$Pb_3TeCo_3P_2O_{14}$ Structure: A3B14C2D3E_mP138_3_3c3d6e_42e_6e_3a3b6e_3a3b-001

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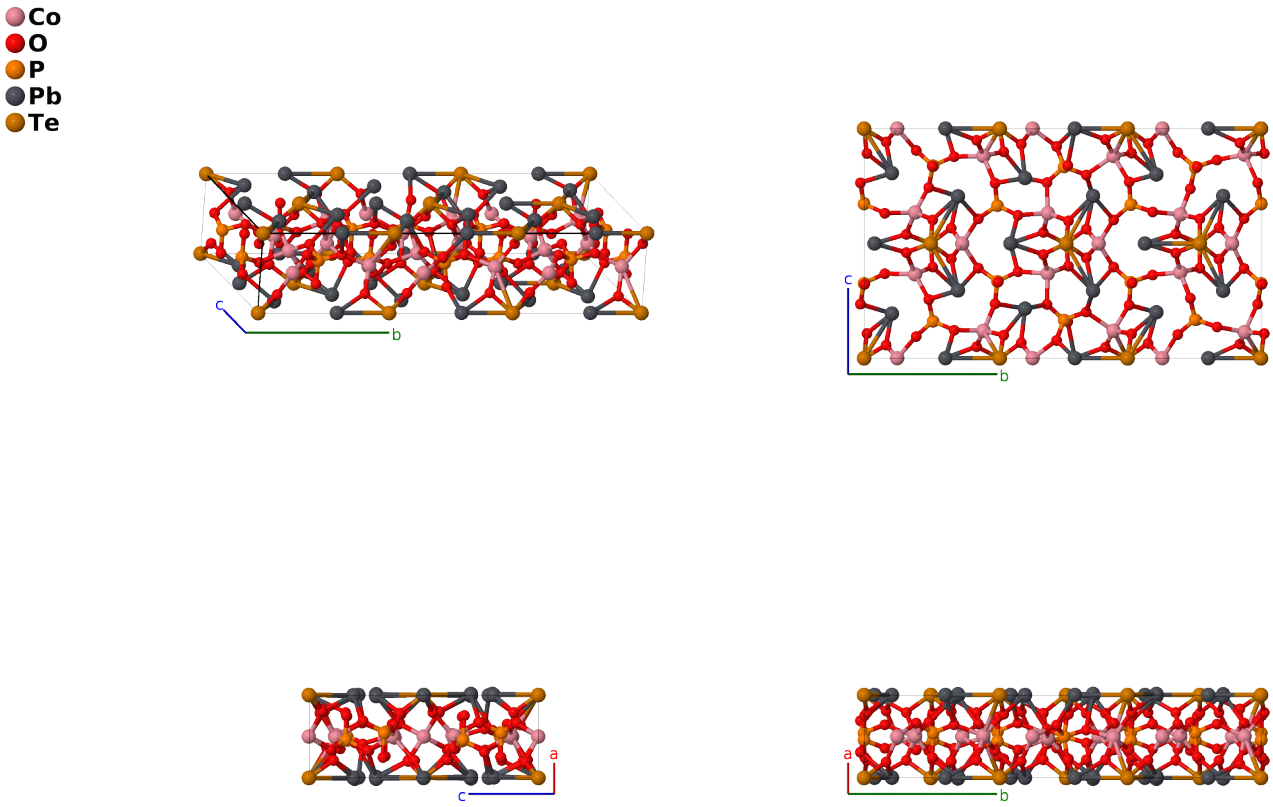
https://aflow.org/p/TBT2

https://aflow.org/p/A3B14C2D3E_mP138_3_3c3d6e_42e_6e_3a3b6e_3a3b-001



Prototype	$Co_3O_{14}P_2Pb_3Te$
AFLOW prototype label	A3B14C2D3E_mP138_3_3c3d6e_42e_6e_3a3b6e_3a3b-001
ICSD	425850
Pearson symbol	mP138
Space group number	3
Space group symbol	$P2$
AFLOW prototype command	`aflow --proto=A3B14C2D3E_mP138_3_3c3d6e_42e_6e_3a3b6e_3a3b-001 --params=`$a, b/a, c/a, \beta, y_1, y_2, y_3, y_4, y_5, y_6, y_7, y_8, y_9, y_{10}, y_{11}, y_{12}, y_{13}, y_{14}, y_{15}, y_{16}, y_{17}, y_{18}, x_{19}, y_{19}, z_{19}, x_{20}, y_{20}, z_{20}, x_{21}, y_{21}, z_{21}, x_{22}, y_{22}, z_{22}, x_{23}, y_{23}, z_{23}, x_{24}, y_{24}, z_{24}, x_{25}, y_{25}, z_{25}, x_{26}, y_{26}, z_{26}, x_{27}, y_{27}, z_{27}, x_{28}, y_{28}, z_{28}, x_{29}, y_{29}, z_{29}, x_{30}, y_{30}, z_{30}, x_{31}, y_{31}, z_{31}, x_{32}, y_{32}, z_{32}, x_{33},$

$y_{33}, z_{33}, x_{34}, y_{34}, z_{34}, x_{35}, y_{35}, z_{35}, x_{36}, y_{36}, z_{36}, x_{37}, y_{37}, z_{37}, x_{38}, y_{38}, z_{38}, x_{39}, y_{39}, z_{39}, x_{40}, y_{40}, z_{40}, x_{41}, y_{41}, z_{41}, x_{42}, y_{42}, z_{42}, x_{43}, y_{43}, z_{43}, x_{44}, y_{44}, z_{44}, x_{45}, y_{45}, z_{45}, x_{46}, y_{46}, z_{46}, x_{47}, y_{47}, z_{47}, x_{48}, y_{48}, z_{48}, x_{49}, y_{49}, z_{49}, x_{50}, y_{50}, z_{50}, x_{51}, y_{51}, z_{51}, x_{52}, y_{52}, z_{52}, x_{53}, y_{53}, z_{53}, x_{54}, y_{54}, z_{54}, x_{55}, y_{55}, z_{55}, x_{56}, y_{56}, z_{56}, x_{57}, y_{57}, z_{57}, x_{58}, y_{58}, z_{58}, x_{59}, y_{59}, z_{59}, x_{60}, y_{60}, z_{60}, x_{61}, y_{61}, z_{61}, x_{62}, y_{62}, z_{62}, x_{63}, y_{63}, z_{63}, x_{64}, y_{64}, z_{64}, x_{65}, y_{65}, z_{65}, x_{66}, y_{66}, z_{66}, x_{67}, y_{67}, z_{67}, x_{68}, y_{68}, z_{68}, x_{69}, y_{69}, z_{69}, x_{70}, y_{70}, z_{70}, x_{71}, y_{71}, z_{71}, x_{72}, y_{72}, z_{72}, x_{73}, y_{73}, z_{73}, x_{74}, y_{74}, z_{74}, x_{75}, y_{75}, z_{75}, x_{76}, y_{76}, z_{76}, x_{77}, y_{77}, z_{77}, x_{78}, y_{78}, z_{78}$

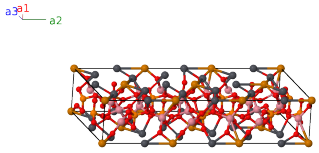
Other compounds with this structure

$Pb_3TeCo_3V_2O_{14}$

- This is a derivative of the dugganite/langasite structure.

Simple Monoclinic primitive vectors

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



Basis vectors

		Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B_1}$	=	$y_1\,\mathbf{a}_2$	=	$by_1\,\hat{\mathbf{y}}$	(1a)	Pb I
$\mathbf{B_2}$	=	$y_2\,\mathbf{a}_2$	=	$by_2\,\hat{\mathbf{y}}$	(1a)	Pb II
$\mathbf{B_3}$	=	$y_3\,\mathbf{a}_2$	=	$by_3\,\hat{\mathbf{y}}$	(1a)	Pb III
$\mathbf{B_4}$	=	$y_4\,\mathbf{a}_2$	=	$by_4\,\hat{\mathbf{y}}$	(1a)	Te I
$\mathbf{B_5}$	=	$y_5\,\mathbf{a}_2$	=	$by_5\,\hat{\mathbf{y}}$	(1a)	Te II
$\mathbf{B_6}$	=	$y_6\,\mathbf{a}_2$	=	$by_6\,\hat{\mathbf{y}}$	(1a)	Te III
$\mathbf{B_7}$	=	$y_7\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3$	=	$\frac{1}{2}c\cos\beta\,\hat{\mathbf{x}} + by_7\,\hat{\mathbf{y}} + \frac{1}{2}c\sin\beta\,\hat{\mathbf{z}}$	(1b)	Pb IV
$\mathbf{B_8}$	=	$y_8\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3$	=	$\frac{1}{2}c\cos\beta\,\hat{\mathbf{x}} + by_8\,\hat{\mathbf{y}} + \frac{1}{2}c\sin\beta\,\hat{\mathbf{z}}$	(1b)	Pb V
$\mathbf{B_9}$	=	$y_9\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3$	=	$\frac{1}{2}c\cos\beta\,\hat{\mathbf{x}} + by_9\,\hat{\mathbf{y}} + \frac{1}{2}c\sin\beta\,\hat{\mathbf{z}}$	(1b)	Pb VI
$\mathbf{B_{10}}$	=	$y_{10}\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3$	=	$\frac{1}{2}c\cos\beta\,\hat{\mathbf{x}} + by_{10}\,\hat{\mathbf{y}} + \frac{1}{2}c\sin\beta\,\hat{\mathbf{z}}$	(1b)	Te IV
$\mathbf{B_{11}}$	=	$y_{11}\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3$	=	$\frac{1}{2}c\cos\beta\,\hat{\mathbf{x}} + by_{11}\,\hat{\mathbf{y}} + \frac{1}{2}c\sin\beta\,\hat{\mathbf{z}}$	(1b)	Te V
$\mathbf{B_{12}}$	=	$y_{12}\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3$	=	$\frac{1}{2}c\cos\beta\,\hat{\mathbf{x}} + by_{12}\,\hat{\mathbf{y}} + \frac{1}{2}c\sin\beta\,\hat{\mathbf{z}}$	(1b)	Te VI
$\mathbf{B_{13}}$	=	$\frac{1}{2}\,\mathbf{a}_1 + y_{13}\,\mathbf{a}_2$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} + by_{13}\,\hat{\mathbf{y}}$	(1c)	Co I
$\mathbf{B_{14}}$	=	$\frac{1}{2}\,\mathbf{a}_1 + y_{14}\,\mathbf{a}_2$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} + by_{14}\,\hat{\mathbf{y}}$	(1c)	Co II
$\mathbf{B_{15}}$	=	$\frac{1}{2}\,\mathbf{a}_1 + y_{15}\,\mathbf{a}_2$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} + by_{15}\,\hat{\mathbf{y}}$	(1c)	Co III
$\mathbf{B_{16}}$	=	$\frac{1}{2}\,\mathbf{a}_1 + y_{16}\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3$	=	$\frac{1}{2}\left(a + c\cos\beta\right)\,\hat{\mathbf{x}} + by_{16}\,\hat{\mathbf{y}} + \frac{1}{2}c\sin\beta\,\hat{\mathbf{z}}$	(1d)	Co IV
$\mathbf{B_{17}}$	=	$\frac{1}{2}\,\mathbf{a}_1 + y_{17}\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3$	=	$\frac{1}{2}\left(a + c\cos\beta\right)\,\hat{\mathbf{x}} + by_{17}\,\hat{\mathbf{y}} + \frac{1}{2}c\sin\beta\,\hat{\mathbf{z}}$	(1d)	Co V
$\mathbf{B_{18}}$	=	$\frac{1}{2}\,\mathbf{a}_1 + y_{18}\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3$	=	$\frac{1}{2}\left(a + c\cos\beta\right)\,\hat{\mathbf{x}} + by_{18}\,\hat{\mathbf{y}} + \frac{1}{2}c\sin\beta\,\hat{\mathbf{z}}$	(1d)	Co VI
$\mathbf{B_{19}}$	=	$x_{19}\,\mathbf{a}_1 + y_{19}\,\mathbf{a}_2 + z_{19}\,\mathbf{a}_3$	=	$\left(ax_{19} + cz_{19}\cos\beta\right)\,\hat{\mathbf{x}} + by_{19}\,\hat{\mathbf{y}} + cz_{19}\sin\beta\,\hat{\mathbf{z}}$	(2e)	Co VII
$\mathbf{B_{20}}$	=	$-x_{19}\,\mathbf{a}_1 + y_{19}\,\mathbf{a}_2 - z_{19}\,\mathbf{a}_3$	=	$-\left(ax_{19} + cz_{19}\cos\beta\right)\,\hat{\mathbf{x}} + by_{19}\,\hat{\mathbf{y}} - cz_{19}\sin\beta\,\hat{\mathbf{z}}$	(2e)	Co VII

$$\mathbf{B_{21}} = x_{20}\,\mathbf{a}_1 + y_{20}\,\mathbf{a}_2 + z_{20}\,\mathbf{a}_3 = (ax_{20} + cz_{20}\cos\beta)\,\hat{\mathbf{x}} + by_{20}\,\hat{\mathbf{y}} + cz_{20}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{Co VIII}$$

$$\mathbf{B_{22}} = -x_{20}\,\mathbf{a}_1 + y_{20}\,\mathbf{a}_2 - z_{20}\,\mathbf{a}_3 = -(ax_{20} + cz_{20}\cos\beta)\,\hat{\mathbf{x}} + by_{20}\,\hat{\mathbf{y}} - cz_{20}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{Co VIII}$$

$$\mathbf{B_{23}} = x_{21}\,\mathbf{a}_1 + y_{21}\,\mathbf{a}_2 + z_{21}\,\mathbf{a}_3 = (ax_{21} + cz_{21}\cos\beta)\,\hat{\mathbf{x}} + by_{21}\,\hat{\mathbf{y}} + cz_{21}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{Co IX}$$

$$\mathbf{B_{24}} = -x_{21}\,\mathbf{a}_1 + y_{21}\,\mathbf{a}_2 - z_{21}\,\mathbf{a}_3 = -(ax_{21} + cz_{21}\cos\beta)\,\hat{\mathbf{x}} + by_{21}\,\hat{\mathbf{y}} - cz_{21}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{Co IX}$$

$$\mathbf{B_{25}} = x_{22}\,\mathbf{a}_1 + y_{22}\,\mathbf{a}_2 + z_{22}\,\mathbf{a}_3 = (ax_{22} + cz_{22}\cos\beta)\,\hat{\mathbf{x}} + by_{22}\,\hat{\mathbf{y}} + cz_{22}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{Co X}$$

$$\mathbf{B_{26}} = -x_{22}\,\mathbf{a}_1 + y_{22}\,\mathbf{a}_2 - z_{22}\,\mathbf{a}_3 = -(ax_{22} + cz_{22}\cos\beta)\,\hat{\mathbf{x}} + by_{22}\,\hat{\mathbf{y}} - cz_{22}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{Co X}$$

$$\mathbf{B_{27}} = x_{23}\,\mathbf{a}_1 + y_{23}\,\mathbf{a}_2 + z_{23}\,\mathbf{a}_3 = (ax_{23} + cz_{23}\cos\beta)\,\hat{\mathbf{x}} + by_{23}\,\hat{\mathbf{y}} + cz_{23}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{Co XI}$$

$$\mathbf{B_{28}} = -x_{23}\,\mathbf{a}_1 + y_{23}\,\mathbf{a}_2 - z_{23}\,\mathbf{a}_3 = -(ax_{23} + cz_{23}\cos\beta)\,\hat{\mathbf{x}} + by_{23}\,\hat{\mathbf{y}} - cz_{23}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{Co XI}$$

$$\mathbf{B_{29}} = x_{24}\,\mathbf{a}_1 + y_{24}\,\mathbf{a}_2 + z_{24}\,\mathbf{a}_3 = (ax_{24} + cz_{24}\cos\beta)\,\hat{\mathbf{x}} + by_{24}\,\hat{\mathbf{y}} + cz_{24}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{Co XII}$$

$$\mathbf{B_{30}} = -x_{24}\,\mathbf{a}_1 + y_{24}\,\mathbf{a}_2 - z_{24}\,\mathbf{a}_3 = -(ax_{24} + cz_{24}\cos\beta)\,\hat{\mathbf{x}} + by_{24}\,\hat{\mathbf{y}} - cz_{24}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{Co XII}$$

$$\mathbf{B_{31}} = x_{25}\,\mathbf{a}_1 + y_{25}\,\mathbf{a}_2 + z_{25}\,\mathbf{a}_3 = (ax_{25} + cz_{25}\cos\beta)\,\hat{\mathbf{x}} + by_{25}\,\hat{\mathbf{y}} + cz_{25}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O I}$$

$$\mathbf{B_{32}} = -x_{25}\,\mathbf{a}_1 + y_{25}\,\mathbf{a}_2 - z_{25}\,\mathbf{a}_3 = -(ax_{25} + cz_{25}\cos\beta)\,\hat{\mathbf{x}} + by_{25}\,\hat{\mathbf{y}} - cz_{25}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O I}$$

$$\mathbf{B_{33}} = x_{26}\,\mathbf{a}_1 + y_{26}\,\mathbf{a}_2 + z_{26}\,\mathbf{a}_3 = (ax_{26} + cz_{26}\cos\beta)\,\hat{\mathbf{x}} + by_{26}\,\hat{\mathbf{y}} + cz_{26}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O II}$$

$$\mathbf{B_{34}} = -x_{26}\,\mathbf{a}_1 + y_{26}\,\mathbf{a}_2 - z_{26}\,\mathbf{a}_3 = -(ax_{26} + cz_{26}\cos\beta)\,\hat{\mathbf{x}} + by_{26}\,\hat{\mathbf{y}} - cz_{26}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O II}$$

$$\mathbf{B_{35}} = x_{27}\,\mathbf{a}_1 + y_{27}\,\mathbf{a}_2 + z_{27}\,\mathbf{a}_3 = (ax_{27} + cz_{27}\cos\beta)\,\hat{\mathbf{x}} + by_{27}\,\hat{\mathbf{y}} + cz_{27}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O III}$$

$$\mathbf{B_{36}} = -x_{27}\,\mathbf{a}_1 + y_{27}\,\mathbf{a}_2 - z_{27}\,\mathbf{a}_3 = -(ax_{27} + cz_{27}\cos\beta)\,\hat{\mathbf{x}} + by_{27}\,\hat{\mathbf{y}} - cz_{27}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O III}$$

$$\mathbf{B_{37}} = x_{28}\,\mathbf{a}_1 + y_{28}\,\mathbf{a}_2 + z_{28}\,\mathbf{a}_3 = (ax_{28} + cz_{28}\cos\beta)\,\hat{\mathbf{x}} + by_{28}\,\hat{\mathbf{y}} + cz_{28}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O IV}$$

$$\mathbf{B_{38}} = -x_{28}\,\mathbf{a}_1 + y_{28}\,\mathbf{a}_2 - z_{28}\,\mathbf{a}_3 = -(ax_{28} + cz_{28}\cos\beta)\,\hat{\mathbf{x}} + by_{28}\,\hat{\mathbf{y}} - cz_{28}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O IV}$$

$$\mathbf{B_{39}} = x_{29}\,\mathbf{a}_1 + y_{29}\,\mathbf{a}_2 + z_{29}\,\mathbf{a}_3 = (ax_{29} + cz_{29}\cos\beta)\,\hat{\mathbf{x}} + by_{29}\,\hat{\mathbf{y}} + cz_{29}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O V}$$

$$\mathbf{B_{40}} = -x_{29}\,\mathbf{a}_1 + y_{29}\,\mathbf{a}_2 - z_{29}\,\mathbf{a}_3 = -(ax_{29} + cz_{29}\cos\beta)\,\hat{\mathbf{x}} + by_{29}\,\hat{\mathbf{y}} - cz_{29}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O V}$$

$$\mathbf{B_{41}} = x_{30}\,\mathbf{a}_1 + y_{30}\,\mathbf{a}_2 + z_{30}\,\mathbf{a}_3 = (ax_{30} + cz_{30}\cos\beta)\,\hat{\mathbf{x}} + by_{30}\,\hat{\mathbf{y}} + cz_{30}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O VI}$$

$$\mathbf{B_{42}} = -x_{30}\,\mathbf{a}_1 + y_{30}\,\mathbf{a}_2 - z_{30}\,\mathbf{a}_3 = -(ax_{30} + cz_{30}\cos\beta)\,\hat{\mathbf{x}} + by_{30}\,\hat{\mathbf{y}} - cz_{30}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O VI}$$

$$\mathbf{B_{43}} = x_{31}\,\mathbf{a}_1 + y_{31}\,\mathbf{a}_2 + z_{31}\,\mathbf{a}_3 = (ax_{31} + cz_{31}\cos\beta)\,\hat{\mathbf{x}} + by_{31}\,\hat{\mathbf{y}} + cz_{31}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O VII}$$

$$\mathbf{B_{44}} = -x_{31}\,\mathbf{a}_1 + y_{31}\,\mathbf{a}_2 - z_{31}\,\mathbf{a}_3 = -(ax_{31} + cz_{31}\cos\beta)\,\hat{\mathbf{x}} + by_{31}\,\hat{\mathbf{y}} - cz_{31}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O VII}$$

$$\mathbf{B_{45}} = x_{32}\,\mathbf{a}_1 + y_{32}\,\mathbf{a}_2 + z_{32}\,\mathbf{a}_3 = (ax_{32} + cz_{32}\cos\beta)\,\hat{\mathbf{x}} + by_{32}\,\hat{\mathbf{y}} + cz_{32}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O VIII}$$

$$\mathbf{B_{46}} = -x_{32}\,\mathbf{a}_1 + y_{32}\,\mathbf{a}_2 - z_{32}\,\mathbf{a}_3 = -(ax_{32} + cz_{32}\cos\beta)\,\hat{\mathbf{x}} + by_{32}\,\hat{\mathbf{y}} - cz_{32}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O VIII}$$

$$\mathbf{B_{47}} = x_{33}\,\mathbf{a}_1 + y_{33}\,\mathbf{a}_2 + z_{33}\,\mathbf{a}_3 = (ax_{33} + cz_{33}\cos\beta)\,\hat{\mathbf{x}} + by_{33}\,\hat{\mathbf{y}} + cz_{33}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O IX}$$

$$\mathbf{B_{48}} = -x_{33}\,\mathbf{a}_1 + y_{33}\,\mathbf{a}_2 - z_{33}\,\mathbf{a}_3 = -(ax_{33} + cz_{33}\cos\beta)\,\hat{\mathbf{x}} + by_{33}\,\hat{\mathbf{y}} - cz_{33}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O IX}$$

$$\mathbf{B_{49}} = x_{34}\,\mathbf{a}_1 + y_{34}\,\mathbf{a}_2 + z_{34}\,\mathbf{a}_3 = (ax_{34} + cz_{34}\cos\beta)\,\hat{\mathbf{x}} + by_{34}\,\hat{\mathbf{y}} + cz_{34}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O X}$$

$$\mathbf{B_{50}} = -x_{34}\,\mathbf{a}_1 + y_{34}\,\mathbf{a}_2 - z_{34}\,\mathbf{a}_3 = -(ax_{34} + cz_{34}\cos\beta)\,\hat{\mathbf{x}} + by_{34}\,\hat{\mathbf{y}} - cz_{34}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{O X}$$

$$\mathbf{B_{51}} = x_{35}\,\mathbf{a}_1 + y_{35}\,\mathbf{a}_2 + z_{35}\,\mathbf{a}_3 = (ax_{35} + cz_{35}\cos\beta)\,\hat{\mathbf{x}} + by_{35}\,\hat{\mathbf{y}} + cz_{35}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XI}$$

$$\mathbf{B_{52}} = -x_{35}\,\mathbf{a}_1 + y_{35}\,\mathbf{a}_2 - z_{35}\,\mathbf{a}_3 = -(ax_{35} + cz_{35}\cos\beta)\,\hat{\mathbf{x}} + by_{35}\,\hat{\mathbf{y}} - cz_{35}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XI}$$

$$\mathbf{B_{53}} = x_{36}\,\mathbf{a}_1 + y_{36}\,\mathbf{a}_2 + z_{36}\,\mathbf{a}_3 = (ax_{36} + cz_{36}\cos\beta)\,\hat{\mathbf{x}} + by_{36}\,\hat{\mathbf{y}} + cz_{36}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XII}$$

$$\mathbf{B_{54}} = -x_{36}\,\mathbf{a}_1 + y_{36}\,\mathbf{a}_2 - z_{36}\,\mathbf{a}_3 = -(ax_{36} + cz_{36}\cos\beta)\,\hat{\mathbf{x}} + by_{36}\,\hat{\mathbf{y}} - cz_{36}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XII}$$

$$\mathbf{B_{55}} = x_{37}\,\mathbf{a}_1 + y_{37}\,\mathbf{a}_2 + z_{37}\,\mathbf{a}_3 = (ax_{37} + cz_{37}\cos\beta)\,\hat{\mathbf{x}} + by_{37}\,\hat{\mathbf{y}} + cz_{37}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XIII}$$

$$\mathbf{B_{56}} = -x_{37}\,\mathbf{a}_1 + y_{37}\,\mathbf{a}_2 - z_{37}\,\mathbf{a}_3 = -(ax_{37} + cz_{37}\cos\beta)\,\hat{\mathbf{x}} + by_{37}\,\hat{\mathbf{y}} - cz_{37}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XIII}$$

$$\mathbf{B_{57}} = x_{38}\,\mathbf{a}_1 + y_{38}\,\mathbf{a}_2 + z_{38}\,\mathbf{a}_3 = (ax_{38} + cz_{38}\cos\beta)\,\hat{\mathbf{x}} + by_{38}\,\hat{\mathbf{y}} + cz_{38}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XIV}$$

$$\mathbf{B_{58}} = -x_{38}\,\mathbf{a}_1 + y_{38}\,\mathbf{a}_2 - z_{38}\,\mathbf{a}_3 = -(ax_{38} + cz_{38}\cos\beta)\,\hat{\mathbf{x}} + by_{38}\,\hat{\mathbf{y}} - cz_{38}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XIV}$$

$$\mathbf{B_{59}} = x_{39}\,\mathbf{a}_1 + y_{39}\,\mathbf{a}_2 + z_{39}\,\mathbf{a}_3 = (ax_{39} + cz_{39}\cos\beta)\,\hat{\mathbf{x}} + by_{39}\,\hat{\mathbf{y}} + cz_{39}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XV}$$

$$\mathbf{B_{60}} = -x_{39}\,\mathbf{a}_1 + y_{39}\,\mathbf{a}_2 - z_{39}\,\mathbf{a}_3 = -(ax_{39} + cz_{39}\cos\beta)\,\hat{\mathbf{x}} + by_{39}\,\hat{\mathbf{y}} - cz_{39}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XV}$$

$$\mathbf{B_{61}} = x_{40}\,\mathbf{a}_1 + y_{40}\,\mathbf{a}_2 + z_{40}\,\mathbf{a}_3 = (ax_{40} + cz_{40}\cos\beta)\,\hat{\mathbf{x}} + by_{40}\,\hat{\mathbf{y}} + cz_{40}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XVI}$$

$$\mathbf{B_{62}} = -x_{40}\,\mathbf{a}_1 + y_{40}\,\mathbf{a}_2 - z_{40}\,\mathbf{a}_3 = -(ax_{40} + cz_{40}\cos\beta)\,\hat{\mathbf{x}} + by_{40}\,\hat{\mathbf{y}} - cz_{40}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XVI}$$

$$\mathbf{B_{63}} = x_{41}\,\mathbf{a}_1 + y_{41}\,\mathbf{a}_2 + z_{41}\,\mathbf{a}_3 = (ax_{41} + cz_{41}\cos\beta)\,\hat{\mathbf{x}} + by_{41}\,\hat{\mathbf{y}} + cz_{41}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XVII}$$

$$\mathbf{B_{64}} = -x_{41}\,\mathbf{a}_1 + y_{41}\,\mathbf{a}_2 - z_{41}\,\mathbf{a}_3 = -(ax_{41} + cz_{41}\cos\beta)\,\hat{\mathbf{x}} + by_{41}\,\hat{\mathbf{y}} - cz_{41}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XVII}$$

$$\mathbf{B_{65}} = x_{42}\,\mathbf{a}_1 + y_{42}\,\mathbf{a}_2 + z_{42}\,\mathbf{a}_3 = (ax_{42} + cz_{42}\cos\beta)\,\hat{\mathbf{x}} + by_{42}\,\hat{\mathbf{y}} + cz_{42}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XVIII}$$

$$\mathbf{B_{66}} = -x_{42}\,\mathbf{a}_1 + y_{42}\,\mathbf{a}_2 - z_{42}\,\mathbf{a}_3 = -(ax_{42} + cz_{42}\cos\beta)\,\hat{\mathbf{x}} + by_{42}\,\hat{\mathbf{y}} - cz_{42}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XVIII}$$

$$\mathbf{B_{67}} = x_{43}\,\mathbf{a}_1 + y_{43}\,\mathbf{a}_2 + z_{43}\,\mathbf{a}_3 = (ax_{43} + cz_{43}\cos\beta)\,\hat{\mathbf{x}} + by_{43}\,\hat{\mathbf{y}} + cz_{43}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XIX}$$

$$\mathbf{B_{68}} = -x_{43}\,\mathbf{a}_1 + y_{43}\,\mathbf{a}_2 - z_{43}\,\mathbf{a}_3 = -(ax_{43} + cz_{43}\cos\beta)\,\hat{\mathbf{x}} + by_{43}\,\hat{\mathbf{y}} - cz_{43}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XIX}$$

$$\mathbf{B_{69}} = x_{44}\,\mathbf{a}_1 + y_{44}\,\mathbf{a}_2 + z_{44}\,\mathbf{a}_3 = (ax_{44} + cz_{44}\cos\beta)\,\hat{\mathbf{x}} + by_{44}\,\hat{\mathbf{y}} + cz_{44}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XX}$$

$$\mathbf{B_{70}} = -x_{44}\,\mathbf{a}_1 + y_{44}\,\mathbf{a}_2 - z_{44}\,\mathbf{a}_3 = -(ax_{44} + cz_{44}\cos\beta)\,\hat{\mathbf{x}} + by_{44}\,\hat{\mathbf{y}} - cz_{44}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XX}$$

$$\mathbf{B_{71}} = x_{45}\,\mathbf{a}_1 + y_{45}\,\mathbf{a}_2 + z_{45}\,\mathbf{a}_3 = (ax_{45} + cz_{45}\cos\beta)\,\hat{\mathbf{x}} + by_{45}\,\hat{\mathbf{y}} + cz_{45}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXI}$$

$$\mathbf{B_{72}} = -x_{45}\,\mathbf{a}_1 + y_{45}\,\mathbf{a}_2 - z_{45}\,\mathbf{a}_3 = -(ax_{45} + cz_{45}\cos\beta)\,\hat{\mathbf{x}} + by_{45}\,\hat{\mathbf{y}} - cz_{45}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXI}$$

$$\mathbf{B_{73}} = x_{46}\,\mathbf{a}_1 + y_{46}\,\mathbf{a}_2 + z_{46}\,\mathbf{a}_3 = (ax_{46} + cz_{46}\cos\beta)\,\hat{\mathbf{x}} + by_{46}\,\hat{\mathbf{y}} + cz_{46}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXII}$$

$$\mathbf{B_{74}} = -x_{46}\,\mathbf{a}_1 + y_{46}\,\mathbf{a}_2 - z_{46}\,\mathbf{a}_3 = -(ax_{46} + cz_{46}\cos\beta)\,\hat{\mathbf{x}} + by_{46}\,\hat{\mathbf{y}} - cz_{46}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXII}$$

$$\mathbf{B_{75}} = x_{47}\,\mathbf{a}_1 + y_{47}\,\mathbf{a}_2 + z_{47}\,\mathbf{a}_3 = (ax_{47} + cz_{47}\cos\beta)\,\hat{\mathbf{x}} + by_{47}\,\hat{\mathbf{y}} + cz_{47}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXIII}$$

$$\mathbf{B_{76}} = -x_{47}\,\mathbf{a}_1 + y_{47}\,\mathbf{a}_2 - z_{47}\,\mathbf{a}_3 = -(ax_{47} + cz_{47}\cos\beta)\,\hat{\mathbf{x}} + by_{47}\,\hat{\mathbf{y}} - cz_{47}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXIII}$$

$$\mathbf{B_{77}} = x_{48}\,\mathbf{a}_1 + y_{48}\,\mathbf{a}_2 + z_{48}\,\mathbf{a}_3 = (ax_{48} + cz_{48}\cos\beta)\,\hat{\mathbf{x}} + by_{48}\,\hat{\mathbf{y}} + cz_{48}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXIV}$$

$$\mathbf{B_{78}} = -x_{48}\,\mathbf{a}_1 + y_{48}\,\mathbf{a}_2 - z_{48}\,\mathbf{a}_3 = -(ax_{48} + cz_{48}\cos\beta)\,\hat{\mathbf{x}} + by_{48}\,\hat{\mathbf{y}} - cz_{48}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXIV}$$

$$\mathbf{B_{79}} = x_{49}\,\mathbf{a}_1 + y_{49}\,\mathbf{a}_2 + z_{49}\,\mathbf{a}_3 = (ax_{49} + cz_{49}\cos\beta)\,\hat{\mathbf{x}} + by_{49}\,\hat{\mathbf{y}} + cz_{49}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXV}$$

$$\mathbf{B_{80}} = -x_{49}\,\mathbf{a}_1 + y_{49}\,\mathbf{a}_2 - z_{49}\,\mathbf{a}_3 = -(ax_{49} + cz_{49}\cos\beta)\,\hat{\mathbf{x}} + by_{49}\,\hat{\mathbf{y}} - cz_{49}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXV}$$

$$\mathbf{B_{81}} = x_{50}\,\mathbf{a}_1 + y_{50}\,\mathbf{a}_2 + z_{50}\,\mathbf{a}_3 = (ax_{50} + cz_{50}\cos\beta)\,\hat{\mathbf{x}} + by_{50}\,\hat{\mathbf{y}} + cz_{50}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXVI}$$

$$\mathbf{B_{82}} = -x_{50}\,\mathbf{a}_1 + y_{50}\,\mathbf{a}_2 - z_{50}\,\mathbf{a}_3 = -(ax_{50} + cz_{50}\cos\beta)\,\hat{\mathbf{x}} + by_{50}\,\hat{\mathbf{y}} - cz_{50}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXVI}$$

$$\mathbf{B_{83}} = x_{51}\,\mathbf{a}_1 + y_{51}\,\mathbf{a}_2 + z_{51}\,\mathbf{a}_3 = (ax_{51} + cz_{51}\cos\beta)\,\hat{\mathbf{x}} + by_{51}\,\hat{\mathbf{y}} + cz_{51}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXVII}$$

$$\mathbf{B_{84}} = -x_{51}\,\mathbf{a}_1 + y_{51}\,\mathbf{a}_2 - z_{51}\,\mathbf{a}_3 = -(ax_{51} + cz_{51}\cos\beta)\,\hat{\mathbf{x}} + by_{51}\,\hat{\mathbf{y}} - cz_{51}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXVII}$$

$$\mathbf{B_{85}} = x_{52}\,\mathbf{a}_1 + y_{52}\,\mathbf{a}_2 + z_{52}\,\mathbf{a}_3 = (ax_{52} + cz_{52}\cos\beta)\,\hat{\mathbf{x}} + by_{52}\,\hat{\mathbf{y}} + cz_{52}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXVIII}$$

$$\mathbf{B_{86}} = -x_{52}\,\mathbf{a}_1 + y_{52}\,\mathbf{a}_2 - z_{52}\,\mathbf{a}_3 = -(ax_{52} + cz_{52}\cos\beta)\,\hat{\mathbf{x}} + by_{52}\,\hat{\mathbf{y}} - cz_{52}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXVIII}$$

$$\mathbf{B_{87}} = x_{53}\,\mathbf{a}_1 + y_{53}\,\mathbf{a}_2 + z_{53}\,\mathbf{a}_3 = (ax_{53} + cz_{53}\cos\beta)\,\hat{\mathbf{x}} + by_{53}\,\hat{\mathbf{y}} + cz_{53}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXIX}$$

$$\mathbf{B_{88}} = -x_{53}\,\mathbf{a}_1 + y_{53}\,\mathbf{a}_2 - z_{53}\,\mathbf{a}_3 = -(ax_{53} + cz_{53}\cos\beta)\,\hat{\mathbf{x}} + by_{53}\,\hat{\mathbf{y}} - cz_{53}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXIX}$$

$$\mathbf{B_{89}} = x_{54}\,\mathbf{a}_1 + y_{54}\,\mathbf{a}_2 + z_{54}\,\mathbf{a}_3 = (ax_{54} + cz_{54}\cos\beta)\,\hat{\mathbf{x}} + by_{54}\,\hat{\mathbf{y}} + cz_{54}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXX}$$

$$\mathbf{B_{90}} = -x_{54}\,\mathbf{a}_1 + y_{54}\,\mathbf{a}_2 - z_{54}\,\mathbf{a}_3 = -(ax_{54} + cz_{54}\cos\beta)\,\hat{\mathbf{x}} + by_{54}\,\hat{\mathbf{y}} - cz_{54}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXX}$$

$$\mathbf{B_{91}} = x_{55}\,\mathbf{a}_1 + y_{55}\,\mathbf{a}_2 + z_{55}\,\mathbf{a}_3 = (ax_{55} + cz_{55}\cos\beta)\,\hat{\mathbf{x}} + by_{55}\,\hat{\mathbf{y}} + cz_{55}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXI}$$

$$\mathbf{B_{92}} = -x_{55}\,\mathbf{a}_1 + y_{55}\,\mathbf{a}_2 - z_{55}\,\mathbf{a}_3 = -(ax_{55} + cz_{55}\cos\beta)\,\hat{\mathbf{x}} + by_{55}\,\hat{\mathbf{y}} - cz_{55}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXI}$$

$$\mathbf{B_{93}} = x_{56}\,\mathbf{a}_1 + y_{56}\,\mathbf{a}_2 + z_{56}\,\mathbf{a}_3 = (ax_{56} + cz_{56}\cos\beta)\,\hat{\mathbf{x}} + by_{56}\,\hat{\mathbf{y}} + cz_{56}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXII}$$

$$\mathbf{B_{94}} = -x_{56}\,\mathbf{a}_1 + y_{56}\,\mathbf{a}_2 - z_{56}\,\mathbf{a}_3 = -(ax_{56} + cz_{56}\cos\beta)\,\hat{\mathbf{x}} + by_{56}\,\hat{\mathbf{y}} - cz_{56}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXII}$$

$$\mathbf{B_{95}} = x_{57}\,\mathbf{a}_1 + y_{57}\,\mathbf{a}_2 + z_{57}\,\mathbf{a}_3 = (ax_{57} + cz_{57}\cos\beta)\,\hat{\mathbf{x}} + by_{57}\,\hat{\mathbf{y}} + cz_{57}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXIII}$$

$$\mathbf{B_{96}} = -x_{57}\,\mathbf{a}_1 + y_{57}\,\mathbf{a}_2 - z_{57}\,\mathbf{a}_3 = -(ax_{57} + cz_{57}\cos\beta)\,\hat{\mathbf{x}} + by_{57}\,\hat{\mathbf{y}} - cz_{57}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXIII}$$

$$\mathbf{B_{97}} = x_{58}\,\mathbf{a}_1 + y_{58}\,\mathbf{a}_2 + z_{58}\,\mathbf{a}_3 = (ax_{58} + cz_{58}\cos\beta)\,\hat{\mathbf{x}} + by_{58}\,\hat{\mathbf{y}} + cz_{58}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXIV}$$

$$\mathbf{B_{98}} = -x_{58}\,\mathbf{a}_1 + y_{58}\,\mathbf{a}_2 - z_{58}\,\mathbf{a}_3 = -(ax_{58} + cz_{58}\cos\beta)\,\hat{\mathbf{x}} + by_{58}\,\hat{\mathbf{y}} - cz_{58}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXIV}$$

$$\mathbf{B_{99}} = x_{59}\,\mathbf{a}_1 + y_{59}\,\mathbf{a}_2 + z_{59}\,\mathbf{a}_3 = (ax_{59} + cz_{59}\cos\beta)\,\hat{\mathbf{x}} + by_{59}\,\hat{\mathbf{y}} + cz_{59}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXV}$$

$$\mathbf{B_{100}} = -x_{59}\,\mathbf{a}_1 + y_{59}\,\mathbf{a}_2 - z_{59}\,\mathbf{a}_3 = -(ax_{59} + cz_{59}\cos\beta)\,\hat{\mathbf{x}} + by_{59}\,\hat{\mathbf{y}} - cz_{59}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXV}$$

$$\mathbf{B_{101}} = x_{60}\,\mathbf{a}_1 + y_{60}\,\mathbf{a}_2 + z_{60}\,\mathbf{a}_3 = (ax_{60} + cz_{60}\cos\beta)\,\hat{\mathbf{x}} + by_{60}\,\hat{\mathbf{y}} + cz_{60}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXVI}$$

$$\mathbf{B_{102}} = -x_{60}\,\mathbf{a}_1 + y_{60}\,\mathbf{a}_2 - z_{60}\,\mathbf{a}_3 = -(ax_{60} + cz_{60}\cos\beta)\,\hat{\mathbf{x}} + by_{60}\,\hat{\mathbf{y}} - cz_{60}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXVI}$$

$$\mathbf{B_{103}} = x_{61}\,\mathbf{a}_1 + y_{61}\,\mathbf{a}_2 + z_{61}\,\mathbf{a}_3 = (ax_{61} + cz_{61}\cos\beta)\,\hat{\mathbf{x}} + by_{61}\,\hat{\mathbf{y}} + cz_{61}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXVII}$$

$$\mathbf{B_{104}} = -x_{61}\,\mathbf{a}_1 + y_{61}\,\mathbf{a}_2 - z_{61}\,\mathbf{a}_3 = -(ax_{61} + cz_{61}\cos\beta)\,\hat{\mathbf{x}} + by_{61}\,\hat{\mathbf{y}} - cz_{61}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXVII}$$

$$\mathbf{B_{105}} = x_{62}\,\mathbf{a}_1 + y_{62}\,\mathbf{a}_2 + z_{62}\,\mathbf{a}_3 = (ax_{62} + cz_{62}\cos\beta)\,\hat{\mathbf{x}} + by_{62}\,\hat{\mathbf{y}} + cz_{62}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXVIII}$$

$$\mathbf{B_{106}} = -x_{62}\,\mathbf{a}_1 + y_{62}\,\mathbf{a}_2 - z_{62}\,\mathbf{a}_3 = -(ax_{62} + cz_{62}\cos\beta)\,\hat{\mathbf{x}} + by_{62}\,\hat{\mathbf{y}} - cz_{62}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXVIII}$$

$$\mathbf{B_{107}} = x_{63}\,\mathbf{a}_1 + y_{63}\,\mathbf{a}_2 + z_{63}\,\mathbf{a}_3 = (ax_{63} + cz_{63}\cos\beta)\,\hat{\mathbf{x}} + by_{63}\,\hat{\mathbf{y}} + cz_{63}\sin\beta\,\hat{\mathbf{z}} \quad (2e) \quad \text{O XXXIX}$$

$\mathbf{B_{108}} = -x_{63}\,\mathbf{a}_1 + y_{63}\,\mathbf{a}_2 - z_{63}\,\mathbf{a}_3 = -\left(ax_{63} + cz_{63}\cos\beta\right)\,\hat{\mathbf{x}} + by_{63}\,\hat{\mathbf{y}} - cz_{63}\sin\beta\,\hat{\mathbf{z}}$ (2e) O XXXIX

$\mathbf{B_{109}} = x_{64}\,\mathbf{a}_1 + y_{64}\,\mathbf{a}_2 + z_{64}\,\mathbf{a}_3 = \left(ax_{64} + cz_{64}\cos\beta\right)\,\hat{\mathbf{x}} + by_{64}\,\hat{\mathbf{y}} + cz_{64}\sin\beta\,\hat{\mathbf{z}}$ (2e) O XL

$\mathbf{B_{110}} = -x_{64}\,\mathbf{a}_1 + y_{64}\,\mathbf{a}_2 - z_{64}\,\mathbf{a}_3 = -\left(ax_{64} + cz_{64}\cos\beta\right)\,\hat{\mathbf{x}} + by_{64}\,\hat{\mathbf{y}} - cz_{64}\sin\beta\,\hat{\mathbf{z}}$ (2e) O XL

$\mathbf{B_{111}} = x_{65}\,\mathbf{a}_1 + y_{65}\,\mathbf{a}_2 + z_{65}\,\mathbf{a}_3 = \left(ax_{65} + cz_{65}\cos\beta\right)\,\hat{\mathbf{x}} + by_{65}\,\hat{\mathbf{y}} + cz_{65}\sin\beta\,\hat{\mathbf{z}}$ (2e) O XLI

$\mathbf{B_{112}} = -x_{65}\,\mathbf{a}_1 + y_{65}\,\mathbf{a}_2 - z_{65}\,\mathbf{a}_3 = -\left(ax_{65} + cz_{65}\cos\beta\right)\,\hat{\mathbf{x}} + by_{65}\,\hat{\mathbf{y}} - cz_{65}\sin\beta\,\hat{\mathbf{z}}$ (2e) O XLI

$\mathbf{B_{113}} = x_{66}\,\mathbf{a}_1 + y_{66}\,\mathbf{a}_2 + z_{66}\,\mathbf{a}_3 = \left(ax_{66} + cz_{66}\cos\beta\right)\,\hat{\mathbf{x}} + by_{66}\,\hat{\mathbf{y}} + cz_{66}\sin\beta\,\hat{\mathbf{z}}$ (2e) O XLII

$\mathbf{B_{114}} = -x_{66}\,\mathbf{a}_1 + y_{66}\,\mathbf{a}_2 - z_{66}\,\mathbf{a}_3 = -\left(ax_{66} + cz_{66}\cos\beta\right)\,\hat{\mathbf{x}} + by_{66}\,\hat{\mathbf{y}} - cz_{66}\sin\beta\,\hat{\mathbf{z}}$ (2e) O XLII

$\mathbf{B_{115}} = x_{67}\,\mathbf{a}_1 + y_{67}\,\mathbf{a}_2 + z_{67}\,\mathbf{a}_3 = \left(ax_{67} + cz_{67}\cos\beta\right)\,\hat{\mathbf{x}} + by_{67}\,\hat{\mathbf{y}} + cz_{67}\sin\beta\,\hat{\mathbf{z}}$ (2e) P I

$\mathbf{B_{116}} = -x_{67}\,\mathbf{a}_1 + y_{67}\,\mathbf{a}_2 - z_{67}\,\mathbf{a}_3 = -\left(ax_{67} + cz_{67}\cos\beta\right)\,\hat{\mathbf{x}} + by_{67}\,\hat{\mathbf{y}} - cz_{67}\sin\beta\,\hat{\mathbf{z}}$ (2e) P I

$\mathbf{B_{117}} = x_{68}\,\mathbf{a}_1 + y_{68}\,\mathbf{a}_2 + z_{68}\,\mathbf{a}_3 = \left(ax_{68} + cz_{68}\cos\beta\right)\,\hat{\mathbf{x}} + by_{68}\,\hat{\mathbf{y}} + cz_{68}\sin\beta\,\hat{\mathbf{z}}$ (2e) P II

$\mathbf{B_{118}} = -x_{68}\,\mathbf{a}_1 + y_{68}\,\mathbf{a}_2 - z_{68}\,\mathbf{a}_3 = -\left(ax_{68} + cz_{68}\cos\beta\right)\,\hat{\mathbf{x}} + by_{68}\,\hat{\mathbf{y}} - cz_{68}\sin\beta\,\hat{\mathbf{z}}$ (2e) P II

$\mathbf{B_{119}} = x_{69}\,\mathbf{a}_1 + y_{69}\,\mathbf{a}_2 + z_{69}\,\mathbf{a}_3 = \left(ax_{69} + cz_{69}\cos\beta\right)\,\hat{\mathbf{x}} + by_{69}\,\hat{\mathbf{y}} + cz_{69}\sin\beta\,\hat{\mathbf{z}}$ (2e) P III

$\mathbf{B_{120}} = -x_{69}\,\mathbf{a}_1 + y_{69}\,\mathbf{a}_2 - z_{69}\,\mathbf{a}_3 = -\left(ax_{69} + cz_{69}\cos\beta\right)\,\hat{\mathbf{x}} + by_{69}\,\hat{\mathbf{y}} - cz_{69}\sin\beta\,\hat{\mathbf{z}}$ (2e) P III

$\mathbf{B_{121}} = x_{70}\,\mathbf{a}_1 + y_{70}\,\mathbf{a}_2 + z_{70}\,\mathbf{a}_3 = \left(ax_{70} + cz_{70}\cos\beta\right)\,\hat{\mathbf{x}} + by_{70}\,\hat{\mathbf{y}} + cz_{70}\sin\beta\,\hat{\mathbf{z}}$ (2e) P IV

$\mathbf{B_{122}} = -x_{70}\,\mathbf{a}_1 + y_{70}\,\mathbf{a}_2 - z_{70}\,\mathbf{a}_3 = -\left(ax_{70} + cz_{70}\cos\beta\right)\,\hat{\mathbf{x}} + by_{70}\,\hat{\mathbf{y}} - cz_{70}\sin\beta\,\hat{\mathbf{z}}$ (2e) P IV

$\mathbf{B_{123}} = x_{71}\,\mathbf{a}_1 + y_{71}\,\mathbf{a}_2 + z_{71}\,\mathbf{a}_3 = \left(ax_{71} + cz_{71}\cos\beta\right)\,\hat{\mathbf{x}} + by_{71}\,\hat{\mathbf{y}} + cz_{71}\sin\beta\,\hat{\mathbf{z}}$ (2e) P V

$\mathbf{B_{124}} = -x_{71}\,\mathbf{a}_1 + y_{71}\,\mathbf{a}_2 - z_{71}\,\mathbf{a}_3 = -\left(ax_{71} + cz_{71}\cos\beta\right)\,\hat{\mathbf{x}} + by_{71}\,\hat{\mathbf{y}} - cz_{71}\sin\beta\,\hat{\mathbf{z}}$ (2e) P V

$\mathbf{B_{125}} = x_{72}\,\mathbf{a}_1 + y_{72}\,\mathbf{a}_2 + z_{72}\,\mathbf{a}_3 = \left(ax_{72} + cz_{72}\cos\beta\right)\,\hat{\mathbf{x}} + by_{72}\,\hat{\mathbf{y}} + cz_{72}\sin\beta\,\hat{\mathbf{z}}$ (2e) P VI

$\mathbf{B_{126}} = -x_{72}\,\mathbf{a}_1 + y_{72}\,\mathbf{a}_2 - z_{72}\,\mathbf{a}_3 = -\left(ax_{72} + cz_{72}\cos\beta\right)\,\hat{\mathbf{x}} + by_{72}\,\hat{\mathbf{y}} - cz_{72}\sin\beta\,\hat{\mathbf{z}}$ (2e) P VI

$\mathbf{B_{127}} = x_{73}\,\mathbf{a}_1 + y_{73}\,\mathbf{a}_2 + z_{73}\,\mathbf{a}_3 = \left(ax_{73} + cz_{73}\cos\beta\right)\,\hat{\mathbf{x}} + by_{73}\,\hat{\mathbf{y}} + cz_{73}\sin\beta\,\hat{\mathbf{z}}$ (2e) Pb VII

$\mathbf{B_{128}} = -x_{73}\,\mathbf{a}_1 + y_{73}\,\mathbf{a}_2 - z_{73}\,\mathbf{a}_3 = -\left(ax_{73} + cz_{73}\cos\beta\right)\,\hat{\mathbf{x}} + by_{73}\,\hat{\mathbf{y}} - cz_{73}\sin\beta\,\hat{\mathbf{z}}$ (2e) Pb VII

$\mathbf{B_{129}} = x_{74}\,\mathbf{a}_1 + y_{74}\,\mathbf{a}_2 + z_{74}\,\mathbf{a}_3 = \left(ax_{74} + cz_{74}\cos\beta\right)\,\hat{\mathbf{x}} + by_{74}\,\hat{\mathbf{y}} + cz_{74}\sin\beta\,\hat{\mathbf{z}}$ (2e) Pb VIII

$\mathbf{B_{130}} = -x_{74}\,\mathbf{a}_1 + y_{74}\,\mathbf{a}_2 - z_{74}\,\mathbf{a}_3 = -\left(ax_{74} + cz_{74}\cos\beta\right)\,\hat{\mathbf{x}} + by_{74}\,\hat{\mathbf{y}} - cz_{74}\sin\beta\,\hat{\mathbf{z}}$ (2e) Pb VIII

$\mathbf{B_{131}} = x_{75}\,\mathbf{a}_1 + y_{75}\,\mathbf{a}_2 + z_{75}\,\mathbf{a}_3 = \left(ax_{75} + cz_{75}\cos\beta\right)\,\hat{\mathbf{x}} + by_{75}\,\hat{\mathbf{y}} + cz_{75}\sin\beta\,\hat{\mathbf{z}}$ (2e) Pb IX

$\mathbf{B_{132}} = -x_{75}\,\mathbf{a}_1 + y_{75}\,\mathbf{a}_2 - z_{75}\,\mathbf{a}_3 = -\left(ax_{75} + cz_{75}\cos\beta\right)\,\hat{\mathbf{x}} + by_{75}\,\hat{\mathbf{y}} - cz_{75}\sin\beta\,\hat{\mathbf{z}}$ (2e) Pb IX

$\mathbf{B_{133}} = x_{76}\,\mathbf{a}_1 + y_{76}\,\mathbf{a}_2 + z_{76}\,\mathbf{a}_3 = \left(ax_{76} + cz_{76}\cos\beta\right)\,\hat{\mathbf{x}} + by_{76}\,\hat{\mathbf{y}} + cz_{76}\sin\beta\,\hat{\mathbf{z}}$ (2e) Pb X

$\mathbf{B_{134}} = -x_{76}\,\mathbf{a}_1 + y_{76}\,\mathbf{a}_2 - z_{76}\,\mathbf{a}_3 = -\left(ax_{76} + cz_{76}\cos\beta\right)\,\hat{\mathbf{x}} + by_{76}\,\hat{\mathbf{y}} - cz_{76}\sin\beta\,\hat{\mathbf{z}}$ (2e) Pb X

$\mathbf{B_{135}} = x_{77}\,\mathbf{a}_1 + y_{77}\,\mathbf{a}_2 + z_{77}\,\mathbf{a}_3 = \left(ax_{77} + cz_{77}\cos\beta\right)\,\hat{\mathbf{x}} + by_{77}\,\hat{\mathbf{y}} + cz_{77}\sin\beta\,\hat{\mathbf{z}}$ (2e) Pb XI

$\mathbf{B_{136}} = -x_{77}\,\mathbf{a}_1 + y_{77}\,\mathbf{a}_2 - z_{77}\,\mathbf{a}_3 = -\left(ax_{77} + cz_{77}\cos\beta\right)\,\hat{\mathbf{x}} + by_{77}\,\hat{\mathbf{y}} - cz_{77}\sin\beta\,\hat{\mathbf{z}}$ (2e) Pb XI

$\mathbf{B_{137}} = x_{78}\,\mathbf{a}_1 + y_{78}\,\mathbf{a}_2 + z_{78}\,\mathbf{a}_3 = \left(ax_{78} + cz_{78}\cos\beta\right)\,\hat{\mathbf{x}} + by_{78}\,\hat{\mathbf{y}} + cz_{78}\sin\beta\,\hat{\mathbf{z}}$ (2e) Pb XII

$$\mathbf{B_{138}} = -x_{78}\,\mathbf{a}_1 + y_{78}\,\mathbf{a}_2 - z_{78}\,\mathbf{a}_3 = -\left(ax_{78} + cz_{78}\cos\beta\right)\,\hat{\mathbf{x}} + by_{78}\,\hat{\mathbf{y}} - cz_{78}\sin\beta\,\hat{\mathbf{z}} \quad \text{(2e)} \quad \text{Pb XII}$$

References

[1] J. W. Krizan, C. de la Cruz, N. H. Andersen, and R. J. Cava, *Crystal structure and magnetic properties of the $Ba_3TeCo_3P_2O_{14}$, $Pb_3TeCo_3P_2O_{14}$, and $Pb_3TeCo_3V_2O_{14}$ langasites*, Journal of Solid State Chemistry **203**, 310–320 (2013), doi:10.1016/j.jssc.2013.04.035.