$Cs_6W_{11}O_{36}$ Structure: A6B36C11_mC212_9_6a_36a_11a-001

This structure originally had the label `A6B36C11_mC212_9_6a_36a_11a`. Calls to that address will be redirected here.

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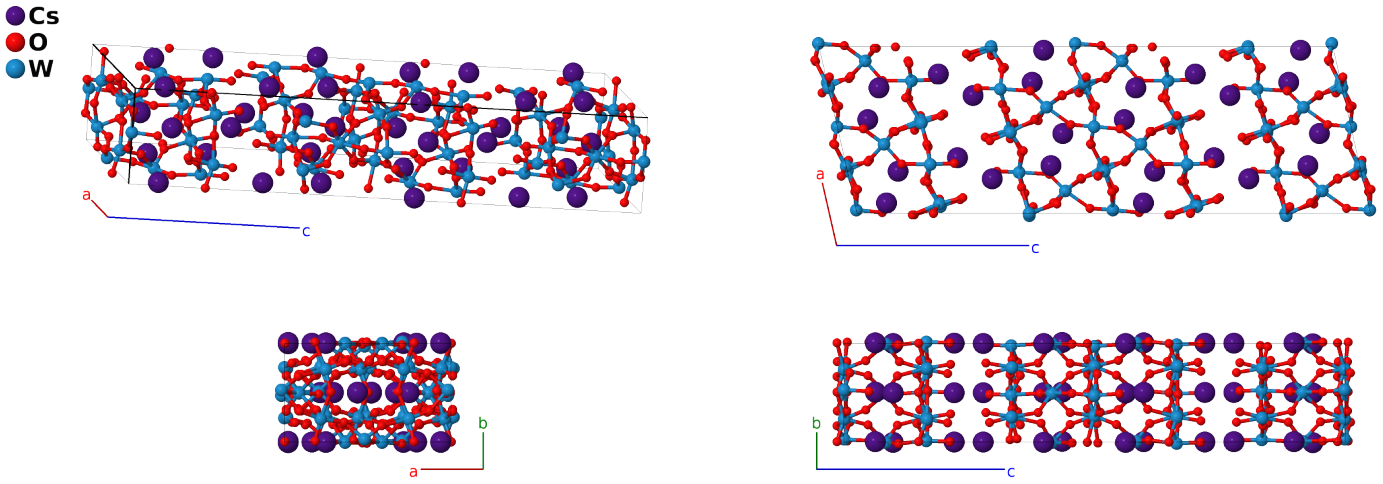
https://aflow.org/p/A3V8

https://aflow.org/p/A6B36C11_mC212_9_6a_36a_11a-001

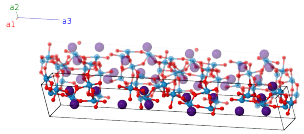


Prototype	$Cs_6O_{36}W_{11}$
AFLOW prototype label	A6B36C11_mC212_9_6a_36a_11a-001
ICSD	80133
Pearson symbol	mC212
Space group number	9
Space group symbol	Cc
AFLOW prototype command	`aflow --proto=A6B36C11_mC212_9_6a_36a_11a-001 --params=`$a, b/a, c/a, \beta, x_1, y_1, z_1, x_2, y_2, z_2, x_3, y_3, z_3, x_4, y_4, z_4, x_5, y_5, z_5, x_6, y_6, z_6, x_7, y_7, z_7, x_8, y_8, z_8, x_9, y_9, z_9, x_{10}, y_{10}, z_{10}, x_{11}, y_{11}, z_{11}, x_{12}, y_{12}, z_{12}, x_{13}, y_{13}, z_{13}, x_{14}, y_{14}, z_{14}, x_{15}, y_{15}, z_{15}, x_{16}, y_{16}, z_{16}, x_{17}, y_{17}, z_{17}, x_{18}, y_{18}, z_{18}, x_{19}, y_{19}, z_{19}, x_{20}, y_{20}, z_{20}, x_{21}, y_{21}, z_{21}, x_{22}, y_{22}, z_{22}, x_{23}, y_{23}, z_{23}, x_{24}, y_{24}, z_{24}, x_{25}, y_{25}, z_{25}, x_{26}, y_{26}, z_{26}, x_{27}, y_{27}, z_{27}, x_{28}, y_{28}, z_{28}, x_{29}, y_{29}, z_{29}, x_{30}, y_{30}, z_{30}, x_{31}, y_{31}, z_{31}, x_{32}, y_{32}, z_{32}, x_{33}, y_{33}, z_{33}, x_{34}, y_{34}, z_{34}, x_{35}, y_{35}, z_{35}, x_{36}, y_{36}, z_{36}, x_{37}, y_{37}, z_{37}, x_{38}, y_{38}, z_{38}, x_{39}, y_{39}, z_{39}, x_{40}, y_{40}, z_{40}, x_{41}, y_{41}, z_{41}, x_{42}, y_{42}, z_{42}, x_{43}, y_{43}, z_{43}, x_{44}, y_{44}, z_{44}, x_{45}, y_{45}, z_{45}, x_{46}, y_{46}, z_{46}, x_{47}, y_{47}, z_{47}, x_{48}, y_{48}, z_{48}, x_{49}, y_{49}, z_{49}, x_{50}, y_{50}, z_{50}, x_{51}, y_{51}, z_{51}, x_{52}, y_{52}, z_{52}, x_{53}, y_{53}, z_{53}$

- (Okada, 1978) placed this in the monoclinic space group Cc#9. (Marsh, 1995) determined that their data fit in space group $R\bar{3}c$#167, and we present their analysis here.

Base-centered Monoclinic primitive vectors

$$\begin{aligned}
\mathbf{a_1} &= \frac{1}{2}a\,\hat{\mathbf{x}} - \frac{1}{2}b\,\hat{\mathbf{y}} \\
\mathbf{a_2} &= \frac{1}{2}a\,\hat{\mathbf{x}} + \frac{1}{2}b\,\hat{\mathbf{y}} \\
\mathbf{a_3} &= c\cos\beta\,\hat{\mathbf{x}} + c\sin\beta\,\hat{\mathbf{z}}
\end{aligned}$$



Basis vectors

		Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B_1}$	=	$(x_1 - y_1)\,\mathbf{a}_1 + (x_1 + y_1)\,\mathbf{a}_2 + z_1\,\mathbf{a}_3$	=	$(ax_1 + cz_1\cos\beta)\,\hat{\mathbf{x}} + by_1\,\hat{\mathbf{y}} + cz_1\sin\beta\,\hat{\mathbf{z}}$	(4a)	Cs I
$\mathbf{B_2}$	=	$(x_1 + y_1)\,\mathbf{a}_1 + (x_1 - y_1)\,\mathbf{a}_2 + \left(z_1 + \frac{1}{2}\right)\mathbf{a}_3$	=	$\left(ax_1 + c\left(z_1 + \frac{1}{2}\right)\cos\beta\right)\hat{\mathbf{x}} - by_1\,\hat{\mathbf{y}} + c\left(z_1 + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4a)	Cs I
$\mathbf{B_3}$	=	$(x_2 - y_2)\,\mathbf{a}_1 + (x_2 + y_2)\,\mathbf{a}_2 + z_2\,\mathbf{a}_3$	=	$(ax_2 + cz_2\cos\beta)\,\hat{\mathbf{x}} + by_2\,\hat{\mathbf{y}} + cz_2\sin\beta\,\hat{\mathbf{z}}$	(4a)	Cs II
$\mathbf{B_4}$	=	$(x_2 + y_2)\,\mathbf{a}_1 + (x_2 - y_2)\,\mathbf{a}_2 + \left(z_2 + \frac{1}{2}\right)\mathbf{a}_3$	=	$\left(ax_2 + c\left(z_2 + \frac{1}{2}\right)\cos\beta\right)\hat{\mathbf{x}} - by_2\,\hat{\mathbf{y}} + c\left(z_2 + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4a)	Cs II
$\mathbf{B_5}$	=	$(x_3 - y_3)\,\mathbf{a}_1 + (x_3 + y_3)\,\mathbf{a}_2 + z_3\,\mathbf{a}_3$	=	$(ax_3 + cz_3\cos\beta)\,\hat{\mathbf{x}} + by_3\,\hat{\mathbf{y}} + cz_3\sin\beta\,\hat{\mathbf{z}}$	(4a)	Cs III
$\mathbf{B_6}$	=	$(x_3 + y_3)\,\mathbf{a}_1 + (x_3 - y_3)\,\mathbf{a}_2 + \left(z_3 + \frac{1}{2}\right)\mathbf{a}_3$	=	$\left(ax_3 + c\left(z_3 + \frac{1}{2}\right)\cos\beta\right)\hat{\mathbf{x}} - by_3\,\hat{\mathbf{y}} + c\left(z_3 + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4a)	Cs III
$\mathbf{B_7}$	=	$(x_4 - y_4)\,\mathbf{a}_1 + (x_4 + y_4)\,\mathbf{a}_2 + z_4\,\mathbf{a}_3$	=	$(ax_4 + cz_4\cos\beta)\,\hat{\mathbf{x}} + by_4\,\hat{\mathbf{y}} + cz_4\sin\beta\,\hat{\mathbf{z}}$	(4a)	Cs IV
$\mathbf{B_8}$	=	$(x_4 + y_4)\,\mathbf{a}_1 + (x_4 - y_4)\,\mathbf{a}_2 + \left(z_4 + \frac{1}{2}\right)\mathbf{a}_3$	=	$\left(ax_4 + c\left(z_4 + \frac{1}{2}\right)\cos\beta\right)\hat{\mathbf{x}} - by_4\,\hat{\mathbf{y}} + c\left(z_4 + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4a)	Cs IV
$\mathbf{B_9}$	=	$(x_5 - y_5)\,\mathbf{a}_1 + (x_5 + y_5)\,\mathbf{a}_2 + z_5\,\mathbf{a}_3$	=	$(ax_5 + cz_5\cos\beta)\,\hat{\mathbf{x}} + by_5\,\hat{\mathbf{y}} + cz_5\sin\beta\,\hat{\mathbf{z}}$	(4a)	Cs V
$\mathbf{B_{10}}$	=	$(x_5 + y_5)\,\mathbf{a}_1 + (x_5 - y_5)\,\mathbf{a}_2 + \left(z_5 + \frac{1}{2}\right)\mathbf{a}_3$	=	$\left(ax_5 + c\left(z_5 + \frac{1}{2}\right)\cos\beta\right)\hat{\mathbf{x}} - by_5\,\hat{\mathbf{y}} + c\left(z_5 + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4a)	Cs V
$\mathbf{B_{11}}$	=	$(x_6 - y_6)\,\mathbf{a}_1 + (x_6 + y_6)\,\mathbf{a}_2 + z_6\,\mathbf{a}_3$	=	$(ax_6 + cz_6\cos\beta)\,\hat{\mathbf{x}} + by_6\,\hat{\mathbf{y}} + cz_6\sin\beta\,\hat{\mathbf{z}}$	(4a)	Cs VI
$\mathbf{B_{12}}$	=	$(x_6 + y_6)\,\mathbf{a}_1 + (x_6 - y_6)\,\mathbf{a}_2 + \left(z_6 + \frac{1}{2}\right)\mathbf{a}_3$	=	$\left(ax_6 + c\left(z_6 + \frac{1}{2}\right)\cos\beta\right)\hat{\mathbf{x}} - by_6\,\hat{\mathbf{y}} + c\left(z_6 + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4a)	Cs VI
$\mathbf{B_{13}}$	=	$(x_7 - y_7)\,\mathbf{a}_1 + (x_7 + y_7)\,\mathbf{a}_2 + z_7\,\mathbf{a}_3$	=	$(ax_7 + cz_7\cos\beta)\,\hat{\mathbf{x}} + by_7\,\hat{\mathbf{y}} + cz_7\sin\beta\,\hat{\mathbf{z}}$	(4a)	O I
$\mathbf{B_{14}}$	=	$(x_7 + y_7)\,\mathbf{a}_1 + (x_7 - y_7)\,\mathbf{a}_2 + \left(z_7 + \frac{1}{2}\right)\mathbf{a}_3$	=	$\left(ax_7 + c\left(z_7 + \frac{1}{2}\right)\cos\beta\right)\hat{\mathbf{x}} - by_7\,\hat{\mathbf{y}} + c\left(z_7 + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4a)	O I
$\mathbf{B_{15}}$	=	$(x_8 - y_8)\,\mathbf{a}_1 + (x_8 + y_8)\,\mathbf{a}_2 + z_8\,\mathbf{a}_3$	=	$(ax_8 + cz_8\cos\beta)\,\hat{\mathbf{x}} + by_8\,\hat{\mathbf{y}} + cz_8\sin\beta\,\hat{\mathbf{z}}$	(4a)	O II
$\mathbf{B_{16}}$	=	$(x_8 + y_8)\,\mathbf{a}_1 + (x_8 - y_8)\,\mathbf{a}_2 + \left(z_8 + \frac{1}{2}\right)\mathbf{a}_3$	=	$\left(ax_8 + c\left(z_8 + \frac{1}{2}\right)\cos\beta\right)\hat{\mathbf{x}} - by_8\,\hat{\mathbf{y}} + c\left(z_8 + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4a)	O II
$\mathbf{B_{17}}$	=	$(x_9 - y_9)\,\mathbf{a}_1 + (x_9 + y_9)\,\mathbf{a}_2 + z_9\,\mathbf{a}_3$	=	$(ax_9 + cz_9\cos\beta)\,\hat{\mathbf{x}} + by_9\,\hat{\mathbf{y}} + cz_9\sin\beta\,\hat{\mathbf{z}}$	(4a)	O III
$\mathbf{B_{18}}$	=	$(x_9 + y_9)\,\mathbf{a}_1 + (x_9 - y_9)\,\mathbf{a}_2 + \left(z_9 + \frac{1}{2}\right)\mathbf{a}_3$	=	$\left(ax_9 + c\left(z_9 + \frac{1}{2}\right)\cos\beta\right)\hat{\mathbf{x}} - by_9\,\hat{\mathbf{y}} + c\left(z_9 + \frac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}}$	(4a)	O III

$$\mathbf{B_{19}} = (x_{10}-y_{10})\,\mathbf{a}_1 + (x_{10}+y_{10})\,\mathbf{a}_2 + z_{10}\,\mathbf{a}_3 = (ax_{10}+cz_{10}\cos\beta)\,\hat{\mathbf{x}} + by_{10}\,\hat{\mathbf{y}} + cz_{10}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O IV}$$

$$\mathbf{B_{20}} = (x_{10}+y_{10})\,\mathbf{a}_1 + (x_{10}-y_{10})\,\mathbf{a}_2 + \left(z_{10}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{10}+c\left(z_{10}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{10}\,\hat{\mathbf{y}} + c\left(z_{10}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O IV}$$

$$\mathbf{B_{21}} = (x_{11}-y_{11})\,\mathbf{a}_1 + (x_{11}+y_{11})\,\mathbf{a}_2 + z_{11}\,\mathbf{a}_3 = (ax_{11}+cz_{11}\cos\beta)\,\hat{\mathbf{x}} + by_{11}\,\hat{\mathbf{y}} + cz_{11}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O V}$$

$$\mathbf{B_{22}} = (x_{11}+y_{11})\,\mathbf{a}_1 + (x_{11}-y_{11})\,\mathbf{a}_2 + \left(z_{11}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{11}+c\left(z_{11}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{11}\,\hat{\mathbf{y}} + c\left(z_{11}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O V}$$

$$\mathbf{B_{23}} = (x_{12}-y_{12})\,\mathbf{a}_1 + (x_{12}+y_{12})\,\mathbf{a}_2 + z_{12}\,\mathbf{a}_3 = (ax_{12}+cz_{12}\cos\beta)\,\hat{\mathbf{x}} + by_{12}\,\hat{\mathbf{y}} + cz_{12}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O VI}$$

$$\mathbf{B_{24}} = (x_{12}+y_{12})\,\mathbf{a}_1 + (x_{12}-y_{12})\,\mathbf{a}_2 + \left(z_{12}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{12}+c\left(z_{12}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{12}\,\hat{\mathbf{y}} + c\left(z_{12}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O VI}$$

$$\mathbf{B_{25}} = (x_{13}-y_{13})\,\mathbf{a}_1 + (x_{13}+y_{13})\,\mathbf{a}_2 + z_{13}\,\mathbf{a}_3 = (ax_{13}+cz_{13}\cos\beta)\,\hat{\mathbf{x}} + by_{13}\,\hat{\mathbf{y}} + cz_{13}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O VII}$$

$$\mathbf{B_{26}} = (x_{13}+y_{13})\,\mathbf{a}_1 + (x_{13}-y_{13})\,\mathbf{a}_2 + \left(z_{13}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{13}+c\left(z_{13}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{13}\,\hat{\mathbf{y}} + c\left(z_{13}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O VII}$$

$$\mathbf{B_{27}} = (x_{14}-y_{14})\,\mathbf{a}_1 + (x_{14}+y_{14})\,\mathbf{a}_2 + z_{14}\,\mathbf{a}_3 = (ax_{14}+cz_{14}\cos\beta)\,\hat{\mathbf{x}} + by_{14}\,\hat{\mathbf{y}} + cz_{14}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O VIII}$$

$$\mathbf{B_{28}} = (x_{14}+y_{14})\,\mathbf{a}_1 + (x_{14}-y_{14})\,\mathbf{a}_2 + \left(z_{14}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{14}+c\left(z_{14}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{14}\,\hat{\mathbf{y}} + c\left(z_{14}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O VIII}$$

$$\mathbf{B_{29}} = (x_{15}-y_{15})\,\mathbf{a}_1 + (x_{15}+y_{15})\,\mathbf{a}_2 + z_{15}\,\mathbf{a}_3 = (ax_{15}+cz_{15}\cos\beta)\,\hat{\mathbf{x}} + by_{15}\,\hat{\mathbf{y}} + cz_{15}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O IX}$$

$$\mathbf{B_{30}} = (x_{15}+y_{15})\,\mathbf{a}_1 + (x_{15}-y_{15})\,\mathbf{a}_2 + \left(z_{15}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{15}+c\left(z_{15}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{15}\,\hat{\mathbf{y}} + c\left(z_{15}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O IX}$$

$$\mathbf{B_{31}} = (x_{16}-y_{16})\,\mathbf{a}_1 + (x_{16}+y_{16})\,\mathbf{a}_2 + z_{16}\,\mathbf{a}_3 = (ax_{16}+cz_{16}\cos\beta)\,\hat{\mathbf{x}} + by_{16}\,\hat{\mathbf{y}} + cz_{16}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O X}$$

$$\mathbf{B_{32}} = (x_{16}+y_{16})\,\mathbf{a}_1 + (x_{16}-y_{16})\,\mathbf{a}_2 + \left(z_{16}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{16}+c\left(z_{16}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{16}\,\hat{\mathbf{y}} + c\left(z_{16}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O X}$$

$$\mathbf{B_{33}} = (x_{17}-y_{17})\,\mathbf{a}_1 + (x_{17}+y_{17})\,\mathbf{a}_2 + z_{17}\,\mathbf{a}_3 = (ax_{17}+cz_{17}\cos\beta)\,\hat{\mathbf{x}} + by_{17}\,\hat{\mathbf{y}} + cz_{17}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XI}$$

$$\mathbf{B_{34}} = (x_{17}+y_{17})\,\mathbf{a}_1 + (x_{17}-y_{17})\,\mathbf{a}_2 + \left(z_{17}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{17}+c\left(z_{17}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{17}\,\hat{\mathbf{y}} + c\left(z_{17}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XI}$$

$$\mathbf{B_{35}} = (x_{18}-y_{18})\,\mathbf{a}_1 + (x_{18}+y_{18})\,\mathbf{a}_2 + z_{18}\,\mathbf{a}_3 = (ax_{18}+cz_{18}\cos\beta)\,\hat{\mathbf{x}} + by_{18}\,\hat{\mathbf{y}} + cz_{18}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XII}$$

$$\mathbf{B_{36}} = (x_{18}+y_{18})\,\mathbf{a}_1 + (x_{18}-y_{18})\,\mathbf{a}_2 + \left(z_{18}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{18}+c\left(z_{18}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{18}\,\hat{\mathbf{y}} + c\left(z_{18}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XII}$$

$$\mathbf{B_{37}} = (x_{19}-y_{19})\,\mathbf{a}_1 + (x_{19}+y_{19})\,\mathbf{a}_2 + z_{19}\,\mathbf{a}_3 = (ax_{19}+cz_{19}\cos\beta)\,\hat{\mathbf{x}} + by_{19}\,\hat{\mathbf{y}} + cz_{19}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XIII}$$

$$\mathbf{B_{38}} = (x_{19}+y_{19})\,\mathbf{a}_1 + (x_{19}-y_{19})\,\mathbf{a}_2 + \left(z_{19}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{19}+c\left(z_{19}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{19}\,\hat{\mathbf{y}} + c\left(z_{19}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XIII}$$

$$\mathbf{B_{39}} = (x_{20}-y_{20})\,\mathbf{a}_1 + (x_{20}+y_{20})\,\mathbf{a}_2 + z_{20}\,\mathbf{a}_3 = (ax_{20}+cz_{20}\cos\beta)\,\hat{\mathbf{x}} + by_{20}\,\hat{\mathbf{y}} + cz_{20}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XIV}$$

$$\mathbf{B_{40}} = (x_{20}+y_{20})\,\mathbf{a}_1 + (x_{20}-y_{20})\,\mathbf{a}_2 + \left(z_{20}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{20}+c\left(z_{20}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{20}\,\hat{\mathbf{y}} + c\left(z_{20}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XIV}$$

$$\mathbf{B_{41}} = (x_{21}-y_{21})\,\mathbf{a}_1 + (x_{21}+y_{21})\,\mathbf{a}_2 + z_{21}\,\mathbf{a}_3 = (ax_{21}+cz_{21}\cos\beta)\,\hat{\mathbf{x}} + by_{21}\,\hat{\mathbf{y}} + cz_{21}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XV}$$

$$\mathbf{B_{42}} = (x_{21}+y_{21})\,\mathbf{a}_1 + (x_{21}-y_{21})\,\mathbf{a}_2 + \left(z_{21}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{21} + c\left(z_{21}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{21}\,\hat{\mathbf{y}} + c\left(z_{21}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XV}$$

$$\mathbf{B_{43}} = (x_{22}-y_{22})\,\mathbf{a}_1 + (x_{22}+y_{22})\,\mathbf{a}_2 + z_{22}\,\mathbf{a}_3 = (ax_{22} + cz_{22}\cos\beta)\,\hat{\mathbf{x}} + by_{22}\,\hat{\mathbf{y}} + cz_{22}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XVI}$$

$$\mathbf{B_{44}} = (x_{22}+y_{22})\,\mathbf{a}_1 + (x_{22}-y_{22})\,\mathbf{a}_2 + \left(z_{22}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{22} + c\left(z_{22}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{22}\,\hat{\mathbf{y}} + c\left(z_{22}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XVI}$$

$$\mathbf{B_{45}} = (x_{23}-y_{23})\,\mathbf{a}_1 + (x_{23}+y_{23})\,\mathbf{a}_2 + z_{23}\,\mathbf{a}_3 = (ax_{23} + cz_{23}\cos\beta)\,\hat{\mathbf{x}} + by_{23}\,\hat{\mathbf{y}} + cz_{23}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XVII}$$

$$\mathbf{B_{46}} = (x_{23}+y_{23})\,\mathbf{a}_1 + (x_{23}-y_{23})\,\mathbf{a}_2 + \left(z_{23}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{23} + c\left(z_{23}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{23}\,\hat{\mathbf{y}} + c\left(z_{23}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XVII}$$

$$\mathbf{B_{47}} = (x_{24}-y_{24})\,\mathbf{a}_1 + (x_{24}+y_{24})\,\mathbf{a}_2 + z_{24}\,\mathbf{a}_3 = (ax_{24} + cz_{24}\cos\beta)\,\hat{\mathbf{x}} + by_{24}\,\hat{\mathbf{y}} + cz_{24}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XVIII}$$

$$\mathbf{B_{48}} = (x_{24}+y_{24})\,\mathbf{a}_1 + (x_{24}-y_{24})\,\mathbf{a}_2 + \left(z_{24}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{24} + c\left(z_{24}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{24}\,\hat{\mathbf{y}} + c\left(z_{24}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XVIII}$$

$$\mathbf{B_{49}} = (x_{25}-y_{25})\,\mathbf{a}_1 + (x_{25}+y_{25})\,\mathbf{a}_2 + z_{25}\,\mathbf{a}_3 = (ax_{25} + cz_{25}\cos\beta)\,\hat{\mathbf{x}} + by_{25}\,\hat{\mathbf{y}} + cz_{25}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XIX}$$

$$\mathbf{B_{50}} = (x_{25}+y_{25})\,\mathbf{a}_1 + (x_{25}-y_{25})\,\mathbf{a}_2 + \left(z_{25}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{25} + c\left(z_{25}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{25}\,\hat{\mathbf{y}} + c\left(z_{25}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XIX}$$

$$\mathbf{B_{51}} = (x_{26}-y_{26})\,\mathbf{a}_1 + (x_{26}+y_{26})\,\mathbf{a}_2 + z_{26}\,\mathbf{a}_3 = (ax_{26} + cz_{26}\cos\beta)\,\hat{\mathbf{x}} + by_{26}\,\hat{\mathbf{y}} + cz_{26}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XX}$$

$$\mathbf{B_{52}} = (x_{26}+y_{26})\,\mathbf{a}_1 + (x_{26}-y_{26})\,\mathbf{a}_2 + \left(z_{26}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{26} + c\left(z_{26}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{26}\,\hat{\mathbf{y}} + c\left(z_{26}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XX}$$

$$\mathbf{B_{53}} = (x_{27}-y_{27})\,\mathbf{a}_1 + (x_{27}+y_{27})\,\mathbf{a}_2 + z_{27}\,\mathbf{a}_3 = (ax_{27} + cz_{27}\cos\beta)\,\hat{\mathbf{x}} + by_{27}\,\hat{\mathbf{y}} + cz_{27}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXI}$$

$$\mathbf{B_{54}} = (x_{27}+y_{27})\,\mathbf{a}_1 + (x_{27}-y_{27})\,\mathbf{a}_2 + \left(z_{27}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{27} + c\left(z_{27}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{27}\,\hat{\mathbf{y}} + c\left(z_{27}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXI}$$

$$\mathbf{B_{55}} = (x_{28}-y_{28})\,\mathbf{a}_1 + (x_{28}+y_{28})\,\mathbf{a}_2 + z_{28}\,\mathbf{a}_3 = (ax_{28} + cz_{28}\cos\beta)\,\hat{\mathbf{x}} + by_{28}\,\hat{\mathbf{y}} + cz_{28}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXII}$$

$$\mathbf{B_{56}} = (x_{28}+y_{28})\,\mathbf{a}_1 + (x_{28}-y_{28})\,\mathbf{a}_2 + \left(z_{28}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{28} + c\left(z_{28}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{28}\,\hat{\mathbf{y}} + c\left(z_{28}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXII}$$

$$\mathbf{B_{57}} = (x_{29}-y_{29})\,\mathbf{a}_1 + (x_{29}+y_{29})\,\mathbf{a}_2 + z_{29}\,\mathbf{a}_3 = (ax_{29} + cz_{29}\cos\beta)\,\hat{\mathbf{x}} + by_{29}\,\hat{\mathbf{y}} + cz_{29}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXIII}$$

$$\mathbf{B_{58}} = (x_{29}+y_{29})\,\mathbf{a}_1 + (x_{29}-y_{29})\,\mathbf{a}_2 + \left(z_{29}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{29} + c\left(z_{29}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{29}\,\hat{\mathbf{y}} + c\left(z_{29}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXIII}$$

$$\mathbf{B_{59}} = (x_{30}-y_{30})\,\mathbf{a}_1 + (x_{30}+y_{30})\,\mathbf{a}_2 + z_{30}\,\mathbf{a}_3 = (ax_{30} + cz_{30}\cos\beta)\,\hat{\mathbf{x}} + by_{30}\,\hat{\mathbf{y}} + cz_{30}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXIV}$$

$$\mathbf{B_{60}} = (x_{30}+y_{30})\,\mathbf{a}_1 + (x_{30}-y_{30})\,\mathbf{a}_2 + \left(z_{30}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{30} + c\left(z_{30}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{30}\,\hat{\mathbf{y}} + c\left(z_{30}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXIV}$$

$$\mathbf{B_{61}} = (x_{31}-y_{31})\,\mathbf{a}_1 + (x_{31}+y_{31})\,\mathbf{a}_2 + z_{31}\,\mathbf{a}_3 = (ax_{31} + cz_{31}\cos\beta)\,\hat{\mathbf{x}} + by_{31}\,\hat{\mathbf{y}} + cz_{31}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXV}$$

$$\mathbf{B_{62}} = (x_{31}+y_{31})\,\mathbf{a}_1 + (x_{31}-y_{31})\,\mathbf{a}_2 + \left(z_{31}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{31} + c\left(z_{31}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{31}\,\hat{\mathbf{y}} + c\left(z_{31}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXV}$$

$$\mathbf{B_{63}} = (x_{32}-y_{32})\,\mathbf{a}_1 + (x_{32}+y_{32})\,\mathbf{a}_2 + z_{32}\,\mathbf{a}_3 = (ax_{32} + cz_{32}\cos\beta)\,\hat{\mathbf{x}} + by_{32}\,\hat{\mathbf{y}} + cz_{32}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXVI}$$

$$\mathbf{B_{64}} = (x_{32}+y_{32})\,\mathbf{a}_1 + (x_{32}-y_{32})\,\mathbf{a}_2 + \left(z_{32}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{32} + c\left(z_{32}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{32}\,\hat{\mathbf{y}} + c\left(z_{32}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXVI}$$

$$\mathbf{B_{65}} = (x_{33}-y_{33})\,\mathbf{a}_1 + (x_{33}+y_{33})\,\mathbf{a}_2 + z_{33}\,\mathbf{a}_3 = (ax_{33}+cz_{33}\cos\beta)\,\hat{\mathbf{x}} + by_{33}\,\hat{\mathbf{y}} + cz_{33}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXVII}$$

$$\mathbf{B_{66}} = (x_{33}+y_{33})\,\mathbf{a}_1 + (x_{33}-y_{33})\,\mathbf{a}_2 + \left(z_{33}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{33}+c\left(z_{33}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{33}\,\hat{\mathbf{y}} + c\left(z_{33}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXVII}$$

$$\mathbf{B_{67}} = (x_{34}-y_{34})\,\mathbf{a}_1 + (x_{34}+y_{34})\,\mathbf{a}_2 + z_{34}\,\mathbf{a}_3 = (ax_{34}+cz_{34}\cos\beta)\,\hat{\mathbf{x}} + by_{34}\,\hat{\mathbf{y}} + cz_{34}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXVIII}$$

$$\mathbf{B_{68}} = (x_{34}+y_{34})\,\mathbf{a}_1 + (x_{34}-y_{34})\,\mathbf{a}_2 + \left(z_{34}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{34}+c\left(z_{34}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{34}\,\hat{\mathbf{y}} + c\left(z_{34}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXVIII}$$

$$\mathbf{B_{69}} = (x_{35}-y_{35})\,\mathbf{a}_1 + (x_{35}+y_{35})\,\mathbf{a}_2 + z_{35}\,\mathbf{a}_3 = (ax_{35}+cz_{35}\cos\beta)\,\hat{\mathbf{x}} + by_{35}\,\hat{\mathbf{y}} + cz_{35}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXIX}$$

$$\mathbf{B_{70}} = (x_{35}+y_{35})\,\mathbf{a}_1 + (x_{35}-y_{35})\,\mathbf{a}_2 + \left(z_{35}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{35}+c\left(z_{35}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{35}\,\hat{\mathbf{y}} + c\left(z_{35}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXIX}$$

$$\mathbf{B_{71}} = (x_{36}-y_{36})\,\mathbf{a}_1 + (x_{36}+y_{36})\,\mathbf{a}_2 + z_{36}\,\mathbf{a}_3 = (ax_{36}+cz_{36}\cos\beta)\,\hat{\mathbf{x}} + by_{36}\,\hat{\mathbf{y}} + cz_{36}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXX}$$

$$\mathbf{B_{72}} = (x_{36}+y_{36})\,\mathbf{a}_1 + (x_{36}-y_{36})\,\mathbf{a}_2 + \left(z_{36}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{36}+c\left(z_{36}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{36}\,\hat{\mathbf{y}} + c\left(z_{36}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXX}$$

$$\mathbf{B_{73}} = (x_{37}-y_{37})\,\mathbf{a}_1 + (x_{37}+y_{37})\,\mathbf{a}_2 + z_{37}\,\mathbf{a}_3 = (ax_{37}+cz_{37}\cos\beta)\,\hat{\mathbf{x}} + by_{37}\,\hat{\mathbf{y}} + cz_{37}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXXI}$$

$$\mathbf{B_{74}} = (x_{37}+y_{37})\,\mathbf{a}_1 + (x_{37}-y_{37})\,\mathbf{a}_2 + \left(z_{37}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{37}+c\left(z_{37}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{37}\,\hat{\mathbf{y}} + c\left(z_{37}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXXI}$$

$$\mathbf{B_{75}} = (x_{38}-y_{38})\,\mathbf{a}_1 + (x_{38}+y_{38})\,\mathbf{a}_2 + z_{38}\,\mathbf{a}_3 = (ax_{38}+cz_{38}\cos\beta)\,\hat{\mathbf{x}} + by_{38}\,\hat{\mathbf{y}} + cz_{38}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXXII}$$

$$\mathbf{B_{76}} = (x_{38}+y_{38})\,\mathbf{a}_1 + (x_{38}-y_{38})\,\mathbf{a}_2 + \left(z_{38}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{38}+c\left(z_{38}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{38}\,\hat{\mathbf{y}} + c\left(z_{38}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXXII}$$

$$\mathbf{B_{77}} = (x_{39}-y_{39})\,\mathbf{a}_1 + (x_{39}+y_{39})\,\mathbf{a}_2 + z_{39}\,\mathbf{a}_3 = (ax_{39}+cz_{39}\cos\beta)\,\hat{\mathbf{x}} + by_{39}\,\hat{\mathbf{y}} + cz_{39}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXXIII}$$

$$\mathbf{B_{78}} = (x_{39}+y_{39})\,\mathbf{a}_1 + (x_{39}-y_{39})\,\mathbf{a}_2 + \left(z_{39}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{39}+c\left(z_{39}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{39}\,\hat{\mathbf{y}} + c\left(z_{39}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXXIII}$$

$$\mathbf{B_{79}} = (x_{40}-y_{40})\,\mathbf{a}_1 + (x_{40}+y_{40})\,\mathbf{a}_2 + z_{40}\,\mathbf{a}_3 = (ax_{40}+cz_{40}\cos\beta)\,\hat{\mathbf{x}} + by_{40}\,\hat{\mathbf{y}} + cz_{40}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXXIV}$$

$$\mathbf{B_{80}} = (x_{40}+y_{40})\,\mathbf{a}_1 + (x_{40}-y_{40})\,\mathbf{a}_2 + \left(z_{40}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{40}+c\left(z_{40}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{40}\,\hat{\mathbf{y}} + c\left(z_{40}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXXIV}$$

$$\mathbf{B_{81}} = (x_{41}-y_{41})\,\mathbf{a}_1 + (x_{41}+y_{41})\,\mathbf{a}_2 + z_{41}\,\mathbf{a}_3 = (ax_{41}+cz_{41}\cos\beta)\,\hat{\mathbf{x}} + by_{41}\,\hat{\mathbf{y}} + cz_{41}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXXV}$$

$$\mathbf{B_{82}} = (x_{41}+y_{41})\,\mathbf{a}_1 + (x_{41}-y_{41})\,\mathbf{a}_2 + \left(z_{41}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{41}+c\left(z_{41}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{41}\,\hat{\mathbf{y}} + c\left(z_{41}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXXV}$$

$$\mathbf{B_{83}} = (x_{42}-y_{42})\,\mathbf{a}_1 + (x_{42}+y_{42})\,\mathbf{a}_2 + z_{42}\,\mathbf{a}_3 = (ax_{42}+cz_{42}\cos\beta)\,\hat{\mathbf{x}} + by_{42}\,\hat{\mathbf{y}} + cz_{42}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXXVI}$$

$$\mathbf{B_{84}} = (x_{42}+y_{42})\,\mathbf{a}_1 + (x_{42}-y_{42})\,\mathbf{a}_2 + \left(z_{42}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{42}+c\left(z_{42}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{42}\,\hat{\mathbf{y}} + c\left(z_{42}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{O XXXVI}$$

$$\mathbf{B_{85}} = (x_{43}-y_{43})\,\mathbf{a}_1 + (x_{43}+y_{43})\,\mathbf{a}_2 + z_{43}\,\mathbf{a}_3 = (ax_{43}+cz_{43}\cos\beta)\,\hat{\mathbf{x}} + by_{43}\,\hat{\mathbf{y}} + cz_{43}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W I}$$

$$\mathbf{B_{86}} = (x_{43}+y_{43})\,\mathbf{a}_1 + (x_{43}-y_{43})\,\mathbf{a}_2 + \left(z_{43}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{43}+c\left(z_{43}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{43}\,\hat{\mathbf{y}} + c\left(z_{43}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W I}$$

$$\mathbf{B_{87}} = (x_{44}-y_{44})\,\mathbf{a}_1 + (x_{44}+y_{44})\,\mathbf{a}_2 + z_{44}\,\mathbf{a}_3 = (ax_{44}+cz_{44}\cos\beta)\,\hat{\mathbf{x}} + by_{44}\,\hat{\mathbf{y}} + cz_{44}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W II}$$

$$\mathbf{B_{88}} = (x_{44}+y_{44})\,\mathbf{a}_1 + (x_{44}-y_{44})\,\mathbf{a}_2 + \left(z_{44}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{44} + c\left(z_{44}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{44}\,\hat{\mathbf{y}} + c\left(z_{44}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W II}$$

$$\mathbf{B_{89}} = (x_{45}-y_{45})\,\mathbf{a}_1 + (x_{45}+y_{45})\,\mathbf{a}_2 + z_{45}\,\mathbf{a}_3 = (ax_{45} + cz_{45}\cos\beta)\,\hat{\mathbf{x}} + by_{45}\,\hat{\mathbf{y}} + cz_{45}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W III}$$

$$\mathbf{B_{90}} = (x_{45}+y_{45})\,\mathbf{a}_1 + (x_{45}-y_{45})\,\mathbf{a}_2 + \left(z_{45}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{45} + c\left(z_{45}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{45}\,\hat{\mathbf{y}} + c\left(z_{45}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W III}$$

$$\mathbf{B_{91}} = (x_{46}-y_{46})\,\mathbf{a}_1 + (x_{46}+y_{46})\,\mathbf{a}_2 + z_{46}\,\mathbf{a}_3 = (ax_{46} + cz_{46}\cos\beta)\,\hat{\mathbf{x}} + by_{46}\,\hat{\mathbf{y}} + cz_{46}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W IV}$$

$$\mathbf{B_{92}} = (x_{46}+y_{46})\,\mathbf{a}_1 + (x_{46}-y_{46})\,\mathbf{a}_2 + \left(z_{46}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{46} + c\left(z_{46}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{46}\,\hat{\mathbf{y}} + c\left(z_{46}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W IV}$$

$$\mathbf{B_{93}} = (x_{47}-y_{47})\,\mathbf{a}_1 + (x_{47}+y_{47})\,\mathbf{a}_2 + z_{47}\,\mathbf{a}_3 = (ax_{47} + cz_{47}\cos\beta)\,\hat{\mathbf{x}} + by_{47}\,\hat{\mathbf{y}} + cz_{47}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W V}$$

$$\mathbf{B_{94}} = (x_{47}+y_{47})\,\mathbf{a}_1 + (x_{47}-y_{47})\,\mathbf{a}_2 + \left(z_{47}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{47} + c\left(z_{47}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{47}\,\hat{\mathbf{y}} + c\left(z_{47}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W V}$$

$$\mathbf{B_{95}} = (x_{48}-y_{48})\,\mathbf{a}_1 + (x_{48}+y_{48})\,\mathbf{a}_2 + z_{48}\,\mathbf{a}_3 = (ax_{48} + cz_{48}\cos\beta)\,\hat{\mathbf{x}} + by_{48}\,\hat{\mathbf{y}} + cz_{48}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W VI}$$

$$\mathbf{B_{96}} = (x_{48}+y_{48})\,\mathbf{a}_1 + (x_{48}-y_{48})\,\mathbf{a}_2 + \left(z_{48}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{48} + c\left(z_{48}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{48}\,\hat{\mathbf{y}} + c\left(z_{48}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W VI}$$

$$\mathbf{B_{97}} = (x_{49}-y_{49})\,\mathbf{a}_1 + (x_{49}+y_{49})\,\mathbf{a}_2 + z_{49}\,\mathbf{a}_3 = (ax_{49} + cz_{49}\cos\beta)\,\hat{\mathbf{x}} + by_{49}\,\hat{\mathbf{y}} + cz_{49}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W VII}$$

$$\mathbf{B_{98}} = (x_{49}+y_{49})\,\mathbf{a}_1 + (x_{49}-y_{49})\,\mathbf{a}_2 + \left(z_{49}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{49} + c\left(z_{49}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{49}\,\hat{\mathbf{y}} + c\left(z_{49}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W VII}$$

$$\mathbf{B_{99}} = (x_{50}-y_{50})\,\mathbf{a}_1 + (x_{50}+y_{50})\,\mathbf{a}_2 + z_{50}\,\mathbf{a}_3 = (ax_{50} + cz_{50}\cos\beta)\,\hat{\mathbf{x}} + by_{50}\,\hat{\mathbf{y}} + cz_{50}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W VIII}$$

$$\mathbf{B_{100}} = (x_{50}+y_{50})\,\mathbf{a}_1 + (x_{50}-y_{50})\,\mathbf{a}_2 + \left(z_{50}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{50} + c\left(z_{50}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{50}\,\hat{\mathbf{y}} + c\left(z_{50}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W VIII}$$

$$\mathbf{B_{101}} = (x_{51}-y_{51})\,\mathbf{a}_1 + (x_{51}+y_{51})\,\mathbf{a}_2 + z_{51}\,\mathbf{a}_3 = (ax_{51} + cz_{51}\cos\beta)\,\hat{\mathbf{x}} + by_{51}\,\hat{\mathbf{y}} + cz_{51}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W IX}$$

$$\mathbf{B_{102}} = (x_{51}+y_{51})\,\mathbf{a}_1 + (x_{51}-y_{51})\,\mathbf{a}_2 + \left(z_{51}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{51} + c\left(z_{51}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{51}\,\hat{\mathbf{y}} + c\left(z_{51}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W IX}$$

$$\mathbf{B_{103}} = (x_{52}-y_{52})\,\mathbf{a}_1 + (x_{52}+y_{52})\,\mathbf{a}_2 + z_{52}\,\mathbf{a}_3 = (ax_{52} + cz_{52}\cos\beta)\,\hat{\mathbf{x}} + by_{52}\,\hat{\mathbf{y}} + cz_{52}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W X}$$

$$\mathbf{B_{104}} = (x_{52}+y_{52})\,\mathbf{a}_1 + (x_{52}-y_{52})\,\mathbf{a}_2 + \left(z_{52}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{52} + c\left(z_{52}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{52}\,\hat{\mathbf{y}} + c\left(z_{52}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W X}$$

$$\mathbf{B_{105}} = (x_{53}-y_{53})\,\mathbf{a}_1 + (x_{53}+y_{53})\,\mathbf{a}_2 + z_{53}\,\mathbf{a}_3 = (ax_{53} + cz_{53}\cos\beta)\,\hat{\mathbf{x}} + by_{53}\,\hat{\mathbf{y}} + cz_{53}\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W XI}$$

$$\mathbf{B_{106}} = (x_{53}+y_{53})\,\mathbf{a}_1 + (x_{53}-y_{53})\,\mathbf{a}_2 + \left(z_{53}+\tfrac{1}{2}\right)\,\mathbf{a}_3 = \left(ax_{53} + c\left(z_{53}+\tfrac{1}{2}\right)\cos\beta\right)\,\hat{\mathbf{x}} - by_{53}\,\hat{\mathbf{y}} + c\left(z_{53}+\tfrac{1}{2}\right)\sin\beta\,\hat{\mathbf{z}} \quad (4a) \quad \text{W XI}$$

References

[1] K. Okada, F. Marumo, and S. Iwai, *The Crystal Structure of $Cs_6W_{11}O_{36}$*, Acta Crystallogr. Sect. B **34**, 50–54 (1978), doi:10.1107/S0567740878014934.