Approximate High Temperature Mo_8O_{23} Structure: A8B23_mP62_13_4g_a11g-001

This structure originally had the label `A8B23_mP62_13_4g_c11g`. Calls to that address will be redirected here.

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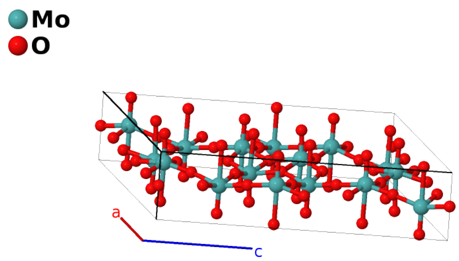
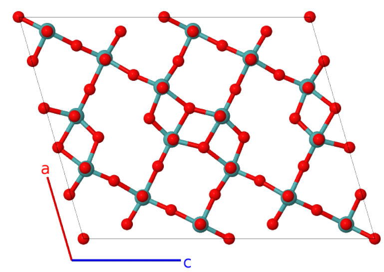
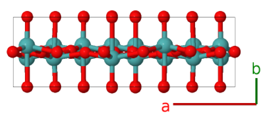
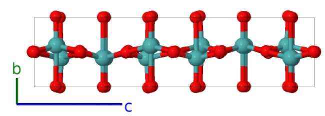
https://aflow.org/p/UWFW

https://aflow.org/p/A8B23_mP62_13_4g_a11g-001







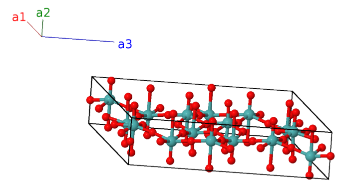


Prototype	Mo_8O_{23}
AFLOW prototype label	A8B23_mP62_13_4g_a11g-001
ICSD	202202
Pearson symbol	mP62
Space group number	13
Space group symbol	$P2/c$
AFLOW prototype command	`aflow --proto=A8B23_mP62_13_4g_a11g-001` `--params=`$a, b/a, c/a, \beta, x_2, y_2, z_2, x_3, y_3, z_3, x_4, y_4, z_4, x_5, y_5, z_5, x_6, y_6, z_6, x_7, y_7, z_7, x_8, y_8, z_8, x_9, y_9, z_9, x_{10}, y_{10}, z_{10}, x_{11}, y_{11}, z_{11}, x_{12}, y_{12}, z_{12}, x_{13}, y_{13}, z_{13}, x_{14}, y_{14}, z_{14}, x_{15}, y_{15}, z_{15}, x_{16}, y_{16}, z_{16}$

- Above 285K the structure exhibits an incommensurate charge density wave. This data was taken at 370K, so the structure given here is only approximate. Below 285K the CDW is locked in, leading to the low temperature Mo_8O_{23} structure.

Simple Monoclinic primitive vectors

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



Basis vectors

		Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B_1}$	=	0	=	0	(2a)	O I
$\mathbf{B_2}$	=	$\frac{1}{2}\,\mathbf{a}_3$	=	$\frac{1}{2}c\cos\beta\,\mathbf{\hat{x}} + \frac{1}{2}c\sin\beta\,\mathbf{\hat{z}}$	(2a)	O I
$\mathbf{B_3}$	=	$x_2\,\mathbf{a}_1 + y_2\,\mathbf{a}_2 + z_2\,\mathbf{a}_3$	=	$(ax_2 + cz_2\cos\beta)\,\mathbf{\hat{x}} + by_2\,\mathbf{\hat{y}} + cz_2\sin\beta\,\mathbf{\hat{z}}$	(4g)	Mo I
$\mathbf{B_4}$	=	$-x_2\,\mathbf{a}_1 + y_2\,\mathbf{a}_2 - \left(z_2 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_2 + c\left(z_2 - \frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}} + by_2\,\mathbf{\hat{y}} - c\left(z_2 - \frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	Mo I
$\mathbf{B_5}$	=	$-x_2\,\mathbf{a}_1 - y_2\,\mathbf{a}_2 - z_2\,\mathbf{a}_3$	=	$-(ax_2 + cz_2\cos\beta)\,\mathbf{\hat{x}} - by_2\,\mathbf{\hat{y}} - cz_2\sin\beta\,\mathbf{\hat{z}}$	(4g)	Mo I
$\mathbf{B_6}$	=	$x_2\,\mathbf{a}_1 - y_2\,\mathbf{a}_2 + \left(z_2 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_2 + c\left(z_2 + \frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}} - by_2\,\mathbf{\hat{y}} + c\left(z_2 + \frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	Mo I
$\mathbf{B_7}$	=	$x_3\,\mathbf{a}_1 + y_3\,\mathbf{a}_2 + z_3\,\mathbf{a}_3$	=	$(ax_3 + cz_3\cos\beta)\,\mathbf{\hat{x}} + by_3\,\mathbf{\hat{y}} + cz_3\sin\beta\,\mathbf{\hat{z}}$	(4g)	Mo II
$\mathbf{B_8}$	=	$-x_3\,\mathbf{a}_1 + y_3\,\mathbf{a}_2 - \left(z_3 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_3 + c\left(z_3 - \frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}} + by_3\,\mathbf{\hat{y}} - c\left(z_3 - \frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	Mo II
$\mathbf{B_9}$	=	$-x_3\,\mathbf{a}_1 - y_3\,\mathbf{a}_2 - z_3\,\mathbf{a}_3$	=	$-(ax_3 + cz_3\cos\beta)\,\mathbf{\hat{x}} - by_3\,\mathbf{\hat{y}} - cz_3\sin\beta\,\mathbf{\hat{z}}$	(4g)	Mo II
$\mathbf{B_{10}}$	=	$x_3\,\mathbf{a}_1 - y_3\,\mathbf{a}_2 + \left(z_3 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_3 + c\left(z_3 + \frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}} - by_3\,\mathbf{\hat{y}} + c\left(z_3 + \frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	Mo II
$\mathbf{B_{11}}$	=	$x_4\,\mathbf{a}_1 + y_4\,\mathbf{a}_2 + z_4\,\mathbf{a}_3$	=	$(ax_4 + cz_4\cos\beta)\,\mathbf{\hat{x}} + by_4\,\mathbf{\hat{y}} + cz_4\sin\beta\,\mathbf{\hat{z}}$	(4g)	Mo III
$\mathbf{B_{12}}$	=	$-x_4\,\mathbf{a}_1 + y_4\,\mathbf{a}_2 - \left(z_4 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_4 + c\left(z_4 - \frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}} + by_4\,\mathbf{\hat{y}} - c\left(z_4 - \frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	Mo III
$\mathbf{B_{13}}$	=	$-x_4\,\mathbf{a}_1 - y_4\,\mathbf{a}_2 - z_4\,\mathbf{a}_3$	=	$-(ax_4 + cz_4\cos\beta)\,\mathbf{\hat{x}} - by_4\,\mathbf{\hat{y}} - cz_4\sin\beta\,\mathbf{\hat{z}}$	(4g)	Mo III
$\mathbf{B_{14}}$	=	$x_4\,\mathbf{a}_1 - y_4\,\mathbf{a}_2 + \left(z_4 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_4 + c\left(z_4 + \frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}} - by_4\,\mathbf{\hat{y}} + c\left(z_4 + \frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	Mo III
$\mathbf{B_{15}}$	=	$x_5\,\mathbf{a}_1 + y_5\,\mathbf{a}_2 + z_5\,\mathbf{a}_3$	=	$(ax_5 + cz_5\cos\beta)\,\mathbf{\hat{x}} + by_5\,\mathbf{\hat{y}} + cz_5\sin\beta\,\mathbf{\hat{z}}$	(4g)	Mo IV
$\mathbf{B_{16}}$	=	$-x_5\,\mathbf{a}_1 + y_5\,\mathbf{a}_2 - \left(z_5 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_5 + c\left(z_5 - \frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}} + by_5\,\mathbf{\hat{y}} - c\left(z_5 - \frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	Mo IV
$\mathbf{B_{17}}$	=	$-x_5\,\mathbf{a}_1 - y_5\,\mathbf{a}_2 - z_5\,\mathbf{a}_3$	=	$-(ax_5 + cz_5\cos\beta)\,\mathbf{\hat{x}} - by_5\,\mathbf{\hat{y}} - cz_5\sin\beta\,\mathbf{\hat{z}}$	(4g)	Mo IV
$\mathbf{B_{18}}$	=	$x_5\,\mathbf{a}_1 - y_5\,\mathbf{a}_2 + \left(z_5 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_5 + c\left(z_5 + \frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}} - by_5\,\mathbf{\hat{y}} + c\left(z_5 + \frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	Mo IV
$\mathbf{B_{19}}$	=	$x_6\,\mathbf{a}_1 + y_6\,\mathbf{a}_2 + z_6\,\mathbf{a}_3$	=	$(ax_6 + cz_6\cos\beta)\,\mathbf{\hat{x}} + by_6\,\mathbf{\hat{y}} + cz_6\sin\beta\,\mathbf{\hat{z}}$	(4g)	O II
$\mathbf{B_{20}}$	=	$-x_6\,\mathbf{a}_1 + y_6\,\mathbf{a}_2 - \left(z_6 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_6 + c\left(z_6 - \frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}} + by_6\,\mathbf{\hat{y}} - c\left(z_6 - \frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	O II
$\mathbf{B_{21}}$	=	$-x_6\,\mathbf{a}_1 - y_6\,\mathbf{a}_2 - z_6\,\mathbf{a}_3$	=	$-(ax_6 + cz_6\cos\beta)\,\mathbf{\hat{x}} - by_6\,\mathbf{\hat{y}} - cz_6\sin\beta\,\mathbf{\hat{z}}$	(4g)	O II
$\mathbf{B_{22}}$	=	$x_6\,\mathbf{a}_1 - y_6\,\mathbf{a}_2 + \left(z_6 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_6 + c\left(z_6 + \frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}} - by_6\,\mathbf{\hat{y}} + c\left(z_6 + \frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	O II

$\mathbf{B_{23}}$	$=$	$x_{7}\,\mathbf{a}_{1}+y_{7}\,\mathbf{a}_{2}+z_{7}\,\mathbf{a}_{3}$	$=$	$\left(ax_{7}+cz_{7}\cos\beta\right)\,\mathbf{\hat{x}}+by_{7}\,\mathbf{\hat{y}}+cz_{7}\sin\beta\,\mathbf{\hat{z}}$	(4g)	O III
$\mathbf{B_{24}}$	$=$	$-x_{7}\,\mathbf{a}_{1}+y_{7}\,\mathbf{a}_{2}-\left(z_{7}-\frac{1}{2}\right)\,\mathbf{a}_{3}$	$=$	$-\left(ax_{7}+c\left(z_{7}-\frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}}+by_{7}\,\mathbf{\hat{y}}-c\left(z_{7}-\frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	O III
$\mathbf{B_{25}}$	$=$	$-x_{7}\,\mathbf{a}_{1}-y_{7}\,\mathbf{a}_{2}-z_{7}\,\mathbf{a}_{3}$	$=$	$-\left(ax_{7}+cz_{7}\cos\beta\right)\,\mathbf{\hat{x}}-by_{7}\,\mathbf{\hat{y}}-cz_{7}\sin\beta\,\mathbf{\hat{z}}$	(4g)	O III
$\mathbf{B_{26}}$	$=$	$x_{7}\,\mathbf{a}_{1}-y_{7}\,\mathbf{a}_{2}+\left(z_{7}+\frac{1}{2}\right)\,\mathbf{a}_{3}$	$=$	$\left(ax_{7}+c\left(z_{7}+\frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}}-by_{7}\,\mathbf{\hat{y}}+c\left(z_{7}+\frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	O III
$\mathbf{B_{27}}$	$=$	$x_{8}\,\mathbf{a}_{1}+y_{8}\,\mathbf{a}_{2}+z_{8}\,\mathbf{a}_{3}$	$=$	$\left(ax_{8}+cz_{8}\cos\beta\right)\,\mathbf{\hat{x}}+by_{8}\,\mathbf{\hat{y}}+cz_{8}\sin\beta\,\mathbf{\hat{z}}$	(4g)	O IV
$\mathbf{B_{28}}$	$=$	$-x_{8}\,\mathbf{a}_{1}+y_{8}\,\mathbf{a}_{2}-\left(z_{8}-\frac{1}{2}\right)\,\mathbf{a}_{3}$	$=$	$-\left(ax_{8}+c\left(z_{8}-\frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}}+by_{8}\,\mathbf{\hat{y}}-c\left(z_{8}-\frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	O IV
$\mathbf{B_{29}}$	$=$	$-x_{8}\,\mathbf{a}_{1}-y_{8}\,\mathbf{a}_{2}-z_{8}\,\mathbf{a}_{3}$	$=$	$-\left(ax_{8}+cz_{8}\cos\beta\right)\,\mathbf{\hat{x}}-by_{8}\,\mathbf{\hat{y}}-cz_{8}\sin\beta\,\mathbf{\hat{z}}$	(4g)	O IV
$\mathbf{B_{30}}$	$=$	$x_{8}\,\mathbf{a}_{1}-y_{8}\,\mathbf{a}_{2}+\left(z_{8}+\frac{1}{2}\right)\,\mathbf{a}_{3}$	$=$	$\left(ax_{8}+c\left(z_{8}+\frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}}-by_{8}\,\mathbf{\hat{y}}+c\left(z_{8}+\frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	O IV
$\mathbf{B_{31}}$	$=$	$x_{9}\,\mathbf{a}_{1}+y_{9}\,\mathbf{a}_{2}+z_{9}\,\mathbf{a}_{3}$	$=$	$\left(ax_{9}+cz_{9}\cos\beta\right)\,\mathbf{\hat{x}}+by_{9}\,\mathbf{\hat{y}}+cz_{9}\sin\beta\,\mathbf{\hat{z}}$	(4g)	O V
$\mathbf{B_{32}}$	$=$	$-x_{9}\,\mathbf{a}_{1}+y_{9}\,\mathbf{a}_{2}-\left(z_{9}-\frac{1}{2}\right)\,\mathbf{a}_{3}$	$=$	$-\left(ax_{9}+c\left(z_{9}-\frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}}+by_{9}\,\mathbf{\hat{y}}-c\left(z_{9}-\frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	O V
$\mathbf{B_{33}}$	$=$	$-x_{9}\,\mathbf{a}_{1}-y_{9}\,\mathbf{a}_{2}-z_{9}\,\mathbf{a}_{3}$	$=$	$-\left(ax_{9}+cz_{9}\cos\beta\right)\,\mathbf{\hat{x}}-by_{9}\,\mathbf{\hat{y}}-cz_{9}\sin\beta\,\mathbf{\hat{z}}$	(4g)	O V
$\mathbf{B_{34}}$	$=$	$x_{9}\,\mathbf{a}_{1}-y_{9}\,\mathbf{a}_{2}+\left(z_{9}+\frac{1}{2}\right)\,\mathbf{a}_{3}$	$=$	$\left(ax_{9}+c\left(z_{9}+\frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}}-by_{9}\,\mathbf{\hat{y}}+c\left(z_{9}+\frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	O V
$\mathbf{B_{35}}$	$=$	$x_{10}\,\mathbf{a}_{1}+y_{10}\,\mathbf{a}_{2}+z_{10}\,\mathbf{a}_{3}$	$=$	$\left(ax_{10}+cz_{10}\cos\beta\right)\,\mathbf{\hat{x}}+by_{10}\,\mathbf{\hat{y}}+cz_{10}\sin\beta\,\mathbf{\hat{z}}$	(4g)	O VI
$\mathbf{B_{36}}$	$=$	$-x_{10}\,\mathbf{a}_{1}+y_{10}\,\mathbf{a}_{2}-\left(z_{10}-\frac{1}{2}\right)\,\mathbf{a}_{3}$	$=$	$-\left(ax_{10}+c\left(z_{10}-\frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}}+by_{10}\,\mathbf{\hat{y}}-c\left(z_{10}-\frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	O VI
$\mathbf{B_{37}}$	$=$	$-x_{10}\,\mathbf{a}_{1}-y_{10}\,\mathbf{a}_{2}-z_{10}\,\mathbf{a}_{3}$	$=$	$-\left(ax_{10}+cz_{10}\cos\beta\right)\,\mathbf{\hat{x}}-by_{10}\,\mathbf{\hat{y}}-cz_{10}\sin\beta\,\mathbf{\hat{z}}$	(4g)	O VI
$\mathbf{B_{38}}$	$=$	$x_{10}\,\mathbf{a}_{1}-y_{10}\,\mathbf{a}_{2}+\left(z_{10}+\frac{1}{2}\right)\,\mathbf{a}_{3}$	$=$	$\left(ax_{10}+c\left(z_{10}+\frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}}-by_{10}\,\mathbf{\hat{y}}+c\left(z_{10}+\frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	O VI
$\mathbf{B_{39}}$	$=$	$x_{11}\,\mathbf{a}_{1}+y_{11}\,\mathbf{a}_{2}+z_{11}\,\mathbf{a}_{3}$	$=$	$\left(ax_{11}+cz_{11}\cos\beta\right)\,\mathbf{\hat{x}}+by_{11}\,\mathbf{\hat{y}}+cz_{11}\sin\beta\,\mathbf{\hat{z}}$	(4g)	O VII
$\mathbf{B_{40}}$	$=$	$-x_{11}\,\mathbf{a}_{1}+y_{11}\,\mathbf{a}_{2}-\left(z_{11}-\frac{1}{2}\right)\,\mathbf{a}_{3}$	$=$	$-\left(ax_{11}+c\left(z_{11}-\frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}}+by_{11}\,\mathbf{\hat{y}}-c\left(z_{11}-\frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	O VII
$\mathbf{B_{41}}$	$=$	$-x_{11}\,\mathbf{a}_{1}-y_{11}\,\mathbf{a}_{2}-z_{11}\,\mathbf{a}_{3}$	$=$	$-\left(ax_{11}+cz_{11}\cos\beta\right)\,\mathbf{\hat{x}}-by_{11}\,\mathbf{\hat{y}}-cz_{11}\sin\beta\,\mathbf{\hat{z}}$	(4g)	O VII
$\mathbf{B_{42}}$	$=$	$x_{11}\,\mathbf{a}_{1}-y_{11}\,\mathbf{a}_{2}+\left(z_{11}+\frac{1}{2}\right)\,\mathbf{a}_{3}$	$=$	$\left(ax_{11}+c\left(z_{11}+\frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}}-by_{11}\,\mathbf{\hat{y}}+c\left(z_{11}+\frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	O VII
$\mathbf{B_{43}}$	$=$	$x_{12}\,\mathbf{a}_{1}+y_{12}\,\mathbf{a}_{2}+z_{12}\,\mathbf{a}_{3}$	$=$	$\left(ax_{12}+cz_{12}\cos\beta\right)\,\mathbf{\hat{x}}+by_{12}\,\mathbf{\hat{y}}+cz_{12}\sin\beta\,\mathbf{\hat{z}}$	(4g)	O VIII
$\mathbf{B_{44}}$	$=$	$-x_{12}\,\mathbf{a}_{1}+y_{12}\,\mathbf{a}_{2}-\left(z_{12}-\frac{1}{2}\right)\,\mathbf{a}_{3}$	$=$	$-\left(ax_{12}+c\left(z_{12}-\frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}}+by_{12}\,\mathbf{\hat{y}}-c\left(z_{12}-\frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	O VIII
$\mathbf{B_{45}}$	$=$	$-x_{12}\,\mathbf{a}_{1}-y_{12}\,\mathbf{a}_{2}-z_{12}\,\mathbf{a}_{3}$	$=$	$-\left(ax_{12}+cz_{12}\cos\beta\right)\,\mathbf{\hat{x}}-by_{12}\,\mathbf{\hat{y}}-cz_{12}\sin\beta\,\mathbf{\hat{z}}$	(4g)	O VIII
$\mathbf{B_{46}}$	$=$	$x_{12}\,\mathbf{a}_{1}-y_{12}\,\mathbf{a}_{2}+\left(z_{12}+\frac{1}{2}\right)\,\mathbf{a}_{3}$	$=$	$\left(ax_{12}+c\left(z_{12}+\frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}}-by_{12}\,\mathbf{\hat{y}}+c\left(z_{12}+\frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	O VIII
$\mathbf{B_{47}}$	$=$	$x_{13}\,\mathbf{a}_{1}+y_{13}\,\mathbf{a}_{2}+z_{13}\,\mathbf{a}_{3}$	$=$	$\left(ax_{13}+cz_{13}\cos\beta\right)\,\mathbf{\hat{x}}+by_{13}\,\mathbf{\hat{y}}+cz_{13}\sin\beta\,\mathbf{\hat{z}}$	(4g)	O IX
$\mathbf{B_{48}}$	$=$	$-x_{13}\,\mathbf{a}_{1}+y_{13}\,\mathbf{a}_{2}-\left(z_{13}-\frac{1}{2}\right)\,\mathbf{a}_{3}$	$=$	$-\left(ax_{13}+c\left(z_{13}-\frac{1}{2}\right)\cos\beta\right)\,\mathbf{\hat{x}}+by_{13}\,\mathbf{\hat{y}}-c\left(z_{13}-\frac{1}{2}\right)\sin\beta\,\mathbf{\hat{z}}$	(4g)	O IX
$\mathbf{B_{49}}$	$=$	$-x_{13}\,\mathbf{a}_{1}-y_{13}\,\mathbf{a}_{2}-z_{13}\,\mathbf{a}_{3}$	$=$	$-\left(ax_{13}+cz_{13}\cos\beta\right)\,\mathbf{\hat{x}}-by_{13}\,\mathbf{\hat{y}}-cz_{13}\sin\beta\,\mathbf{\hat{z}}$	(4g)	O IX

$\mathbf{B_{50}}$	=	$x_{13}\,\mathbf{a}_1 - y_{13}\,\mathbf{a}_2 + \left(z_{13} + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_{13} + c\left(z_{13} + \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{13}\,\hat{\mathbf{y}} + c\left(z_{13} + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4g)	O IX
$\mathbf{B_{51}}$	=	$x_{14}\,\mathbf{a}_1 + y_{14}\,\mathbf{a}_2 + z_{14}\,\mathbf{a}_3$	=	$\left(ax_{14} + cz_{14}\cos\beta\right)\,\hat{\mathbf{x}} + by_{14}\,\hat{\mathbf{y}} + cz_{14}\sin\beta\,\hat{\mathbf{z}}$	(4g)	O X
$\mathbf{B_{52}}$	=	$-x_{14}\,\mathbf{a}_1 + y_{14}\,\mathbf{a}_2 - \left(z_{14} - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_{14} + c\left(z_{14} - \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} + by_{14}\,\hat{\mathbf{y}} - c\left(z_{14} - \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4g)	O X
$\mathbf{B_{53}}$	=	$-x_{14}\,\mathbf{a}_1 - y_{14}\,\mathbf{a}_2 - z_{14}\,\mathbf{a}_3$	=	$-\left(ax_{14} + cz_{14}\cos\beta\right)\,\hat{\mathbf{x}} - by_{14}\,\hat{\mathbf{y}} - cz_{14}\sin\beta\,\hat{\mathbf{z}}$	(4g)	O X
$\mathbf{B_{54}}$	=	$x_{14}\,\mathbf{a}_1 - y_{14}\,\mathbf{a}_2 + \left(z_{14} + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_{14} + c\left(z_{14} + \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{14}\,\hat{\mathbf{y}} + c\left(z_{14} + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4g)	O X
$\mathbf{B_{55}}$	=	$x_{15}\,\mathbf{a}_1 + y_{15}\,\mathbf{a}_2 + z_{15}\,\mathbf{a}_3$	=	$\left(ax_{15} + cz_{15}\cos\beta\right)\,\hat{\mathbf{x}} + by_{15}\,\hat{\mathbf{y}} + cz_{15}\sin\beta\,\hat{\mathbf{z}}$	(4g)	O XI
$\mathbf{B_{56}}$	=	$-x_{15}\,\mathbf{a}_1 + y_{15}\,\mathbf{a}_2 - \left(z_{15} - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_{15} + c\left(z_{15} - \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} + by_{15}\,\hat{\mathbf{y}} - c\left(z_{15} - \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4g)	O XI
$\mathbf{B_{57}}$	=	$-x_{15}\,\mathbf{a}_1 - y_{15}\,\mathbf{a}_2 - z_{15}\,\mathbf{a}_3$	=	$-\left(ax_{15} + cz_{15}\cos\beta\right)\,\hat{\mathbf{x}} - by_{15}\,\hat{\mathbf{y}} - cz_{15}\sin\beta\,\hat{\mathbf{z}}$	(4g)	O XI
$\mathbf{B_{58}}$	=	$x_{15}\,\mathbf{a}_1 - y_{15}\,\mathbf{a}_2 + \left(z_{15} + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_{15} + c\left(z_{15} + \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{15}\,\hat{\mathbf{y}} + c\left(z_{15} + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4g)	O XI
$\mathbf{B_{59}}$	=	$x_{16}\,\mathbf{a}_1 + y_{16}\,\mathbf{a}_2 + z_{16}\,\mathbf{a}_3$	=	$\left(ax_{16} + cz_{16}\cos\beta\right)\,\hat{\mathbf{x}} + by_{16}\,\hat{\mathbf{y}} + cz_{16}\sin\beta\,\hat{\mathbf{z}}$	(4g)	O XII
$\mathbf{B_{60}}$	=	$-x_{16}\,\mathbf{a}_1 + y_{16}\,\mathbf{a}_2 - \left(z_{16} - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\left(ax_{16} + c\left(z_{16} - \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} + by_{16}\,\hat{\mathbf{y}} - c\left(z_{16} - \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4g)	O XII
$\mathbf{B_{61}}$	=	$-x_{16}\,\mathbf{a}_1 - y_{16}\,\mathbf{a}_2 - z_{16}\,\mathbf{a}_3$	=	$-\left(ax_{16} + cz_{16}\cos\beta\right)\,\hat{\mathbf{x}} - by_{16}\,\hat{\mathbf{y}} - cz_{16}\sin\beta\,\hat{\mathbf{z}}$	(4g)	O XII
$\mathbf{B_{62}}$	=	$x_{16}\,\mathbf{a}_1 - y_{16}\,\mathbf{a}_2 + \left(z_{16} + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\left(ax_{16} + c\left(z_{16} + \frac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{16}\,\hat{\mathbf{y}} + c\left(z_{16} + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4g)	O XII

References

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