O-Carbamoylhydroxylamine ($CH_4N_2O_2$) Structure: AB4C2D2_oP72_61_c_4c_2c_2c-001

https://aflow.org/p/K3UE

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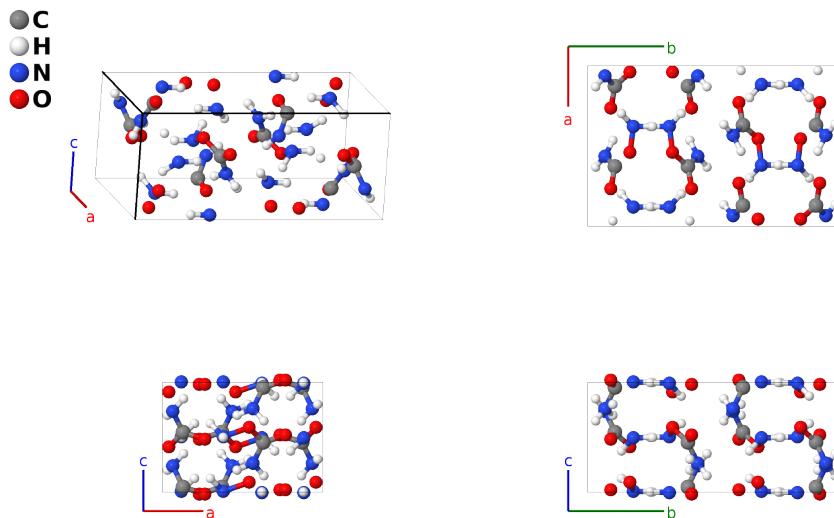
Prototype	$CH_4N_2O_2$
AFLOW prototype label	AB4C2D2_oP72_61_c_4c_2c_2c-001
Mineral name	O-carbamoylhydroxylamine
CCDC	1119388
Pearson symbol	oP72
Space group number	61
Space group symbol	*Pbca*
AFLOW prototype command	aflow --proto=AB4C2D2_oP72_61_c_4c_2c_2c-001 --params=$a, b/a, c/a, x_1, y_1, z_1, x_2, y_2, z_2, x_3, y_3, z_3, x_4, y_4, z_4, x_5, y_5, z_5, x_6, y_6, z_6, x_7, y_7, z_7, x_8, y_8, z_8, x_9, y_9, z_9$

- $CH_4N_2O_2$ is found in two isomers: monoclinic N-hydroxyurea ($H_2NCONHOH$), and

- orthorhombic O-hydroxyurea ($C(NH_2)ONH_2$) (this structure).

Simple Orthorhombic primitive vectors

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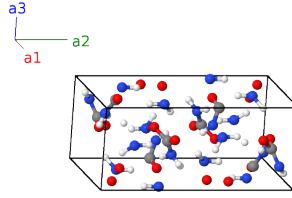
Basis vectors

		Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B_1}$	$=$	$x_1\,\mathbf{a_1} + y_1\,\mathbf{a_2} + z_1\,\mathbf{a_3}$	$=$	$ax_1\,\hat{\mathbf{x}} + by_1\,\hat{\mathbf{y}} + cz_1\,\hat{\mathbf{z}}$	(8c)	C I
$\mathbf{B_2}$	$=$	$-\left(x_1 - \frac{1}{2}\right)\mathbf{a_1} - y_1\,\mathbf{a_2} + \left(z_1 + \frac{1}{2}\right)\mathbf{a_3}$	$=$	$-a\left(x_1 - \frac{1}{2}\right)\hat{\mathbf{x}} - by_1\,\hat{\mathbf{y}} + c\left(z_1 + \frac{1}{2}\right)\hat{\mathbf{z}}$	(8c)	C I
$\mathbf{B_3}$	$=$	$-x_1\,\mathbf{a_1} + \left(y_1 + \frac{1}{2}\right)\mathbf{a_2} - \left(z_1 - \frac{1}{2}\right)\mathbf{a_3}$	$=$	$-ax_1\,\hat{\mathbf{x}} + b\left(y_1 + \frac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_1 - \frac{1}{2}\right)\hat{\mathbf{z}}$	(8c)	C I
$\mathbf{B_4}$	$=$	$\left(x_1 + \frac{1}{2}\right)\mathbf{a_1} - \left(y_1 - \frac{1}{2}\right)\mathbf{a_2} - z_1\,\mathbf{a_3}$	$=$	$a\left(x_1 + \frac{1}{2}\right)\hat{\mathbf{x}} - b\left(y_1 - \frac{1}{2}\right)\hat{\mathbf{y}} - cz_1\,\hat{\mathbf{z}}$	(8c)	C I
$\mathbf{B_5}$	$=$	$-x_1\,\mathbf{a_1} - y_1\,\mathbf{a_2} - z_1\,\mathbf{a_3}$	$=$	$-ax_1\,\hat{\mathbf{x}} - by_1\,\hat{\mathbf{y}} - cz_1\,\hat{\mathbf{z}}$	(8c)	C I
$\mathbf{B_6}$	$=$	$\left(x_1 + \frac{1}{2}\right)\mathbf{a_1} + y_1\,\mathbf{a_2} - \left(z_1 - \frac{1}{2}\right)\mathbf{a_3}$	$=$	$a\left(x_1 + \frac{1}{2}\right)\hat{\mathbf{x}} + by_1\,\hat{\mathbf{y}} - c\left(z_1 - \frac{1}{2}\right)\hat{\mathbf{z}}$	(8c)	C I
$\mathbf{B_7}$	$=$	$x_1\,\mathbf{a_1} - \left(y_1 - \frac{1}{2}\right)\mathbf{a_2} + \left(z_1 + \frac{1}{2}\right)\mathbf{a_3}$	$=$	$ax_1\,\hat{\mathbf{x}} - b\left(y_1 - \frac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_1 + \frac{1}{2}\right)\hat{\mathbf{z}}$	(8c)	C I
$\mathbf{B_8}$	$=$	$-\left(x_1 - \frac{1}{2}\right)\mathbf{a_1} + \left(y_1 + \frac{1}{2}\right)\mathbf{a_2} + z_1\,\mathbf{a_3}$	$=$	$-a\left(x_1 - \frac{1}{2}\right)\hat{\mathbf{x}} + b\left(y_1 + \frac{1}{2}\right)\hat{\mathbf{y}} + cz_1\,\hat{\mathbf{z}}$	(8c)	C I
$\mathbf{B_9}$	$=$	$x_2\,\mathbf{a_1} + y_2\,\mathbf{a_2} + z_2\,\mathbf{a_3}$	$=$	$ax_2\,\hat{\mathbf{x}} + by_2\,\hat{\mathbf{y}} + cz_2\,\hat{\mathbf{z}}$	(8c)	H I
$\mathbf{B_{10}}$	$=$	$-\left(x_2 - \frac{1}{2}\right)\mathbf{a_1} - y_2\,\mathbf{a_2} + \left(z_2 + \frac{1}{2}\right)\mathbf{a_3}$	$=$	$-a\left(x_2 - \frac{1}{2}\right)\hat{\mathbf{x}} - by_2\,\hat{\mathbf{y}} + c\left(z_2 + \frac{1}{2}\right)\hat{\mathbf{z}}$	(8c)	H I
$\mathbf{B_{11}}$	$=$	$-x_2\,\mathbf{a_1} + \left(y_2 + \frac{1}{2}\right)\mathbf{a_2} - \left(z_2 - \frac{1}{2}\right)\mathbf{a_3}$	$=$	$-ax_2\,\hat{\mathbf{x}} + b\left(y_2 + \frac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_2 - \frac{1}{2}\right)\hat{\mathbf{z}}$	(8c)	H I
$\mathbf{B_{12}}$	$=$	$\left(x_2 + \frac{1}{2}\right)\mathbf{a_1} - \left(y_2 - \frac{1}{2}\right)\mathbf{a_2} - z_2\,\mathbf{a_3}$	$=$	$a\left(x_2 + \frac{1}{2}\right)\hat{\mathbf{x}} - b\left(y_2 - \frac{1}{2}\right)\hat{\mathbf{y}} - cz_2\,\hat{\mathbf{z}}$	(8c)	H I
$\mathbf{B_{13}}$	$=$	$-x_2\,\mathbf{a_1} - y_2\,\mathbf{a_2} - z_2\,\mathbf{a_3}$	$=$	$-ax_2\,\hat{\mathbf{x}} - by_2\,\hat{\mathbf{y}} - cz_2\,\hat{\mathbf{z}}$	(8c)	H I
$\mathbf{B_{14}}$	$=$	$\left(x_2 + \frac{1}{2}\right)\mathbf{a_1} + y_2\,\mathbf{a_2} - \left(z_2 - \frac{1}{2}\right)\mathbf{a_3}$	$=$	$a\left(x_2 + \frac{1}{2}\right)\hat{\mathbf{x}} + by_2\,\hat{\mathbf{y}} - c\left(z_2 - \frac{1}{2}\right)\hat{\mathbf{z}}$	(8c)	H I
$\mathbf{B_{15}}$	$=$	$x_2\,\mathbf{a_1} - \left(y_2 - \frac{1}{2}\right)\mathbf{a_2} + \left(z_2 + \frac{1}{2}\right)\mathbf{a_3}$	$=$	$ax_2\,\hat{\mathbf{x}} - b\left(y_2 - \frac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_2 + \frac{1}{2}\right)\hat{\mathbf{z}}$	(8c)	H I
$\mathbf{B_{16}}$	$=$	$-\left(x_2 - \frac{1}{2}\right)\mathbf{a_1} + \left(y_2 + \frac{1}{2}\right)\mathbf{a_2} + z_2\,\mathbf{a_3}$	$=$	$-a\left(x_2 - \frac{1}{2}\right)\hat{\mathbf{x}} + b\left(y_2 + \frac{1}{2}\right)\hat{\mathbf{y}} + cz_2\,\hat{\mathbf{z}}$	(8c)	H I
$\mathbf{B_{17}}$	$=$	$x_3\,\mathbf{a_1} + y_3\,\mathbf{a_2} + z_3\,\mathbf{a_3}$	$=$	$ax_3\,\hat{\mathbf{x}} + by_3\,\hat{\mathbf{y}} + cz_3\,\hat{\mathbf{z}}$	(8c)	H II
$\mathbf{B_{18}}$	$=$	$-\left(x_3 - \frac{1}{2}\right)\mathbf{a_1} - y_3\,\mathbf{a_2} + \left(z_3 + \frac{1}{2}\right)\mathbf{a_3}$	$=$	$-a\left(x_3 - \frac{1}{2}\right)\hat{\mathbf{x}} - by_3\,\hat{\mathbf{y}} + c\left(z_3 + \frac{1}{2}\right)\hat{\mathbf{z}}$	(8c)	H II
$\mathbf{B_{19}}$	$=$	$-x_3\,\mathbf{a_1} + \left(y_3 + \frac{1}{2}\right)\mathbf{a_2} - \left(z_3 - \frac{1}{2}\right)\mathbf{a_3}$	$=$	$-ax_3\,\hat{\mathbf{x}} + b\left(y_3 + \frac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_3 - \frac{1}{2}\right)\hat{\mathbf{z}}$	(8c)	H II
$\mathbf{B_{20}}$	$=$	$\left(x_3 + \frac{1}{2}\right)\mathbf{a_1} - \left(y_3 - \frac{1}{2}\right)\mathbf{a_2} - z_3\,\mathbf{a_3}$	$=$	$a\left(x_3 + \frac{1}{2}\right)\hat{\mathbf{x}} - b\left(y_3 - \frac{1}{2}\right)\hat{\mathbf{y}} - cz_3\,\hat{\mathbf{z}}$	(8c)	H II
$\mathbf{B_{21}}$	$=$	$-x_3\,\mathbf{a_1} - y_3\,\mathbf{a_2} - z_3\,\mathbf{a_3}$	$=$	$-ax_3\,\hat{\mathbf{x}} - by_3\,\hat{\mathbf{y}} - cz_3\,\hat{\mathbf{z}}$	(8c)	H II
$\mathbf{B_{22}}$	$=$	$\left(x_3 + \frac{1}{2}\right)\mathbf{a_1} + y_3\,\mathbf{a_2} - \left(z_3 - \frac{1}{2}\right)\mathbf{a_3}$	$=$	$a\left(x_3 + \frac{1}{2}\right)\hat{\mathbf{x}} + by_3\,\hat{\mathbf{y}} - c\left(z_3 - \frac{1}{2}\right)\hat{\mathbf{z}}$	(8c)	H II
$\mathbf{B_{23}}$	$=$	$x_3\,\mathbf{a_1} - \left(y_3 - \frac{1}{2}\right)\mathbf{a_2} + \left(z_3 + \frac{1}{2}\right)\mathbf{a_3}$	$=$	$ax_3\,\hat{\mathbf{x}} - b\left(y_3 - \frac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_3 + \frac{1}{2}\right)\hat{\mathbf{z}}$	(8c)	H II
$\mathbf{B_{24}}$	$=$	$-\left(x_3 - \frac{1}{2}\right)\mathbf{a_1} + \left(y_3 + \frac{1}{2}\right)\mathbf{a_2} + z_3\,\mathbf{a_3}$	$=$	$-a\left(x_3 - \frac{1}{2}\right)\hat{\mathbf{x}} + b\left(y_3 + \frac{1}{2}\right)\hat{\mathbf{y}} + cz_3\,\hat{\mathbf{z}}$	(8c)	H II
$\mathbf{B_{25}}$	$=$	$x_4\,\mathbf{a_1} + y_4\,\mathbf{a_2} + z_4\,\mathbf{a_3}$	$=$	$ax_4\,\hat{\mathbf{x}} + by_4\,\hat{\mathbf{y}} + cz_4\,\hat{\mathbf{z}}$	(8c)	H III

$$\mathbf{B_{26}} = -\left(x_4 - \tfrac{1}{2}\right)\mathbf{a}_1 - y_4\,\mathbf{a}_2 + \left(z_4 + \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad -a\left(x_4 - \tfrac{1}{2}\right)\hat{\mathbf{x}} - by_4\,\hat{\mathbf{y}} + c\left(z_4 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{H III}$$

$$\mathbf{B_{27}} = -x_4\,\mathbf{a}_1 + \left(y_4 + \tfrac{1}{2}\right)\mathbf{a}_2 - \left(z_4 - \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad -ax_4\,\hat{\mathbf{x}} + b\left(y_4 + \tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_4 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{H III}$$

$$\mathbf{B_{28}} = \left(x_4 + \tfrac{1}{2}\right)\mathbf{a}_1 - \left(y_4 - \tfrac{1}{2}\right)\mathbf{a}_2 - z_4\,\mathbf{a}_3 \quad = \quad a\left(x_4 + \tfrac{1}{2}\right)\hat{\mathbf{x}} - b\left(y_4 - \tfrac{1}{2}\right)\hat{\mathbf{y}} - cz_4\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{H III}$$

$$\mathbf{B_{29}} = -x_4\,\mathbf{a}_1 - y_4\,\mathbf{a}_2 - z_4\,\mathbf{a}_3 \quad = \quad -ax_4\,\hat{\mathbf{x}} - by_4\,\hat{\mathbf{y}} - cz_4\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{H III}$$

$$\mathbf{B_{30}} = \left(x_4 + \tfrac{1}{2}\right)\mathbf{a}_1 + y_4\,\mathbf{a}_2 - \left(z_4 - \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad a\left(x_4 + \tfrac{1}{2}\right)\hat{\mathbf{x}} + by_4\,\hat{\mathbf{y}} - c\left(z_4 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{H III}$$

$$\mathbf{B_{31}} = x_4\,\mathbf{a}_1 - \left(y_4 - \tfrac{1}{2}\right)\mathbf{a}_2 + \left(z_4 + \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad ax_4\,\hat{\mathbf{x}} - b\left(y_4 - \tfrac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_4 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{H III}$$

$$\mathbf{B_{32}} = -\left(x_4 - \tfrac{1}{2}\right)\mathbf{a}_1 + \left(y_4 + \tfrac{1}{2}\right)\mathbf{a}_2 + z_4\,\mathbf{a}_3 \quad = \quad -a\left(x_4 - \tfrac{1}{2}\right)\hat{\mathbf{x}} + b\left(y_4 + \tfrac{1}{2}\right)\hat{\mathbf{y}} + cz_4\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{H III}$$

$$\mathbf{B_{33}} = x_5\,\mathbf{a}_1 + y_5\,\mathbf{a}_2 + z_5\,\mathbf{a}_3 \quad = \quad ax_5\,\hat{\mathbf{x}} + by_5\,\hat{\mathbf{y}} + cz_5\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{H IV}$$

$$\mathbf{B_{34}} = -\left(x_5 - \tfrac{1}{2}\right)\mathbf{a}_1 - y_5\,\mathbf{a}_2 + \left(z_5 + \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad -a\left(x_5 - \tfrac{1}{2}\right)\hat{\mathbf{x}} - by_5\,\hat{\mathbf{y}} + c\left(z_5 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{H IV}$$

$$\mathbf{B_{35}} = -x_5\,\mathbf{a}_1 + \left(y_5 + \tfrac{1}{2}\right)\mathbf{a}_2 - \left(z_5 - \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad -ax_5\,\hat{\mathbf{x}} + b\left(y_5 + \tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_5 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{H IV}$$

$$\mathbf{B_{36}} = \left(x_5 + \tfrac{1}{2}\right)\mathbf{a}_1 - \left(y_5 - \tfrac{1}{2}\right)\mathbf{a}_2 - z_5\,\mathbf{a}_3 \quad = \quad a\left(x_5 + \tfrac{1}{2}\right)\hat{\mathbf{x}} - b\left(y_5 - \tfrac{1}{2}\right)\hat{\mathbf{y}} - cz_5\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{H IV}$$

$$\mathbf{B_{37}} = -x_5\,\mathbf{a}_1 - y_5\,\mathbf{a}_2 - z_5\,\mathbf{a}_3 \quad = \quad -ax_5\,\hat{\mathbf{x}} - by_5\,\hat{\mathbf{y}} - cz_5\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{H IV}$$

$$\mathbf{B_{38}} = \left(x_5 + \tfrac{1}{2}\right)\mathbf{a}_1 + y_5\,\mathbf{a}_2 - \left(z_5 - \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad a\left(x_5 + \tfrac{1}{2}\right)\hat{\mathbf{x}} + by_5\,\hat{\mathbf{y}} - c\left(z_5 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{H IV}$$

$$\mathbf{B_{39}} = x_5\,\mathbf{a}_1 - \left(y_5 - \tfrac{1}{2}\right)\mathbf{a}_2 + \left(z_5 + \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad ax_5\,\hat{\mathbf{x}} - b\left(y_5 - \tfrac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_5 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{H IV}$$

$$\mathbf{B_{40}} = -\left(x_5 - \tfrac{1}{2}\right)\mathbf{a}_1 + \left(y_5 + \tfrac{1}{2}\right)\mathbf{a}_2 + z_5\,\mathbf{a}_3 \quad = \quad -a\left(x_5 - \tfrac{1}{2}\right)\hat{\mathbf{x}} + b\left(y_5 + \tfrac{1}{2}\right)\hat{\mathbf{y}} + cz_5\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{H IV}$$

$$\mathbf{B_{41}} = x_6\,\mathbf{a}_1 + y_6\,\mathbf{a}_2 + z_6\,\mathbf{a}_3 \quad = \quad ax_6\,\hat{\mathbf{x}} + by_6\,\hat{\mathbf{y}} + cz_6\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{N I}$$

$$\mathbf{B_{42}} = -\left(x_6 - \tfrac{1}{2}\right)\mathbf{a}_1 - y_6\,\mathbf{a}_2 + \left(z_6 + \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad -a\left(x_6 - \tfrac{1}{2}\right)\hat{\mathbf{x}} - by_6\,\hat{\mathbf{y}} + c\left(z_6 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{N I}$$

$$\mathbf{B_{43}} = -x_6\,\mathbf{a}_1 + \left(y_6 + \tfrac{1}{2}\right)\mathbf{a}_2 - \left(z_6 - \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad -ax_6\,\hat{\mathbf{x}} + b\left(y_6 + \tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_6 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{N I}$$

$$\mathbf{B_{44}} = \left(x_6 + \tfrac{1}{2}\right)\mathbf{a}_1 - \left(y_6 - \tfrac{1}{2}\right)\mathbf{a}_2 - z_6\,\mathbf{a}_3 \quad = \quad a\left(x_6 + \tfrac{1}{2}\right)\hat{\mathbf{x}} - b\left(y_6 - \tfrac{1}{2}\right)\hat{\mathbf{y}} - cz_6\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{N I}$$

$$\mathbf{B_{45}} = -x_6\,\mathbf{a}_1 - y_6\,\mathbf{a}_2 - z_6\,\mathbf{a}_3 \quad = \quad -ax_6\,\hat{\mathbf{x}} - by_6\,\hat{\mathbf{y}} - cz_6\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{N I}$$

$$\mathbf{B_{46}} = \left(x_6 + \tfrac{1}{2}\right)\mathbf{a}_1 + y_6\,\mathbf{a}_2 - \left(z_6 - \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad a\left(x_6 + \tfrac{1}{2}\right)\hat{\mathbf{x}} + by_6\,\hat{\mathbf{y}} - c\left(z_6 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{N I}$$

$$\mathbf{B_{47}} = x_6\,\mathbf{a}_1 - \left(y_6 - \tfrac{1}{2}\right)\mathbf{a}_2 + \left(z_6 + \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad ax_6\,\hat{\mathbf{x}} - b\left(y_6 - \tfrac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_6 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{N I}$$

$$\mathbf{B_{48}} = -\left(x_6 - \tfrac{1}{2}\right)\mathbf{a}_1 + \left(y_6 + \tfrac{1}{2}\right)\mathbf{a}_2 + z_6\,\mathbf{a}_3 \quad = \quad -a\left(x_6 - \tfrac{1}{2}\right)\hat{\mathbf{x}} + b\left(y_6 + \tfrac{1}{2}\right)\hat{\mathbf{y}} + cz_6\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{N I}$$

$$\mathbf{B_{49}} = x_7\,\mathbf{a}_1 + y_7\,\mathbf{a}_2 + z_7\,\mathbf{a}_3 \quad = \quad ax_7\,\hat{\mathbf{x}} + by_7\,\hat{\mathbf{y}} + cz_7\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{N II}$$

$$\mathbf{B_{50}} = -\left(x_7 - \tfrac{1}{2}\right)\mathbf{a}_1 - y_7\,\mathbf{a}_2 + \left(z_7 + \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad -a\left(x_7 - \tfrac{1}{2}\right)\hat{\mathbf{x}} - by_7\,\hat{\mathbf{y}} + c\left(z_7 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{N II}$$

$$\mathbf{B_{51}} = -x_7\,\mathbf{a}_1 + \left(y_7 + \tfrac{1}{2}\right)\mathbf{a}_2 - \left(z_7 - \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad -ax_7\,\hat{\mathbf{x}} + b\left(y_7 + \tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_7 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{N II}$$

$$\mathbf{B_{52}} = \left(x_7 + \tfrac{1}{2}\right)\mathbf{a}_1 - \left(y_7 - \tfrac{1}{2}\right)\mathbf{a}_2 - z_7\,\mathbf{a}_3 \quad = \quad a\left(x_7 + \tfrac{1}{2}\right)\hat{\mathbf{x}} - b\left(y_7 - \tfrac{1}{2}\right)\hat{\mathbf{y}} - cz_7\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{N II}$$

$$\mathbf{B_{53}} = -x_7\,\mathbf{a}_1 - y_7\,\mathbf{a}_2 - z_7\,\mathbf{a}_3 \quad = \quad -ax_7\,\hat{\mathbf{x}} - by_7\,\hat{\mathbf{y}} - cz_7\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{N II}$$

$$\mathbf{B_{54}} = \left(x_7 + \tfrac{1}{2}\right)\mathbf{a}_1 + y_7\,\mathbf{a}_2 - \left(z_7 - \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad a\left(x_7 + \tfrac{1}{2}\right)\hat{\mathbf{x}} + by_7\,\hat{\mathbf{y}} - c\left(z_7 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{N II}$$

$$\mathbf{B_{55}} = x_7\,\mathbf{a}_1 - \left(y_7 - \tfrac{1}{2}\right)\mathbf{a}_2 + \left(z_7 + \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad ax_7\,\hat{\mathbf{x}} - b\left(y_7 - \tfrac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_7 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{N II}$$

$$\mathbf{B_{56}} = -\left(x_7 - \tfrac{1}{2}\right)\mathbf{a}_1 + \left(y_7 + \tfrac{1}{2}\right)\mathbf{a}_2 + z_7\,\mathbf{a}_3 \quad = \quad -a\left(x_7 - \tfrac{1}{2}\right)\hat{\mathbf{x}} + b\left(y_7 + \tfrac{1}{2}\right)\hat{\mathbf{y}} + cz_7\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{N II}$$

$$\mathbf{B_{57}} = x_8\,\mathbf{a}_1 + y_8\,\mathbf{a}_2 + z_8\,\mathbf{a}_3 \quad = \quad ax_8\,\hat{\mathbf{x}} + by_8\,\hat{\mathbf{y}} + cz_8\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{O I}$$

$$\mathbf{B_{58}} = -\left(x_8 - \tfrac{1}{2}\right)\mathbf{a}_1 - y_8\,\mathbf{a}_2 + \left(z_8 + \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad -a\left(x_8 - \tfrac{1}{2}\right)\hat{\mathbf{x}} - by_8\,\hat{\mathbf{y}} + c\left(z_8 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{O I}$$

$$\mathbf{B_{59}} = -x_8\,\mathbf{a}_1 + \left(y_8 + \tfrac{1}{2}\right)\mathbf{a}_2 - \left(z_8 - \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad -ax_8\,\hat{\mathbf{x}} + b\left(y_8 + \tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_8 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{O I}$$

$$\mathbf{B_{60}} = \left(x_8 + \tfrac{1}{2}\right)\mathbf{a}_1 - \left(y_8 - \tfrac{1}{2}\right)\mathbf{a}_2 - z_8\,\mathbf{a}_3 \quad = \quad a\left(x_8 + \tfrac{1}{2}\right)\hat{\mathbf{x}} - b\left(y_8 - \tfrac{1}{2}\right)\hat{\mathbf{y}} - cz_8\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{O I}$$

$$\mathbf{B_{61}} = -x_8\,\mathbf{a}_1 - y_8\,\mathbf{a}_2 - z_8\,\mathbf{a}_3 \quad = \quad -ax_8\,\hat{\mathbf{x}} - by_8\,\hat{\mathbf{y}} - cz_8\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{O I}$$

$$\mathbf{B_{62}} = \left(x_8 + \tfrac{1}{2}\right)\mathbf{a}_1 + y_8\,\mathbf{a}_2 - \left(z_8 - \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad a\left(x_8 + \tfrac{1}{2}\right)\hat{\mathbf{x}} + by_8\,\hat{\mathbf{y}} - c\left(z_8 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{O I}$$

$$\mathbf{B_{63}} = x_8\,\mathbf{a}_1 - \left(y_8 - \tfrac{1}{2}\right)\mathbf{a}_2 + \left(z_8 + \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad ax_8\,\hat{\mathbf{x}} - b\left(y_8 - \tfrac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_8 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{O I}$$

$$\mathbf{B_{64}} = -\left(x_8 - \tfrac{1}{2}\right)\mathbf{a}_1 + \left(y_8 + \tfrac{1}{2}\right)\mathbf{a}_2 + z_8\,\mathbf{a}_3 \quad = \quad -a\left(x_8 - \tfrac{1}{2}\right)\hat{\mathbf{x}} + b\left(y_8 + \tfrac{1}{2}\right)\hat{\mathbf{y}} + cz_8\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{O I}$$

$$\mathbf{B_{65}} = x_9\,\mathbf{a}_1 + y_9\,\mathbf{a}_2 + z_9\,\mathbf{a}_3 \quad = \quad ax_9\,\hat{\mathbf{x}} + by_9\,\hat{\mathbf{y}} + cz_9\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{O II}$$

$$\mathbf{B_{66}} = -\left(x_9 - \tfrac{1}{2}\right)\mathbf{a}_1 - y_9\,\mathbf{a}_2 + \left(z_9 + \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad -a\left(x_9 - \tfrac{1}{2}\right)\hat{\mathbf{x}} - by_9\,\hat{\mathbf{y}} + c\left(z_9 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{O II}$$

$$\mathbf{B_{67}} = -x_9\,\mathbf{a}_1 + \left(y_9 + \tfrac{1}{2}\right)\mathbf{a}_2 - \left(z_9 - \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad -ax_9\,\hat{\mathbf{x}} + b\left(y_9 + \tfrac{1}{2}\right)\hat{\mathbf{y}} - c\left(z_9 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{O II}$$

$$\mathbf{B_{68}} = \left(x_9 + \tfrac{1}{2}\right)\mathbf{a}_1 - \left(y_9 - \tfrac{1}{2}\right)\mathbf{a}_2 - z_9\,\mathbf{a}_3 \quad = \quad a\left(x_9 + \tfrac{1}{2}\right)\hat{\mathbf{x}} - b\left(y_9 - \tfrac{1}{2}\right)\hat{\mathbf{y}} - cz_9\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{O II}$$

$$\mathbf{B_{69}} = -x_9\,\mathbf{a}_1 - y_9\,\mathbf{a}_2 - z_9\,\mathbf{a}_3 \quad = \quad -ax_9\,\hat{\mathbf{x}} - by_9\,\hat{\mathbf{y}} - cz_9\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{O II}$$

$$\mathbf{B_{70}} = \left(x_9 + \tfrac{1}{2}\right)\mathbf{a}_1 + y_9\,\mathbf{a}_2 - \left(z_9 - \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad a\left(x_9 + \tfrac{1}{2}\right)\hat{\mathbf{x}} + by_9\,\hat{\mathbf{y}} - c\left(z_9 - \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{O II}$$

$$\mathbf{B_{71}} = x_9\,\mathbf{a}_1 - \left(y_9 - \tfrac{1}{2}\right)\mathbf{a}_2 + \left(z_9 + \tfrac{1}{2}\right)\mathbf{a}_3 \quad = \quad ax_9\,\hat{\mathbf{x}} - b\left(y_9 - \tfrac{1}{2}\right)\hat{\mathbf{y}} + c\left(z_9 + \tfrac{1}{2}\right)\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{O II}$$

$$\mathbf{B_{72}} = -\left(x_9 - \tfrac{1}{2}\right)\mathbf{a}_1 + \left(y_9 + \tfrac{1}{2}\right)\mathbf{a}_2 + z_9\,\mathbf{a}_3 \quad = \quad -a\left(x_9 - \tfrac{1}{2}\right)\hat{\mathbf{x}} + b\left(y_9 + \tfrac{1}{2}\right)\hat{\mathbf{y}} + cz_9\,\hat{\mathbf{z}} \qquad \text{(8c)} \qquad \text{O II}$$

References

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