Monoclinic $Fe_2(SO_4)_3$ Structure: A2B12C3_mP68_14_2e_12e_3e-001

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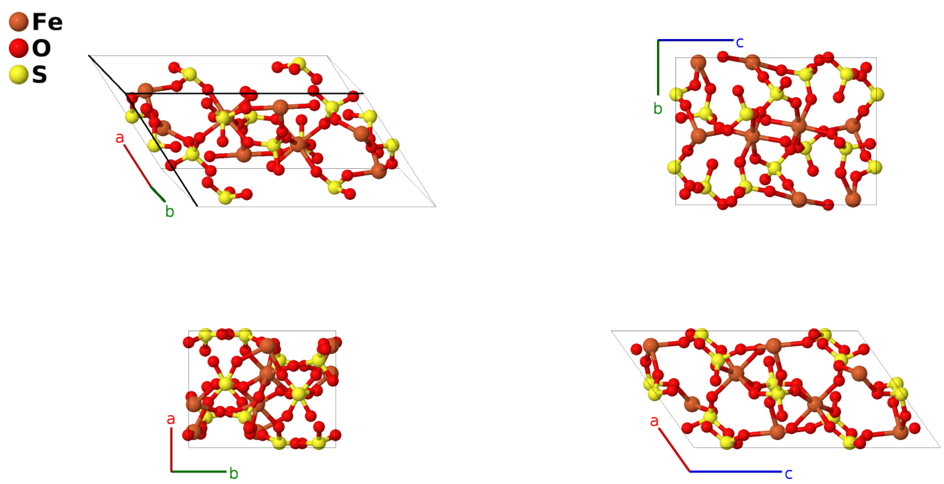
https://aflow.org/p/LK3Z

https://aflow.org/p/A2B12C3_mP68_14_2e_12e_3e-001

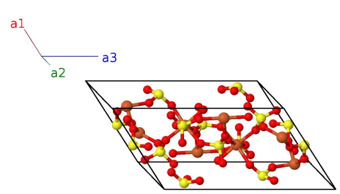


Prototype	$Fe_2O_{12}S_3$
AFLOW prototype label	A2B12C3_mP68_14_2e_12e_3e-001
ICSD	4301
Pearson symbol	mP68
Space group number	14
Space group symbol	$P2_1/c$
AFLOW prototype command	`aflow --proto=A2B12C3_mP68_14_2e_12e_3e-001` `--params=`$a, b/a, c/a, \beta, x_1, y_1, z_1, x_2, y_2, z_2, x_3, y_3, z_3, x_4, y_4, z_4, x_5, y_5, z_5, x_6, y_6, z_6, x_7, y_7, z_7, x_8, y_8, z_8, x_9, y_9, z_9, x_{10}, y_{10}, z_{10}, x_{11}, y_{11}, z_{11}, x_{12}, y_{12}, z_{12}, x_{13}, y_{13}, z_{13}, x_{14}, y_{14}, z_{14}, x_{15}, y_{15}, z_{15}, x_{16}, y_{16}, z_{16}, x_{17}, y_{17}, z_{17}$

- $Fe_2O_{12}S_3$ can also be found as the rhombohedral mineral mikasaite.

Simple Monoclinic primitive vectors

$$\mathbf{a_1} = a\,\hat{\mathbf{x}}$$
$$\mathbf{a_2} = b\,\hat{\mathbf{y}}$$
$$\mathbf{a_3} = c\cos\beta\,\hat{\mathbf{x}} + c\sin\beta\,\hat{\mathbf{z}}$$



Basis vectors

		Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B_1}$	=	$x_1\,\mathbf{a}_1 + y_1\,\mathbf{a}_2 + z_1\,\mathbf{a}_3$	=	$(ax_1 + cz_1\cos\beta)\,\hat{\mathbf{x}} + by_1\,\hat{\mathbf{y}} + cz_1\sin\beta\,\hat{\mathbf{z}}$	(4e)	Fe I
$\mathbf{B_2}$	=	$-x_1\,\mathbf{a}_1 + \left(y_1 + \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_1 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_1 + c\left(z_1 - \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} + b\left(y_1 + \frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_1 - \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	Fe I
$\mathbf{B_3}$	=	$-x_1\,\mathbf{a}_1 - y_1\,\mathbf{a}_2 - z_1\,\mathbf{a}_3$	=	$-(ax_1 + cz_1\cos\beta)\,\hat{\mathbf{x}} - by_1\,\hat{\mathbf{y}} - cz_1\sin\beta\,\hat{\mathbf{z}}$	(4e)	Fe I
$\mathbf{B_4}$	=	$x_1\,\mathbf{a}_1 - \left(y_1 - \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_1 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_1 + c\left(z_1 + \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - b\left(y_1 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_1 + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	Fe I
$\mathbf{B_5}$	=	$x_2\,\mathbf{a}_1 + y_2\,\mathbf{a}_2 + z_2\,\mathbf{a}_3$	=	$(ax_2 + cz_2\cos\beta)\,\hat{\mathbf{x}} + by_2\,\hat{\mathbf{y}} + cz_2\sin\beta\,\hat{\mathbf{z}}$	(4e)	Fe II
$\mathbf{B_6}$	=	$-x_2\,\mathbf{a}_1 + \left(y_2 + \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_2 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_2 + c\left(z_2 - \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} + b\left(y_2 + \frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_2 - \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	Fe II
$\mathbf{B_7}$	=	$-x_2\,\mathbf{a}_1 - y_2\,\mathbf{a}_2 - z_2\,\mathbf{a}_3$	=	$-(ax_2 + cz_2\cos\beta)\,\hat{\mathbf{x}} - by_2\,\hat{\mathbf{y}} - cz_2\sin\beta\,\hat{\mathbf{z}}$	(4e)	Fe II
$\mathbf{B_8}$	=	$x_2\,\mathbf{a}_1 - \left(y_2 - \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_2 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_2 + c\left(z_2 + \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - b\left(y_2 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_2 + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	Fe II
$\mathbf{B_9}$	=	$x_3\,\mathbf{a}_1 + y_3\,\mathbf{a}_2 + z_3\,\mathbf{a}_3$	=	$(ax_3 + cz_3\cos\beta)\,\hat{\mathbf{x}} + by_3\,\hat{\mathbf{y}} + cz_3\sin\beta\,\hat{\mathbf{z}}$	(4e)	O I
$\mathbf{B_{10}}$	=	$-x_3\,\mathbf{a}_1 + \left(y_3 + \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_3 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_3 + c\left(z_3 - \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} + b\left(y_3 + \frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_3 - \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O I
$\mathbf{B_{11}}$	=	$-x_3\,\mathbf{a}_1 - y_3\,\mathbf{a}_2 - z_3\,\mathbf{a}_3$	=	$-(ax_3 + cz_3\cos\beta)\,\hat{\mathbf{x}} - by_3\,\hat{\mathbf{y}} - cz_3\sin\beta\,\hat{\mathbf{z}}$	(4e)	O I
$\mathbf{B_{12}}$	=	$x_3\,\mathbf{a}_1 - \left(y_3 - \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_3 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_3 + c\left(z_3 + \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - b\left(y_3 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_3 + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O I
$\mathbf{B_{13}}$	=	$x_4\,\mathbf{a}_1 + y_4\,\mathbf{a}_2 + z_4\,\mathbf{a}_3$	=	$(ax_4 + cz_4\cos\beta)\,\hat{\mathbf{x}} + by_4\,\hat{\mathbf{y}} + cz_4\sin\beta\,\hat{\mathbf{z}}$	(4e)	O II
$\mathbf{B_{14}}$	=	$-x_4\,\mathbf{a}_1 + \left(y_4 + \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_4 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_4 + c\left(z_4 - \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} + b\left(y_4 + \frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_4 - \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O II
$\mathbf{B_{15}}$	=	$-x_4\,\mathbf{a}_1 - y_4\,\mathbf{a}_2 - z_4\,\mathbf{a}_3$	=	$-(ax_4 + cz_4\cos\beta)\,\hat{\mathbf{x}} - by_4\,\hat{\mathbf{y}} - cz_4\sin\beta\,\hat{\mathbf{z}}$	(4e)	O II
$\mathbf{B_{16}}$	=	$x_4\,\mathbf{a}_1 - \left(y_4 - \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_4 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_4 + c\left(z_4 + \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - b\left(y_4 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_4 + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O II
$\mathbf{B_{17}}$	=	$x_5\,\mathbf{a}_1 + y_5\,\mathbf{a}_2 + z_5\,\mathbf{a}_3$	=	$(ax_5 + cz_5\cos\beta)\,\hat{\mathbf{x}} + by_5\,\hat{\mathbf{y}} + cz_5\sin\beta\,\hat{\mathbf{z}}$	(4e)	O III
$\mathbf{B_{18}}$	=	$-x_5\,\mathbf{a}_1 + \left(y_5 + \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_5 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_5 + c\left(z_5 - \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} + b\left(y_5 + \frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_5 - \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O III
$\mathbf{B_{19}}$	=	$-x_5\,\mathbf{a}_1 - y_5\,\mathbf{a}_2 - z_5\,\mathbf{a}_3$	=	$-(ax_5 + cz_5\cos\beta)\,\hat{\mathbf{x}} - by_5\,\hat{\mathbf{y}} - cz_5\sin\beta\,\hat{\mathbf{z}}$	(4e)	O III
$\mathbf{B_{20}}$	=	$x_5\,\mathbf{a}_1 - \left(y_5 - \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_5 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_5 + c\left(z_5 + \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - b\left(y_5 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_5 + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O III
$\mathbf{B_{21}}$	=	$x_6\,\mathbf{a}_1 + y_6\,\mathbf{a}_2 + z_6\,\mathbf{a}_3$	=	$(ax_6 + cz_6\cos\beta)\,\hat{\mathbf{x}} + by_6\,\hat{\mathbf{y}} + cz_6\sin\beta\,\hat{\mathbf{z}}$	(4e)	O IV
$\mathbf{B_{22}}$	=	$-x_6\,\mathbf{a}_1 + \left(y_6 + \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_6 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_6 + c\left(z_6 - \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} + b\left(y_6 + \frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_6 - \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O IV
$\mathbf{B_{23}}$	=	$-x_6\,\mathbf{a}_1 - y_6\,\mathbf{a}_2 - z_6\,\mathbf{a}_3$	=	$-(ax_6 + cz_6\cos\beta)\,\hat{\mathbf{x}} - by_6\,\hat{\mathbf{y}} - cz_6\sin\beta\,\hat{\mathbf{z}}$	(4e)	O IV
$\mathbf{B_{24}}$	=	$x_6\,\mathbf{a}_1 - \left(y_6 - \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_6 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_6 + c\left(z_6 + \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - b\left(y_6 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_6 + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O IV
$\mathbf{B_{25}}$	=	$x_7\,\mathbf{a}_1 + y_7\,\mathbf{a}_2 + z_7\,\mathbf{a}_3$	=	$(ax_7 + cz_7\cos\beta)\,\hat{\mathbf{x}} + by_7\,\hat{\mathbf{y}} + cz_7\sin\beta\,\hat{\mathbf{z}}$	(4e)	O V
$\mathbf{B_{26}}$	=	$-x_7\,\mathbf{a}_1 + \left(y_7 + \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_7 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_7 + c\left(z_7 - \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} + b\left(y_7 + \frac{1}{2}\right)\,\hat{\mathbf{y}} - c\left(z_7 - \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O V
$\mathbf{B_{27}}$	=	$-x_7\,\mathbf{a}_1 - y_7\,\mathbf{a}_2 - z_7\,\mathbf{a}_3$	=	$-(ax_7 + cz_7\cos\beta)\,\hat{\mathbf{x}} - by_7\,\hat{\mathbf{y}} - cz_7\sin\beta\,\hat{\mathbf{z}}$	(4e)	O V
$\mathbf{B_{28}}$	=	$x_7\,\mathbf{a}_1 - \left(y_7 - \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_7 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_7 + c\left(z_7 + \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - b\left(y_7 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + c\left(z_7 + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O V
$\mathbf{B_{29}}$	=	$x_8\,\mathbf{a}_1 + y_8\,\mathbf{a}_2 + z_8\,\mathbf{a}_3$	=	$(ax_8 + cz_8\cos\beta)\,\hat{\mathbf{x}} + by_8\,\hat{\mathbf{y}} + cz_8\sin\beta\,\hat{\mathbf{z}}$	(4e)	O VI

$\mathbf{B_{30}}$	=	$-x_8\,\mathbf{a}_1+\left(y_8+\frac{1}{2}\right)\,\mathbf{a}_2-\left(z_8-\frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_8+c\left(z_8-\frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}}+b\left(y_8+\frac{1}{2}\right)\,\hat{\mathbf{y}}-c\left(z_8-\frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O VI
$\mathbf{B_{31}}$	=	$-x_8\,\mathbf{a}_1-y_8\,\mathbf{a}_2-z_8\,\mathbf{a}_3$	=	$-\left(ax_8+cz_8\cos\beta\right)\,\hat{\mathbf{x}}-by_8\,\hat{\mathbf{y}}-cz_8\sin\beta\,\hat{\mathbf{z}}$	(4e)	O VI
$\mathbf{B_{32}}$	=	$x_8\,\mathbf{a}_1-\left(y_8-\frac{1}{2}\right)\,\mathbf{a}_2+\left(z_8+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_8+c\left(z_8+\frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}}-b\left(y_8-\frac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_8+\frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O VI
$\mathbf{B_{33}}$	=	$x_9\,\mathbf{a}_1+y_9\,\mathbf{a}_2+z_9\,\mathbf{a}_3$	=	$\left(ax_9+cz_9\cos\beta\right)\,\hat{\mathbf{x}}+by_9\,\hat{\mathbf{y}}+cz_9\sin\beta\,\hat{\mathbf{z}}$	(4e)	O VII
$\mathbf{B_{34}}$	=	$-x_9\,\mathbf{a}_1+\left(y_9+\frac{1}{2}\right)\,\mathbf{a}_2-\left(z_9-\frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_9+c\left(z_9-\frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}}+b\left(y_9+\frac{1}{2}\right)\,\hat{\mathbf{y}}-c\left(z_9-\frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O VII
$\mathbf{B_{35}}$	=	$-x_9\,\mathbf{a}_1-y_9\,\mathbf{a}_2-z_9\,\mathbf{a}_3$	=	$-\left(ax_9+cz_9\cos\beta\right)\,\hat{\mathbf{x}}-by_9\,\hat{\mathbf{y}}-cz_9\sin\beta\,\hat{\mathbf{z}}$	(4e)	O VII
$\mathbf{B_{36}}$	=	$x_9\,\mathbf{a}_1-\left(y_9-\frac{1}{2}\right)\,\mathbf{a}_2+\left(z_9+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_9+c\left(z_9+\frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}}-b\left(y_9-\frac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_9+\frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O VII
$\mathbf{B_{37}}$	=	$x_{10}\,\mathbf{a}_1+y_{10}\,\mathbf{a}_2+z_{10}\,\mathbf{a}_3$	=	$\left(ax_{10}+cz_{10}\cos\beta\right)\,\hat{\mathbf{x}}+by_{10}\,\hat{\mathbf{y}}+cz_{10}\sin\beta\,\hat{\mathbf{z}}$	(4e)	O VIII
$\mathbf{B_{38}}$	=	$-x_{10}\,\mathbf{a}_1+\left(y_{10}+\frac{1}{2}\right)\,\mathbf{a}_2-\left(z_{10}-\frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_{10}+c\left(z_{10}-\frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}}+b\left(y_{10}+\frac{1}{2}\right)\,\hat{\mathbf{y}}-c\left(z_{10}-\frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O VIII
$\mathbf{B_{39}}$	=	$-x_{10}\,\mathbf{a}_1-y_{10}\,\mathbf{a}_2-z_{10}\,\mathbf{a}_3$	=	$-\left(ax_{10}+cz_{10}\cos\beta\right)\,\hat{\mathbf{x}}-by_{10}\,\hat{\mathbf{y}}-cz_{10}\sin\beta\,\hat{\mathbf{z}}$	(4e)	O VIII
$\mathbf{B_{40}}$	=	$x_{10}\,\mathbf{a}_1-\left(y_{10}-\frac{1}{2}\right)\,\mathbf{a}_2+\left(z_{10}+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_{10}+c\left(z_{10}+\frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}}-b\left(y_{10}-\frac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_{10}+\frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O VIII
$\mathbf{B_{41}}$	=	$x_{11}\,\mathbf{a}_1+y_{11}\,\mathbf{a}_2+z_{11}\,\mathbf{a}_3$	=	$\left(ax_{11}+cz_{11}\cos\beta\right)\,\hat{\mathbf{x}}+by_{11}\,\hat{\mathbf{y}}+cz_{11}\sin\beta\,\hat{\mathbf{z}}$	(4e)	O IX
$\mathbf{B_{42}}$	=	$-x_{11}\,\mathbf{a}_1+\left(y_{11}+\frac{1}{2}\right)\,\mathbf{a}_2-\left(z_{11}-\frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_{11}+c\left(z_{11}-\frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}}+b\left(y_{11}+\frac{1}{2}\right)\,\hat{\mathbf{y}}-c\left(z_{11}-\frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O IX
$\mathbf{B_{43}}$	=	$-x_{11}\,\mathbf{a}_1-y_{11}\,\mathbf{a}_2-z_{11}\,\mathbf{a}_3$	=	$-\left(ax_{11}+cz_{11}\cos\beta\right)\,\hat{\mathbf{x}}-by_{11}\,\hat{\mathbf{y}}-cz_{11}\sin\beta\,\hat{\mathbf{z}}$	(4e)	O IX
$\mathbf{B_{44}}$	=	$x_{11}\,\mathbf{a}_1-\left(y_{11}-\frac{1}{2}\right)\,\mathbf{a}_2+\left(z_{11}+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_{11}+c\left(z_{11}+\frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}}-b\left(y_{11}-\frac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_{11}+\frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O IX
$\mathbf{B_{45}}$	=	$x_{12}\,\mathbf{a}_1+y_{12}\,\mathbf{a}_2+z_{12}\,\mathbf{a}_3$	=	$\left(ax_{12}+cz_{12}\cos\beta\right)\,\hat{\mathbf{x}}+by_{12}\,\hat{\mathbf{y}}+cz_{12}\sin\beta\,\hat{\mathbf{z}}$	(4e)	O X
$\mathbf{B_{46}}$	=	$-x_{12}\,\mathbf{a}_1+\left(y_{12}+\frac{1}{2}\right)\,\mathbf{a}_2-\left(z_{12}-\frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_{12}+c\left(z_{12}-\frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}}+b\left(y_{12}+\frac{1}{2}\right)\,\hat{\mathbf{y}}-c\left(z_{12}-\frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O X
$\mathbf{B_{47}}$	=	$-x_{12}\,\mathbf{a}_1-y_{12}\,\mathbf{a}_2-z_{12}\,\mathbf{a}_3$	=	$-\left(ax_{12}+cz_{12}\cos\beta\right)\,\hat{\mathbf{x}}-by_{12}\,\hat{\mathbf{y}}-cz_{12}\sin\beta\,\hat{\mathbf{z}}$	(4e)	O X
$\mathbf{B_{48}}$	=	$x_{12}\,\mathbf{a}_1-\left(y_{12}-\frac{1}{2}\right)\,\mathbf{a}_2+\left(z_{12}+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_{12}+c\left(z_{12}+\frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}}-b\left(y_{12}-\frac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_{12}+\frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O X
$\mathbf{B_{49}}$	=	$x_{13}\,\mathbf{a}_1+y_{13}\,\mathbf{a}_2+z_{13}\,\mathbf{a}_3$	=	$\left(ax_{13}+cz_{13}\cos\beta\right)\,\hat{\mathbf{x}}+by_{13}\,\hat{\mathbf{y}}+cz_{13}\sin\beta\,\hat{\mathbf{z}}$	(4e)	O XI
$\mathbf{B_{50}}$	=	$-x_{13}\,\mathbf{a}_1+\left(y_{13}+\frac{1}{2}\right)\,\mathbf{a}_2-\left(z_{13}-\frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_{13}+c\left(z_{13}-\frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}}+b\left(y_{13}+\frac{1}{2}\right)\,\hat{\mathbf{y}}-c\left(z_{13}-\frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O XI
$\mathbf{B_{51}}$	=	$-x_{13}\,\mathbf{a}_1-y_{13}\,\mathbf{a}_2-z_{13}\,\mathbf{a}_3$	=	$-\left(ax_{13}+cz_{13}\cos\beta\right)\,\hat{\mathbf{x}}-by_{13}\,\hat{\mathbf{y}}-cz_{13}\sin\beta\,\hat{\mathbf{z}}$	(4e)	O XI
$\mathbf{B_{52}}$	=	$x_{13}\,\mathbf{a}_1-\left(y_{13}-\frac{1}{2}\right)\,\mathbf{a}_2+\left(z_{13}+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_{13}+c\left(z_{13}+\frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}}-b\left(y_{13}-\frac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_{13}+\frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O XI
$\mathbf{B_{53}}$	=	$x_{14}\,\mathbf{a}_1+y_{14}\,\mathbf{a}_2+z_{14}\,\mathbf{a}_3$	=	$\left(ax_{14}+cz_{14}\cos\beta\right)\,\hat{\mathbf{x}}+by_{14}\,\hat{\mathbf{y}}+cz_{14}\sin\beta\,\hat{\mathbf{z}}$	(4e)	O XII
$\mathbf{B_{54}}$	=	$-x_{14}\,\mathbf{a}_1+\left(y_{14}+\frac{1}{2}\right)\,\mathbf{a}_2-\left(z_{14}-\frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_{14}+c\left(z_{14}-\frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}}+b\left(y_{14}+\frac{1}{2}\right)\,\hat{\mathbf{y}}-c\left(z_{14}-\frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O XII
$\mathbf{B_{55}}$	=	$-x_{14}\,\mathbf{a}_1-y_{14}\,\mathbf{a}_2-z_{14}\,\mathbf{a}_3$	=	$-\left(ax_{14}+cz_{14}\cos\beta\right)\,\hat{\mathbf{x}}-by_{14}\,\hat{\mathbf{y}}-cz_{14}\sin\beta\,\hat{\mathbf{z}}$	(4e)	O XII
$\mathbf{B_{56}}$	=	$x_{14}\,\mathbf{a}_1-\left(y_{14}-\frac{1}{2}\right)\,\mathbf{a}_2+\left(z_{14}+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_{14}+c\left(z_{14}+\frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}}-b\left(y_{14}-\frac{1}{2}\right)\,\hat{\mathbf{y}}+c\left(z_{14}+\frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4e)	O XII

$\mathbf{B_{57}}$	=	$x_{15}\,\mathbf{a}_1 + y_{15}\,\mathbf{a}_2 + z_{15}\,\mathbf{a}_3$	=	$(ax_{15} + cz_{15}\cos\beta)\,\mathbf{\hat{x}} + by_{15}\,\mathbf{\hat{y}} + cz_{15}\sin\beta\,\mathbf{\hat{z}}$	(4e)	S I
$\mathbf{B_{58}}$	=	$-x_{15}\,\mathbf{a}_1 + \left(y_{15} + \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_{15} - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_{15} + c\left(z_{15} - \frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}} + b\left(y_{15} + \frac{1}{2}\right)\,\mathbf{\hat{y}} - c\left(z_{15} - \frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4e)	S I
$\mathbf{B_{59}}$	=	$-x_{15}\,\mathbf{a}_1 - y_{15}\,\mathbf{a}_2 - z_{15}\,\mathbf{a}_3$	=	$-(ax_{15} + cz_{15}\cos\beta)\,\mathbf{\hat{x}} - by_{15}\,\mathbf{\hat{y}} - cz_{15}\sin\beta\,\mathbf{\hat{z}}$	(4e)	S I
$\mathbf{B_{60}}$	=	$x_{15}\,\mathbf{a}_1 - \left(y_{15} - \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_{15} + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_{15} + c\left(z_{15} + \frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}} - b\left(y_{15} - \frac{1}{2}\right)\,\mathbf{\hat{y}} + c\left(z_{15} + \frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4e)	S I
$\mathbf{B_{61}}$	=	$x_{16}\,\mathbf{a}_1 + y_{16}\,\mathbf{a}_2 + z_{16}\,\mathbf{a}_3$	=	$(ax_{16} + cz_{16}\cos\beta)\,\mathbf{\hat{x}} + by_{16}\,\mathbf{\hat{y}} + cz_{16}\sin\beta\,\mathbf{\hat{z}}$	(4e)	S II
$\mathbf{B_{62}}$	=	$-x_{16}\,\mathbf{a}_1 + \left(y_{16} + \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_{16} - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_{16} + c\left(z_{16} - \frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}} + b\left(y_{16} + \frac{1}{2}\right)\,\mathbf{\hat{y}} - c\left(z_{16} - \frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4e)	S II
$\mathbf{B_{63}}$	=	$-x_{16}\,\mathbf{a}_1 - y_{16}\,\mathbf{a}_2 - z_{16}\,\mathbf{a}_3$	=	$-(ax_{16} + cz_{16}\cos\beta)\,\mathbf{\hat{x}} - by_{16}\,\mathbf{\hat{y}} - cz_{16}\sin\beta\,\mathbf{\hat{z}}$	(4e)	S II
$\mathbf{B_{64}}$	=	$x_{16}\,\mathbf{a}_1 - \left(y_{16} - \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_{16} + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_{16} + c\left(z_{16} + \frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}} - b\left(y_{16} - \frac{1}{2}\right)\,\mathbf{\hat{y}} + c\left(z_{16} + \frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4e)	S II
$\mathbf{B_{65}}$	=	$x_{17}\,\mathbf{a}_1 + y_{17}\,\mathbf{a}_2 + z_{17}\,\mathbf{a}_3$	=	$(ax_{17} + cz_{17}\cos\beta)\,\mathbf{\hat{x}} + by_{17}\,\mathbf{\hat{y}} + cz_{17}\sin\beta\,\mathbf{\hat{z}}$	(4e)	S III
$\mathbf{B_{66}}$	=	$-x_{17}\,\mathbf{a}_1 + \left(y_{17} + \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_{17} - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_{17} + c\left(z_{17} - \frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}} + b\left(y_{17} + \frac{1}{2}\right)\,\mathbf{\hat{y}} - c\left(z_{17} - \frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4e)	S III
$\mathbf{B_{67}}$	=	$-x_{17}\,\mathbf{a}_1 - y_{17}\,\mathbf{a}_2 - z_{17}\,\mathbf{a}_3$	=	$-(ax_{17} + cz_{17}\cos\beta)\,\mathbf{\hat{x}} - by_{17}\,\mathbf{\hat{y}} - cz_{17}\sin\beta\,\mathbf{\hat{z}}$	(4e)	S III
$\mathbf{B_{68}}$	=	$x_{17}\,\mathbf{a}_1 - \left(y_{17} - \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_{17} + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_{17} + c\left(z_{17} + \frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}} - b\left(y_{17} - \frac{1}{2}\right)\,\mathbf{\hat{y}} + c\left(z_{17} + \frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4e)	S III

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