3 & = & -a\left(y_{12} - \tfrac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(x_{12} + \tfrac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_{12} + \tfrac{1}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O IV} \\
\mathbf{B_{84}} & = & \left(y_{12} + \tfrac{1}{2}\right)\,\mathbf{a}_1 - \left(x_{12} - \tfrac{1}{2}\right)\,\mathbf{a}_2 + \left(z_{12} + \tfrac{3}{4}\right)\,\mathbf{a}_3 & = & a\left(y_{12} + \tfrac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(x_{12} - \tfrac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_{12} + \tfrac{3}{4}\right)\,\hat{\mathbf{z}} & \text{(8b)} & \text{O IV}
\end{array}
$$

$$\mathbf{B_{85}} = -\left(x_{12}-\tfrac{1}{2}\right)\mathbf{a}_1+\left(y_{12}+\tfrac{1}{2}\right)\mathbf{a}_2-\left(z_{12}-\tfrac{1}{4}\right)\mathbf{a}_3 = -a\left(x_{12}-\tfrac{1}{2}\right)\hat{\mathbf{x}}+a\left(y_{12}+\tfrac{1}{2}\right)\hat{\mathbf{y}}-c\left(z_{12}-\tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (8b) \quad \text{O IV}$$

$$\mathbf{B_{86}} = \left(x_{12}+\tfrac{1}{2}\right)\mathbf{a}_1-\left(y_{12}-\tfrac{1}{2}\right)\mathbf{a}_2-\left(z_{12}-\tfrac{3}{4}\right)\mathbf{a}_3 = a\left(x_{12}+\tfrac{1}{2}\right)\hat{\mathbf{x}}-a\left(y_{12}-\tfrac{1}{2}\right)\hat{\mathbf{y}}-c\left(z_{12}-\tfrac{3}{4}\right)\hat{\mathbf{z}} \quad (8b) \quad \text{O IV}$$

$$\mathbf{B_{87}} = y_{12}\mathbf{a}_1+x_{12}\mathbf{a}_2-z_{12}\mathbf{a}_3 = ay_{12}\hat{\mathbf{x}}+ax_{12}\hat{\mathbf{y}}-cz_{12}\hat{\mathbf{z}} \quad (8b) \quad \text{O IV}$$

$$\mathbf{B_{88}} = -y_{12}\mathbf{a}_1-x_{12}\mathbf{a}_2-\left(z_{12}-\tfrac{1}{2}\right)\mathbf{a}_3 = -ay_{12}\hat{\mathbf{x}}-ax_{12}\hat{\mathbf{y}}-c\left(z_{12}-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8b) \quad \text{O IV}$$

$$\mathbf{B_{89}} = x_{13}\mathbf{a}_1+y_{13}\mathbf{a}_2+z_{13}\mathbf{a}_3 = ax_{13}\hat{\mathbf{x}}+ay_{13}\hat{\mathbf{y}}+cz_{13}\hat{\mathbf{z}} \quad (8b) \quad \text{O V}$$

$$\mathbf{B_{90}} = -x_{13}\mathbf{a}_1-y_{13}\mathbf{a}_2+\left(z_{13}+\tfrac{1}{2}\right)\mathbf{a}_3 = -ax_{13}\hat{\mathbf{x}}-ay_{13}\hat{\mathbf{y}}+c\left(z_{13}+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8b) \quad \text{O V}$$

$$\mathbf{B_{91}} = -\left(y_{13}-\tfrac{1}{2}\right)\mathbf{a}_1+\left(x_{13}+\tfrac{1}{2}\right)\mathbf{a}_2+\left(z_{13}+\tfrac{1}{4}\right)\mathbf{a}_3 = -a\left(y_{13}-\tfrac{1}{2}\right)\hat{\mathbf{x}}+a\left(x_{13}+\tfrac{1}{2}\right)\hat{\mathbf{y}}+c\left(z_{13}+\tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (8b) \quad \text{O V}$$

$$\mathbf{B_{92}} = \left(y_{13}+\tfrac{1}{2}\right)\mathbf{a}_1-\left(x_{13}-\tfrac{1}{2}\right)\mathbf{a}_2+\left(z_{13}+\tfrac{3}{4}\right)\mathbf{a}_3 = a\left(y_{13}+\tfrac{1}{2}\right)\hat{\mathbf{x}}-a\left(x_{13}-\tfrac{1}{2}\right)\hat{\mathbf{y}}+c\left(z_{13}+\tfrac{3}{4}\right)\hat{\mathbf{z}} \quad (8b) \quad \text{O V}$$

$$\mathbf{B_{93}} = -\left(x_{13}-\tfrac{1}{2}\right)\mathbf{a}_1+\left(y_{13}+\tfrac{1}{2}\right)\mathbf{a}_2-\left(z_{13}-\tfrac{1}{4}\right)\mathbf{a}_3 = -a\left(x_{13}-\tfrac{1}{2}\right)\hat{\mathbf{x}}+a\left(y_{13}+\tfrac{1}{2}\right)\hat{\mathbf{y}}-c\left(z_{13}-\tfrac{1}{4}\right)\hat{\mathbf{z}} \quad (8b) \quad \text{O V}$$

$$\mathbf{B_{94}} = \left(x_{13}+\tfrac{1}{2}\right)\mathbf{a}_1-\left(y_{13}-\tfrac{1}{2}\right)\mathbf{a}_2-\left(z_{13}-\tfrac{3}{4}\right)\mathbf{a}_3 = a\left(x_{13}+\tfrac{1}{2}\right)\hat{\mathbf{x}}-a\left(y_{13}-\tfrac{1}{2}\right)\hat{\mathbf{y}}-c\left(z_{13}-\tfrac{3}{4}\right)\hat{\mathbf{z}} \quad (8b) \quad \text{O V}$$

$$\mathbf{B_{95}} = y_{13}\mathbf{a}_1+x_{13}\mathbf{a}_2-z_{13}\mathbf{a}_3 = ay_{13}\hat{\mathbf{x}}+ax_{13}\hat{\mathbf{y}}-cz_{13}\hat{\mathbf{z}} \quad (8b) \quad \text{O V}$$

$$\mathbf{B_{96}} = -y_{13}\mathbf{a}_1-x_{13}\mathbf{a}_2-\left(z_{13}-\tfrac{1}{2}\right)\mathbf{a}_3 = -ay_{13}\hat{\mathbf{x}}-ax_{13}\hat{\mathbf{y}}-c\left(z_{13}-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (8b) \quad \text{O V}$$

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