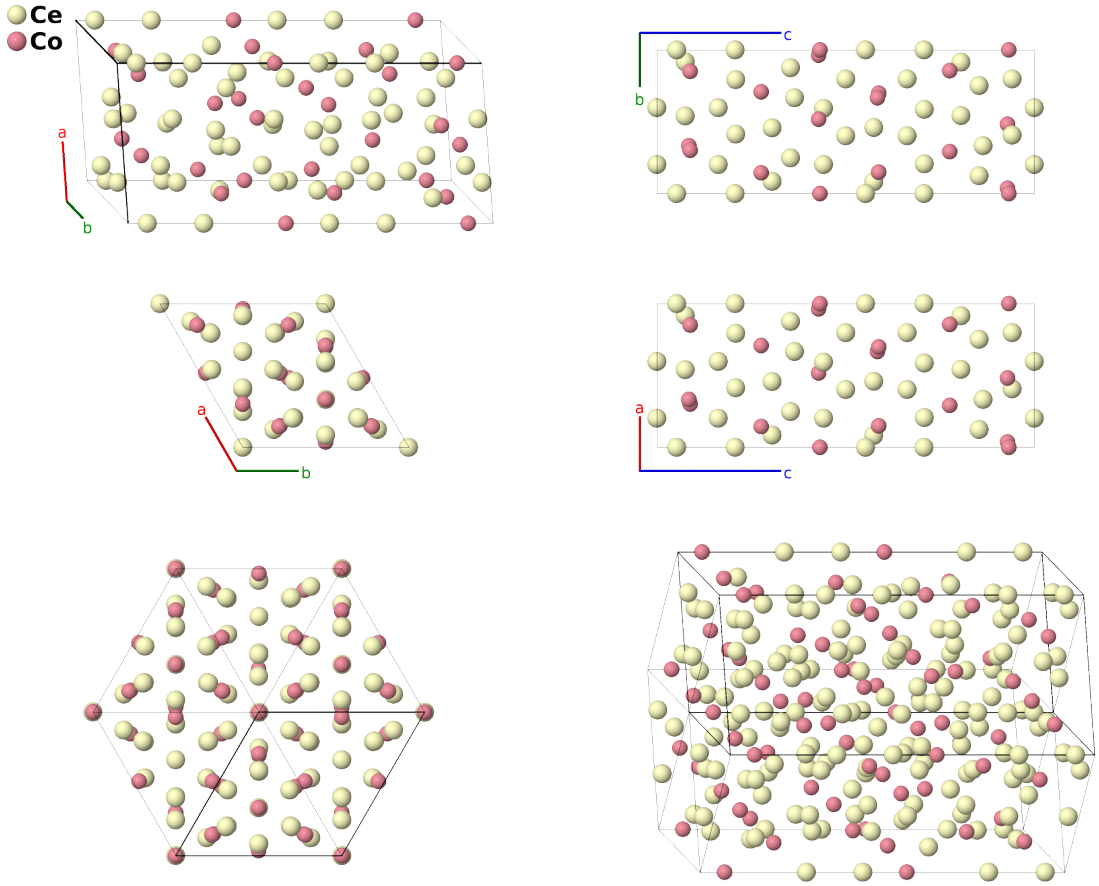
$Ce_{24}Co_{11}$ Structure: A24B11_hP70_186_2ab7c_ab3c-001

Cite this page as: H. Eckert, S. Divilov, A. Zettel, M. J. Mehl, D. Hicks, and S. Curtarolo, *The AFLOW Library of Crystallographic Prototypes: Part 4*. In preparation.

https://aflow.org/p/D6S6

https://aflow.org/p/A24B11_hP70_186_2ab7c_ab3c-001



Prototype	$Ce_{24}Co_{11}$
AFLOW prototype label	A24B11_hP70_186_2ab7c_ab3c-001
ICSD	102101
Pearson symbol	hP70
Space group number	186
Space group symbol	$P6_3mc$
AFLOW prototype command	`aflow --proto=A24B11_hP70_186_2ab7c_ab3c-001 --params=`$a, c/a, z_1, z_2, z_3, z_4, z_5, x_6, z_6, x_7, z_7, x_8, z_8, x_9, z_9, x_{10}, z_{10}, x_{11}, z_{11}, x_{12}, z_{12}, x_{13}, z_{13}, x_{14}, z_{14}, x_{15}, z_{15}$

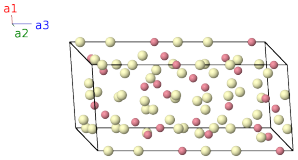
Other compounds with this structure

$La_{24}Ru_{11}$, $Nd_{24}Co_{11}$

- Space group $P6_3mc$ #186 allows an arbitrary placement of the origin of the z-axis. Here we set $z_6 = 0$.

Hexagonal primitive vectors

$$\begin{aligned}
\mathbf{a_1} &= \tfrac{1}{2}a\,\hat{\mathbf{x}} - \tfrac{\sqrt{3}}{2}a\,\hat{\mathbf{y}} \\
\mathbf{a_2} &= \tfrac{1}{2}a\,\hat{\mathbf{x}} + \tfrac{\sqrt{3}}{2}a\,\hat{\mathbf{y}} \\
\mathbf{a_3} &= c\,\hat{\mathbf{z}}
\end{aligned}$$



Basis vectors

		Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B_1}$	=	$z_1\,\mathbf{a}_3$	=	$cz_1\,\hat{\mathbf{z}}$	(2a)	Ce I
$\mathbf{B_2}$	=	$\left(z_1+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$c\left(z_1+\frac{1}{2}\right)\,\hat{\mathbf{z}}$	(2a)	Ce I
$\mathbf{B_3}$	=	$z_2\,\mathbf{a}_3$	=	$cz_2\,\hat{\mathbf{z}}$	(2a)	Ce II
$\mathbf{B_4}$	=	$\left(z_2+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$c\left(z_2+\frac{1}{2}\right)\,\hat{\mathbf{z}}$	(2a)	Ce II
$\mathbf{B_5}$	=	$z_3\,\mathbf{a}_3$	=	$cz_3\,\hat{\mathbf{z}}$	(2a)	Co I
$\mathbf{B_6}$	=	$\left(z_3+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$c\left(z_3+\frac{1}{2}\right)\,\hat{\mathbf{z}}$	(2a)	Co I
$\mathbf{B_7}$	=	$\frac{1}{3}\,\mathbf{a}_1+\frac{2}{3}\,\mathbf{a}_2+z_4\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}}+\frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}}+cz_4\,\hat{\mathbf{z}}$	(2b)	Ce III
$\mathbf{B_8}$	=	$\frac{2}{3}\,\mathbf{a}_1+\frac{1}{3}\,\mathbf{a}_2+\left(z_4+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}}-\frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}}+c\left(z_4+\frac{1}{2}\right)\,\hat{\mathbf{z}}$	(2b)	Ce III
$\mathbf{B_9}$	=	$\frac{1}{3}\,\mathbf{a}_1+\frac{2}{3}\,\mathbf{a}_2+z_5\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}}+\frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}}+cz_5\,\hat{\mathbf{z}}$	(2b)	Co II
$\mathbf{B_{10}}$	=	$\frac{2}{3}\,\mathbf{a}_1+\frac{1}{3}\,\mathbf{a}_2+\left(z_5+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}}-\frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}}+c\left(z_5+\frac{1}{2}\right)\,\hat{\mathbf{z}}$	(2b)	Co II
$\mathbf{B_{11}}$	=	$x_6\,\mathbf{a}_1-x_6\,\mathbf{a}_2+z_6\,\mathbf{a}_3$	=	$-\sqrt{3}ax_6\,\hat{\mathbf{y}}+cz_6\,\hat{\mathbf{z}}$	(6c)	Ce IV
$\mathbf{B_{12}}$	=	$x_6\,\mathbf{a}_1+2x_6\,\mathbf{a}_2+z_6\,\mathbf{a}_3$	=	$\frac{3}{2}ax_6\,\hat{\mathbf{x}}+\frac{\sqrt{3}}{2}ax_6\,\hat{\mathbf{y}}+cz_6\,\hat{\mathbf{z}}$	(6c)	Ce IV
$\mathbf{B_{13}}$	=	$-2x_6\,\mathbf{a}_1-x_6\,\mathbf{a}_2+z_6\,\mathbf{a}_3$	=	$-\frac{3}{2}ax_6\,\hat{\mathbf{x}}+\frac{\sqrt{3}}{2}ax_6\,\hat{\mathbf{y}}+cz_6\,\hat{\mathbf{z}}$	(6c)	Ce IV
$\mathbf{B_{14}}$	=	$-x_6\,\mathbf{a}_1+x_6\,\mathbf{a}_2+\left(z_6+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$\sqrt{3}ax_6\,\hat{\mathbf{y}}+c\left(z_6+\frac{1}{2}\right)\,\hat{\mathbf{z}}$	(6c)	Ce IV
$\mathbf{B_{15}}$	=	$-x_6\,\mathbf{a}_1-2x_6\,\mathbf{a}_2+\left(z_6+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\frac{3}{2}ax_6\,\hat{\mathbf{x}}-\frac{\sqrt{3}}{2}ax_6\,\hat{\mathbf{y}}+c\left(z_6+\frac{1}{2}\right)\,\hat{\mathbf{z}}$	(6c)	Ce IV
$\mathbf{B_{16}}$	=	$2x_6\,\mathbf{a}_1+x_6\,\mathbf{a}_2+\left(z_6+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$\frac{3}{2}ax_6\,\hat{\mathbf{x}}-\frac{\sqrt{3}}{2}ax_6\,\hat{\mathbf{y}}+c\left(z_6+\frac{1}{2}\right)\,\hat{\mathbf{z}}$	(6c)	Ce IV
$\mathbf{B_{17}}$	=	$x_7\,\mathbf{a}_1-x_7\,\mathbf{a}_2+z_7\,\mathbf{a}_3$	=	$-\sqrt{3}ax_7\,\hat{\mathbf{y}}+cz_7\,\hat{\mathbf{z}}$	(6c)	Ce V
$\mathbf{B_{18}}$	=	$x_7\,\mathbf{a}_1+2x_7\,\mathbf{a}_2+z_7\,\mathbf{a}_3$	=	$\frac{3}{2}ax_7\,\hat{\mathbf{x}}+\frac{\sqrt{3}}{2}ax_7\,\hat{\mathbf{y}}+cz_7\,\hat{\mathbf{z}}$	(6c)	Ce V
$\mathbf{B_{19}}$	=	$-2x_7\,\mathbf{a}_1-x_7\,\mathbf{a}_2+z_7\,\mathbf{a}_3$	=	$-\frac{3}{2}ax_7\,\hat{\mathbf{x}}+\frac{\sqrt{3}}{2}ax_7\,\hat{\mathbf{y}}+cz_7\,\hat{\mathbf{z}}$	(6c)	Ce V
$\mathbf{B_{20}}$	=	$-x_7\,\mathbf{a}_1+x_7\,\mathbf{a}_2+\left(z_7+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$\sqrt{3}ax_7\,\hat{\mathbf{y}}+c\left(z_7+\frac{1}{2}\right)\,\hat{\mathbf{z}}$	(6c)	Ce V
$\mathbf{B_{21}}$	=	$-x_7\,\mathbf{a}_1-2x_7\,\mathbf{a}_2+\left(z_7+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\frac{3}{2}ax_7\,\hat{\mathbf{x}}-\frac{\sqrt{3}}{2}ax_7\,\hat{\mathbf{y}}+c\left(z_7+\frac{1}{2}\right)\,\hat{\mathbf{z}}$	(6c)	Ce V
$\mathbf{B_{22}}$	=	$2x_7\,\mathbf{a}_1+x_7\,\mathbf{a}_2+\left(z_7+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$\frac{3}{2}ax_7\,\hat{\mathbf{x}}-\frac{\sqrt{3}}{2}ax_7\,\hat{\mathbf{y}}+c\left(z_7+\frac{1}{2}\right)\,\hat{\mathbf{z}}$	(6c)	Ce V
$\mathbf{B_{23}}$	=	$x_8\,\mathbf{a}_1-x_8\,\mathbf{a}_2+z_8\,\mathbf{a}_3$	=	$-\sqrt{3}ax_8\,\hat{\mathbf{y}}+cz_8\,\hat{\mathbf{z}}$	(6c)	Ce VI
$\mathbf{B_{24}}$	=	$x_8\,\mathbf{a}_1+2x_8\,\mathbf{a}_2+z_8\,\mathbf{a}_3$	=	$\frac{3}{2}ax_8\,\hat{\mathbf{x}}+\frac{\sqrt{3}}{2}ax_8\,\hat{\mathbf{y}}+cz_8\,\hat{\mathbf{z}}$	(6c)	Ce VI
$\mathbf{B_{25}}$	=	$-2x_8\,\mathbf{a}_1-x_8\,\mathbf{a}_2+z_8\,\mathbf{a}_3$	=	$-\frac{3}{2}ax_8\,\hat{\mathbf{x}}+\frac{\sqrt{3}}{2}ax_8\,\hat{\mathbf{y}}+cz_8\,\hat{\mathbf{z}}$	(6c)	Ce VI
$\mathbf{B_{26}}$	=	$-x_8\,\mathbf{a}_1+x_8\,\mathbf{a}_2+\left(z_8+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$\sqrt{3}ax_8\,\hat{\mathbf{y}}+c\left(z_8+\frac{1}{2}\right)\,\hat{\mathbf{z}}$	(6c)	Ce VI
$\mathbf{B_{27}}$	=	$-x_8\,\mathbf{a}_1-2x_8\,\mathbf{a}_2+\left(z_8+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$-\frac{3}{2}ax_8\,\hat{\mathbf{x}}-\frac{\sqrt{3}}{2}ax_8\,\hat{\mathbf{y}}+c\left(z_8+\frac{1}{2}\right)\,\hat{\mathbf{z}}$	(6c)	Ce VI
$\mathbf{B_{28}}$	=	$2x_8\,\mathbf{a}_1+x_8\,\mathbf{a}_2+\left(z_8+\frac{1}{2}\right)\,\mathbf{a}_3$	=	$\frac{3}{2}ax_8\,\hat{\mathbf{x}}-\frac{\sqrt{3}}{2}ax_8\,\hat{\mathbf{y}}+c\left(z_8+\frac{1}{2}\right)\,\hat{\mathbf{z}}$	(6c)	Ce VI
$\mathbf{B_{29}}$	=	$x_9\,\mathbf{a}_1-x_9\,\mathbf{a}_2+z_9\,\mathbf{a}_3$	=	$-\sqrt{3}ax_9\,\hat{\mathbf{y}}+cz_9\,\hat{\mathbf{z}}$	(6c)	Ce VII
$\mathbf{B_{30}}$	=	$x_9\,\mathbf{a}_1+2x_9\,\mathbf{a}_2+z_9\,\mathbf{a}_3$	=	$\frac{3}{2}ax_9\,\hat{\mathbf{x}}+\frac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}}+cz_9\,\hat{\mathbf{z}}$	(6c)	Ce VII

$$
\begin{array}{lcccccc}
\mathbf{B_{31}} & = & -2x_9\,\mathbf{a}_1 - x_9\,\mathbf{a}_2 + z_9\,\mathbf{a}_3 & = & -\frac{3}{2}ax_9\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} + cz_9\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce VII} \\
\mathbf{B_{32}} & = & -x_9\,\mathbf{a}_1 + x_9\,\mathbf{a}_2 + \left(z_9+\frac{1}{2}\right)\,\mathbf{a}_3 & = & \sqrt{3}ax_9\,\hat{\mathbf{y}} + c\left(z_9+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce VII} \\
\mathbf{B_{33}} & = & -x_9\,\mathbf{a}_1 - 2x_9\,\mathbf{a}_2 + \left(z_9+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -\frac{3}{2}ax_9\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} + c\left(z_9+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce VII} \\
\mathbf{B_{34}} & = & 2x_9\,\mathbf{a}_1 + x_9\,\mathbf{a}_2 + \left(z_9+\frac{1}{2}\right)\,\mathbf{a}_3 & = & \frac{3}{2}ax_9\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} + c\left(z_9+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce VII} \\
\mathbf{B_{35}} & = & x_{10}\,\mathbf{a}_1 - x_{10}\,\mathbf{a}_2 + z_{10}\,\mathbf{a}_3 & = & -\sqrt{3}ax_{10}\,\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce VIII} \\
\mathbf{B_{36}} & = & x_{10}\,\mathbf{a}_1 + 2x_{10}\,\mathbf{a}_2 + z_{10}\,\mathbf{a}_3 & = & \frac{3}{2}ax_{10}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce VIII} \\
\mathbf{B_{37}} & = & -2x_{10}\,\mathbf{a}_1 - x_{10}\,\mathbf{a}_2 + z_{10}\,\mathbf{a}_3 & = & -\frac{3}{2}ax_{10}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce VIII} \\
\mathbf{B_{38}} & = & -x_{10}\,\mathbf{a}_1 + x_{10}\,\mathbf{a}_2 + \left(z_{10}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & \sqrt{3}ax_{10}\,\hat{\mathbf{y}} + c\left(z_{10}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce VIII} \\
\mathbf{B_{39}} & = & -x_{10}\,\mathbf{a}_1 - 2x_{10}\,\mathbf{a}_2 + \left(z_{10}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -\frac{3}{2}ax_{10}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} + c\left(z_{10}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce VIII} \\
\mathbf{B_{40}} & = & 2x_{10}\,\mathbf{a}_1 + x_{10}\,\mathbf{a}_2 + \left(z_{10}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & \frac{3}{2}ax_{10}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} + c\left(z_{10}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce VIII} \\
\mathbf{B_{41}} & = & x_{11}\,\mathbf{a}_1 - x_{11}\,\mathbf{a}_2 + z_{11}\,\mathbf{a}_3 & = & -\sqrt{3}ax_{11}\,\hat{\mathbf{y}} + cz_{11}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce IX} \\
\mathbf{B_{42}} & = & x_{11}\,\mathbf{a}_1 + 2x_{11}\,\mathbf{a}_2 + z_{11}\,\mathbf{a}_3 & = & \frac{3}{2}ax_{11}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} + cz_{11}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce IX} \\
\mathbf{B_{43}} & = & -2x_{11}\,\mathbf{a}_1 - x_{11}\,\mathbf{a}_2 + z_{11}\,\mathbf{a}_3 & = & -\frac{3}{2}ax_{11}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} + cz_{11}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce IX} \\
\mathbf{B_{44}} & = & -x_{11}\,\mathbf{a}_1 + x_{11}\,\mathbf{a}_2 + \left(z_{11}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & \sqrt{3}ax_{11}\,\hat{\mathbf{y}} + c\left(z_{11}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce IX} \\
\mathbf{B_{45}} & = & -x_{11}\,\mathbf{a}_1 - 2x_{11}\,\mathbf{a}_2 + \left(z_{11}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -\frac{3}{2}ax_{11}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} + c\left(z_{11}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce IX} \\
\mathbf{B_{46}} & = & 2x_{11}\,\mathbf{a}_1 + x_{11}\,\mathbf{a}_2 + \left(z_{11}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & \frac{3}{2}ax_{11}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} + c\left(z_{11}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce IX} \\
\mathbf{B_{47}} & = & x_{12}\,\mathbf{a}_1 - x_{12}\,\mathbf{a}_2 + z_{12}\,\mathbf{a}_3 & = & -\sqrt{3}ax_{12}\,\hat{\mathbf{y}} + cz_{12}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce X} \\
\mathbf{B_{48}} & = & x_{12}\,\mathbf{a}_1 + 2x_{12}\,\mathbf{a}_2 + z_{12}\,\mathbf{a}_3 & = & \frac{3}{2}ax_{12}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{12}\,\hat{\mathbf{y}} + cz_{12}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce X} \\
\mathbf{B_{49}} & = & -2x_{12}\,\mathbf{a}_1 - x_{12}\,\mathbf{a}_2 + z_{12}\,\mathbf{a}_3 & = & -\frac{3}{2}ax_{12}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{12}\,\hat{\mathbf{y}} + cz_{12}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce X} \\
\mathbf{B_{50}} & = & -x_{12}\,\mathbf{a}_1 + x_{12}\,\mathbf{a}_2 + \left(z_{12}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & \sqrt{3}ax_{12}\,\hat{\mathbf{y}} + c\left(z_{12}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce X} \\
\mathbf{B_{51}} & = & -x_{12}\,\mathbf{a}_1 - 2x_{12}\,\mathbf{a}_2 + \left(z_{12}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -\frac{3}{2}ax_{12}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{12}\,\hat{\mathbf{y}} + c\left(z_{12}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce X} \\
\mathbf{B_{52}} & = & 2x_{12}\,\mathbf{a}_1 + x_{12}\,\mathbf{a}_2 + \left(z_{12}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & \frac{3}{2}ax_{12}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{12}\,\hat{\mathbf{y}} + c\left(z_{12}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Ce X} \\
\mathbf{B_{53}} & = & x_{13}\,\mathbf{a}_1 - x_{13}\,\mathbf{a}_2 + z_{13}\,\mathbf{a}_3 & = & -\sqrt{3}ax_{13}\,\hat{\mathbf{y}} + cz_{13}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co III} \\
\mathbf{B_{54}} & = & x_{13}\,\mathbf{a}_1 + 2x_{13}\,\mathbf{a}_2 + z_{13}\,\mathbf{a}_3 & = & \frac{3}{2}ax_{13}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{13}\,\hat{\mathbf{y}} + cz_{13}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co III} \\
\mathbf{B_{55}} & = & -2x_{13}\,\mathbf{a}_1 - x_{13}\,\mathbf{a}_2 + z_{13}\,\mathbf{a}_3 & = & -\frac{3}{2}ax_{13}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{13}\,\hat{\mathbf{y}} + cz_{13}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co III} \\
\mathbf{B_{56}} & = & -x_{13}\,\mathbf{a}_1 + x_{13}\,\mathbf{a}_2 + \left(z_{13}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & \sqrt{3}ax_{13}\,\hat{\mathbf{y}} + c\left(z_{13}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co III} \\
\mathbf{B_{57}} & = & -x_{13}\,\mathbf{a}_1 - 2x_{13}\,\mathbf{a}_2 + \left(z_{13}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -\frac{3}{2}ax_{13}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{13}\,\hat{\mathbf{y}} + c\left(z_{13}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co III} \\
\mathbf{B_{58}} & = & 2x_{13}\,\mathbf{a}_1 + x_{13}\,\mathbf{a}_2 + \left(z_{13}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & \frac{3}{2}ax_{13}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{13}\,\hat{\mathbf{y}} + c\left(z_{13}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co III} \\
\mathbf{B_{59}} & = & x_{14}\,\mathbf{a}_1 - x_{14}\,\mathbf{a}_2 + z_{14}\,\mathbf{a}_3 & = & -\sqrt{3}ax_{14}\,\hat{\mathbf{y}} + cz_{14}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co IV} \\
\mathbf{B_{60}} & = & x_{14}\,\mathbf{a}_1 + 2x_{14}\,\mathbf{a}_2 + z_{14}\,\mathbf{a}_3 & = & \frac{3}{2}ax_{14}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{14}\,\hat{\mathbf{y}} + cz_{14}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co IV} \\
\mathbf{B_{61}} & = & -2x_{14}\,\mathbf{a}_1 - x_{14}\,\mathbf{a}_2 + z_{14}\,\mathbf{a}_3 & = & -\frac{3}{2}ax_{14}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{14}\,\hat{\mathbf{y}} + cz_{14}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co IV} \\
\mathbf{B_{62}} & = & -x_{14}\,\mathbf{a}_1 + x_{14}\,\mathbf{a}_2 + \left(z_{14}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & \sqrt{3}ax_{14}\,\hat{\mathbf{y}} + c\left(z_{14}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co IV} \\
\mathbf{B_{63}} & = & -x_{14}\,\mathbf{a}_1 - 2x_{14}\,\mathbf{a}_2 + \left(z_{14}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -\frac{3}{2}ax_{14}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{14}\,\hat{\mathbf{y}} + c\left(z_{14}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co IV} \\
\mathbf{B_{64}} & = & 2x_{14}\,\mathbf{a}_1 + x_{14}\,\mathbf{a}_2 + \left(z_{14}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & \frac{3}{2}ax_{14}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{14}\,\hat{\mathbf{y}} + c\left(z_{14}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co IV} \\
\mathbf{B_{65}} & = & x_{15}\,\mathbf{a}_1 - x_{15}\,\mathbf{a}_2 + z_{15}\,\mathbf{a}_3 & = & -\sqrt{3}ax_{15}\,\hat{\mathbf{y}} + cz_{15}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co V} \\
\mathbf{B_{66}} & = & x_{15}\,\mathbf{a}_1 + 2x_{15}\,\mathbf{a}_2 + z_{15}\,\mathbf{a}_3 & = & \frac{3}{2}ax_{15}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{15}\,\hat{\mathbf{y}} + cz_{15}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co V} \\
\mathbf{B_{67}} & = & -2x_{15}\,\mathbf{a}_1 - x_{15}\,\mathbf{a}_2 + z_{15}\,\mathbf{a}_3 & = & -\frac{3}{2}ax_{15}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{15}\,\hat{\mathbf{y}} + cz_{15}\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co V} \\
\mathbf{B_{68}} & = & -x_{15}\,\mathbf{a}_1 + x_{15}\,\mathbf{a}_2 + \left(z_{15}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & \sqrt{3}ax_{15}\,\hat{\mathbf{y}} + c\left(z_{15}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co V} \\
\mathbf{B_{69}} & = & -x_{15}\,\mathbf{a}_1 - 2x_{15}\,\mathbf{a}_2 + \left(z_{15}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & -\frac{3}{2}ax_{15}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{15}\,\hat{\mathbf{y}} + c\left(z_{15}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co V} \\
\mathbf{B_{70}} & = & 2x_{15}\,\mathbf{a}_1 + x_{15}\,\mathbf{a}_2 + \left(z_{15}+\frac{1}{2}\right)\,\mathbf{a}_3 & = & \frac{3}{2}ax_{15}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{15}\,\hat{\mathbf{y}} + c\left(z_{15}+\frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(6c)} & \text{Co V}
\end{array}
$$

References

[1] A. C. Larson and D. T. Cromer, *The crystal structure of* $Ce_{24}Co_{11}$, Acta Cryst. **15**, 1224–1227 (1962), doi:10.1107/S0365110X62003254.