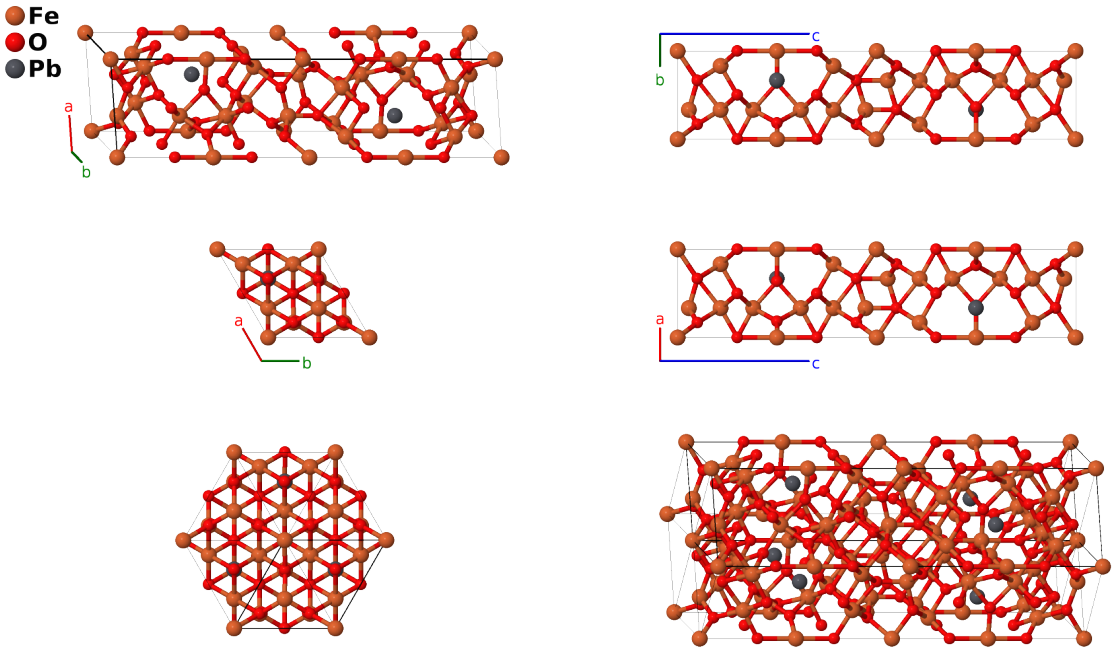
Magnetoplumbite ($PbFe_{12}O_{19}$) Structure: A12B19C_hP64_194_ab2fk_efh2k_c-001

This structure originally had the label `A12B19C_hP64_194_ab2fk_efh2k_d`. Calls to that address will be redirected here.

Cite this page as: D. Hicks, M. J. Mehl, M. Esters, C. Oses, O. Levy, G. L. W. Hart, C. Toher, and S. Curtarolo, *The AFLOW Library of Crystallographic Prototypes: Part 3*, Comput. Mater. Sci. **199**, 110450 (2021), doi: 10.1016/j.commatsci.2021.110450.

https://aflow.org/p/5L5V

https://aflow.org/p/A12B19C_hP64_194_ab2fk_efh2k_c-001



Prototype	$Fe_{12}O_{19}Pb$
AFLOW prototype label	A12B19C_hP64_194_ab2fk_efh2k_c-001
Mineral name	magnetoplumbite
ICSD	36259
Pearson symbol	hP64
Space group number	194
Space group symbol	$P6_3/mmc$
AFLOW prototype command	`aflow --proto=A12B19C_hP64_194_ab2fk_efh2k_c-001 --params=`$a, c/a, z_4, z_5, z_6, z_7, x_8, x_9, z_9, x_{10}, z_{10}, x_{11}, z_{11}$

Other compounds with this structure

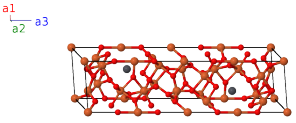
$PbAl_{12}O_{19}$, $PbGa_{12}O_{19}$, $PbMn_{12}O_{19}$, $Pb(Co, Ti)_{12}O_{19}$, $BaAl_{12}O_{19}$, $BaFe_{12}O_{19}$, $BaGa_{12}O_{19}$, $BaMn_{12}O_{19}$, $Ba(Co, Ti)_{12}O_{19}$, $CaAl_{12}O_{19}$, $CaGa_{12}O_{19}$, $CaMn_{12}O_{19}$, $Ca(Co, Ti)_{12}O_{19}$, $SrAl_{12}O_{19}$, $SrGa_{12}O_{19}$, $SrMn_{12}O_{19}$, $Sr(Co, Ti)_{12}O_{19}$

- In addition to the listed compounds, the lead and iron sites may be alloyed with a wide variety of metals and semi-metals resulting in high-entropy phases (Vinnik, 2019).

- We did not find an ICSD or CCDC entry for (Simsa, 1994). We use the ICSD entry from the early work of (Adelskoeld, 1938).

Hexagonal primitive vectors

$$\mathbf{a_1} = \frac{1}{2}a\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}a\,\hat{\mathbf{y}}$$
$$\mathbf{a_2} = \frac{1}{2}a\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}a\,\hat{\mathbf{y}}$$
$$\mathbf{a_3} = c\,\hat{\mathbf{z}}$$



Basis vectors

		Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B_1}$	=	0	=	0	(2a)	Fe I
$\mathbf{B_2}$	=	$\frac{1}{2}\,\mathbf{a}_3$	=	$\frac{1}{2}c\,\hat{\mathbf{z}}$	(2a)	Fe I
$\mathbf{B_3}$	=	$\frac{1}{4}\,\mathbf{a}_3$	=	$\frac{1}{4}c\,\hat{\mathbf{z}}$	(2b)	Fe II
$\mathbf{B_4}$	=	$\frac{3}{4}\,\mathbf{a}_3$	=	$\frac{3}{4}c\,\hat{\mathbf{z}}$	(2b)	Fe II
$\mathbf{B_5}$	=	$\frac{1}{3}\,\mathbf{a}_1 + \frac{2}{3}\,\mathbf{a}_2 + \frac{1}{4}\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} + \frac{1}{4}c\,\hat{\mathbf{z}}$	(2c)	Pb I
$\mathbf{B_6}$	=	$\frac{2}{3}\,\mathbf{a}_1 + \frac{1}{3}\,\mathbf{a}_2 + \frac{3}{4}\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} + \frac{3}{4}c\,\hat{\mathbf{z}}$	(2c)	Pb I
$\mathbf{B_7}$	=	$z_4\,\mathbf{a}_3$	=	$cz_4\,\hat{\mathbf{z}}$	(4e)	O I
$\mathbf{B_8}$	=	$\left(z_4 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$c\left(z_4 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4e)	O I
$\mathbf{B_9}$	=	$-z_4\,\mathbf{a}_3$	=	$-cz_4\,\hat{\mathbf{z}}$	(4e)	O I
$\mathbf{B_{10}}$	=	$-\left(z_4 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-c\left(z_4 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4e)	O I
$\mathbf{B_{11}}$	=	$\frac{1}{3}\,\mathbf{a}_1 + \frac{2}{3}\,\mathbf{a}_2 + z_5\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} + cz_5\,\hat{\mathbf{z}}$	(4f)	Fe III
$\mathbf{B_{12}}$	=	$\frac{2}{3}\,\mathbf{a}_1 + \frac{1}{3}\,\mathbf{a}_2 + \left(z_5 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} + c\left(z_5 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4f)	Fe III
$\mathbf{B_{13}}$	=	$\frac{2}{3}\,\mathbf{a}_1 + \frac{1}{3}\,\mathbf{a}_2 - z_5\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} - cz_5\,\hat{\mathbf{z}}$	(4f)	Fe III
$\mathbf{B_{14}}$	=	$\frac{1}{3}\,\mathbf{a}_1 + \frac{2}{3}\,\mathbf{a}_2 - \left(z_5 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} - c\left(z_5 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4f)	Fe III
$\mathbf{B_{15}}$	=	$\frac{1}{3}\,\mathbf{a}_1 + \frac{2}{3}\,\mathbf{a}_2 + z_6\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} + cz_6\,\hat{\mathbf{z}}$	(4f)	Fe IV
$\mathbf{B_{16}}$	=	$\frac{2}{3}\,\mathbf{a}_1 + \frac{1}{3}\,\mathbf{a}_2 + \left(z_6 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} + c\left(z_6 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4f)	Fe IV
$\mathbf{B_{17}}$	=	$\frac{2}{3}\,\mathbf{a}_1 + \frac{1}{3}\,\mathbf{a}_2 - z_6\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} - cz_6\,\hat{\mathbf{z}}$	(4f)	Fe IV
$\mathbf{B_{18}}$	=	$\frac{1}{3}\,\mathbf{a}_1 + \frac{2}{3}\,\mathbf{a}_2 - \left(z_6 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} - c\left(z_6 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4f)	Fe IV
$\mathbf{B_{19}}$	=	$\frac{1}{3}\,\mathbf{a}_1 + \frac{2}{3}\,\mathbf{a}_2 + z_7\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} + cz_7\,\hat{\mathbf{z}}$	(4f)	O II
$\mathbf{B_{20}}$	=	$\frac{2}{3}\,\mathbf{a}_1 + \frac{1}{3}\,\mathbf{a}_2 + \left(z_7 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} + c\left(z_7 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4f)	O II
$\mathbf{B_{21}}$	=	$\frac{2}{3}\,\mathbf{a}_1 + \frac{1}{3}\,\mathbf{a}_2 - z_7\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} - cz_7\,\hat{\mathbf{z}}$	(4f)	O II
$\mathbf{B_{22}}$	=	$\frac{1}{3}\,\mathbf{a}_1 + \frac{2}{3}\,\mathbf{a}_2 - \left(z_7 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{6}a\,\hat{\mathbf{y}} - c\left(z_7 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(4f)	O II
$\mathbf{B_{23}}$	=	$x_8\,\mathbf{a}_1 + 2x_8\,\mathbf{a}_2 + \frac{1}{4}\,\mathbf{a}_3$	=	$\frac{3}{2}ax_8\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_8\,\hat{\mathbf{y}} + \frac{1}{4}c\,\hat{\mathbf{z}}$	(6h)	O III
$\mathbf{B_{24}}$	=	$-2x_8\,\mathbf{a}_1 - x_8\,\mathbf{a}_2 + \frac{1}{4}\,\mathbf{a}_3$	=	$-\frac{3}{2}ax_8\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_8\,\hat{\mathbf{y}} + \frac{1}{4}c\,\hat{\mathbf{z}}$	(6h)	O III
$\mathbf{B_{25}}$	=	$x_8\,\mathbf{a}_1 - x_8\,\mathbf{a}_2 + \frac{1}{4}\,\mathbf{a}_3$	=	$-\sqrt{3}ax_8\,\hat{\mathbf{y}} + \frac{1}{4}c\,\hat{\mathbf{z}}$	(6h)	O III
$\mathbf{B_{26}}$	=	$-x_8\,\mathbf{a}_1 - 2x_8\,\mathbf{a}_2 + \frac{3}{4}\,\mathbf{a}_3$	=	$-\frac{3}{2}ax_8\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_8\,\hat{\mathbf{y}} + \frac{3}{4}c\,\hat{\mathbf{z}}$	(6h)	O III
$\mathbf{B_{27}}$	=	$2x_8\,\mathbf{a}_1 + x_8\,\mathbf{a}_2 + \frac{3}{4}\,\mathbf{a}_3$	=	$\frac{3}{2}ax_8\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_8\,\hat{\mathbf{y}} + \frac{3}{4}c\,\hat{\mathbf{z}}$	(6h)	O III
$\mathbf{B_{28}}$	=	$-x_8\,\mathbf{a}_1 + x_8\,\mathbf{a}_2 + \frac{3}{4}\,\mathbf{a}_3$	=	$\sqrt{3}ax_8\,\hat{\mathbf{y}} + \frac{3}{4}c\,\hat{\mathbf{z}}$	(6h)	O III
$\mathbf{B_{29}}$	=	$x_9\,\mathbf{a}_1 + 2x_9\,\mathbf{a}_2 + z_9\,\mathbf{a}_3$	=	$\frac{3}{2}ax_9\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} + cz_9\,\hat{\mathbf{z}}$	(12k)	Fe V
$\mathbf{B_{30}}$	=	$-2x_9\,\mathbf{a}_1 - x_9\,\mathbf{a}_2 + z_9\,\mathbf{a}_3$	=	$-\frac{3}{2}ax_9\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} + cz_9\,\hat{\mathbf{z}}$	(12k)	Fe V
$\mathbf{B_{31}}$	=	$x_9\,\mathbf{a}_1 - x_9\,\mathbf{a}_2 + z_9\,\mathbf{a}_3$	=	$-\sqrt{3}ax_9\,\hat{\mathbf{y}} + cz_9\,\hat{\mathbf{z}}$	(12k)	Fe V

$\mathbf{B_{32}}$	$= -x_9\,\mathbf{a}_1 - 2x_9\,\mathbf{a}_2 + \left(z_9 + \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$-\frac{3}{2}ax_9\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} + c\left(z_9 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	Fe V
$\mathbf{B_{33}}$	$= 2x_9\,\mathbf{a}_1 + x_9\,\mathbf{a}_2 + \left(z_9 + \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$\frac{3}{2}ax_9\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} + c\left(z_9 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	Fe V
$\mathbf{B_{34}}$	$= -x_9\,\mathbf{a}_1 + x_9\,\mathbf{a}_2 + \left(z_9 + \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$\sqrt{3}ax_9\,\hat{\mathbf{y}} + c\left(z_9 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	Fe V
$\mathbf{B_{35}}$	$= 2x_9\,\mathbf{a}_1 + x_9\,\mathbf{a}_2 - z_9\,\mathbf{a}_3$	$=$	$\frac{3}{2}ax_9\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} - cz_9\,\hat{\mathbf{z}}$	(12k)	Fe V
$\mathbf{B_{36}}$	$= -x_9\,\mathbf{a}_1 - 2x_9\,\mathbf{a}_2 - z_9\,\mathbf{a}_3$	$=$	$-\frac{3}{2}ax_9\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} - cz_9\,\hat{\mathbf{z}}$	(12k)	Fe V
$\mathbf{B_{37}}$	$= -x_9\,\mathbf{a}_1 + x_9\,\mathbf{a}_2 - z_9\,\mathbf{a}_3$	$=$	$\sqrt{3}ax_9\,\hat{\mathbf{y}} - cz_9\,\hat{\mathbf{z}}$	(12k)	Fe V
$\mathbf{B_{38}}$	$= -2x_9\,\mathbf{a}_1 - x_9\,\mathbf{a}_2 - \left(z_9 - \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$-\frac{3}{2}ax_9\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} - c\left(z_9 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	Fe V
$\mathbf{B_{39}}$	$= x_9\,\mathbf{a}_1 + 2x_9\,\mathbf{a}_2 - \left(z_9 - \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$\frac{3}{2}ax_9\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} - c\left(z_9 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	Fe V
$\mathbf{B_{40}}$	$= x_9\,\mathbf{a}_1 - x_9\,\mathbf{a}_2 - \left(z_9 - \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$-\sqrt{3}ax_9\,\hat{\mathbf{y}} - c\left(z_9 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	Fe V
$\mathbf{B_{41}}$	$= x_{10}\,\mathbf{a}_1 + 2x_{10}\,\mathbf{a}_2 + z_{10}\,\mathbf{a}_3$	$=$	$\frac{3}{2}ax_{10}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}}$	(12k)	O IV
$\mathbf{B_{42}}$	$= -2x_{10}\,\mathbf{a}_1 - x_{10}\,\mathbf{a}_2 + z_{10}\,\mathbf{a}_3$	$=$	$-\frac{3}{2}ax_{10}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}}$	(12k)	O IV
$\mathbf{B_{43}}$	$= x_{10}\,\mathbf{a}_1 - x_{10}\,\mathbf{a}_2 + z_{10}\,\mathbf{a}_3$	$=$	$-\sqrt{3}ax_{10}\,\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}}$	(12k)	O IV
$\mathbf{B_{44}}$	$= -x_{10}\,\mathbf{a}_1 - 2x_{10}\,\mathbf{a}_2 + \left(z_{10} + \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$-\frac{3}{2}ax_{10}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} + c\left(z_{10} + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	O IV
$\mathbf{B_{45}}$	$= 2x_{10}\,\mathbf{a}_1 + x_{10}\,\mathbf{a}_2 + \left(z_{10} + \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$\frac{3}{2}ax_{10}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} + c\left(z_{10} + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	O IV
$\mathbf{B_{46}}$	$= -x_{10}\,\mathbf{a}_1 + x_{10}\,\mathbf{a}_2 + \left(z_{10} + \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$\sqrt{3}ax_{10}\,\hat{\mathbf{y}} + c\left(z_{10} + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	O IV
$\mathbf{B_{47}}$	$= 2x_{10}\,\mathbf{a}_1 + x_{10}\,\mathbf{a}_2 - z_{10}\,\mathbf{a}_3$	$=$	$\frac{3}{2}ax_{10}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} - cz_{10}\,\hat{\mathbf{z}}$	(12k)	O IV
$\mathbf{B_{48}}$	$= -x_{10}\,\mathbf{a}_1 - 2x_{10}\,\mathbf{a}_2 - z_{10}\,\mathbf{a}_3$	$=$	$-\frac{3}{2}ax_{10}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} - cz_{10}\,\hat{\mathbf{z}}$	(12k)	O IV
$\mathbf{B_{49}}$	$= -x_{10}\,\mathbf{a}_1 + x_{10}\,\mathbf{a}_2 - z_{10}\,\mathbf{a}_3$	$=$	$\sqrt{3}ax_{10}\,\hat{\mathbf{y}} - cz_{10}\,\hat{\mathbf{z}}$	(12k)	O IV
$\mathbf{B_{50}}$	$= -2x_{10}\,\mathbf{a}_1 - x_{10}\,\mathbf{a}_2 - \left(z_{10} - \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$-\frac{3}{2}ax_{10}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} - c\left(z_{10} - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	O IV
$\mathbf{B_{51}}$	$= x_{10}\,\mathbf{a}_1 + 2x_{10}\,\mathbf{a}_2 - \left(z_{10} - \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$\frac{3}{2}ax_{10}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} - c\left(z_{10} - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	O IV
$\mathbf{B_{52}}$	$= x_{10}\,\mathbf{a}_1 - x_{10}\,\mathbf{a}_2 - \left(z_{10} - \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$-\sqrt{3}ax_{10}\,\hat{\mathbf{y}} - c\left(z_{10} - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	O IV
$\mathbf{B_{53}}$	$= x_{11}\,\mathbf{a}_1 + 2x_{11}\,\mathbf{a}_2 + z_{11}\,\mathbf{a}_3$	$=$	$\frac{3}{2}ax_{11}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} + cz_{11}\,\hat{\mathbf{z}}$	(12k)	O V
$\mathbf{B_{54}}$	$= -2x_{11}\,\mathbf{a}_1 - x_{11}\,\mathbf{a}_2 + z_{11}\,\mathbf{a}_3$	$=$	$-\frac{3}{2}ax_{11}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} + cz_{11}\,\hat{\mathbf{z}}$	(12k)	O V
$\mathbf{B_{55}}$	$= x_{11}\,\mathbf{a}_1 - x_{11}\,\mathbf{a}_2 + z_{11}\,\mathbf{a}_3$	$=$	$-\sqrt{3}ax_{11}\,\hat{\mathbf{y}} + cz_{11}\,\hat{\mathbf{z}}$	(12k)	O V
$\mathbf{B_{56}}$	$= -x_{11}\,\mathbf{a}_1 - 2x_{11}\,\mathbf{a}_2 + \left(z_{11} + \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$-\frac{3}{2}ax_{11}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} + c\left(z_{11} + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	O V
$\mathbf{B_{57}}$	$= 2x_{11}\,\mathbf{a}_1 + x_{11}\,\mathbf{a}_2 + \left(z_{11} + \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$\frac{3}{2}ax_{11}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} + c\left(z_{11} + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	O V
$\mathbf{B_{58}}$	$= -x_{11}\,\mathbf{a}_1 + x_{11}\,\mathbf{a}_2 + \left(z_{11} + \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$\sqrt{3}ax_{11}\,\hat{\mathbf{y}} + c\left(z_{11} + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	O V
$\mathbf{B_{59}}$	$= 2x_{11}\,\mathbf{a}_1 + x_{11}\,\mathbf{a}_2 - z_{11}\,\mathbf{a}_3$	$=$	$\frac{3}{2}ax_{11}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} - cz_{11}\,\hat{\mathbf{z}}$	(12k)	O V
$\mathbf{B_{60}}$	$= -x_{11}\,\mathbf{a}_1 - 2x_{11}\,\mathbf{a}_2 - z_{11}\,\mathbf{a}_3$	$=$	$-\frac{3}{2}ax_{11}\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} - cz_{11}\,\hat{\mathbf{z}}$	(12k)	O V
$\mathbf{B_{61}}$	$= -x_{11}\,\mathbf{a}_1 + x_{11}\,\mathbf{a}_2 - z_{11}\,\mathbf{a}_3$	$=$	$\sqrt{3}ax_{11}\,\hat{\mathbf{y}} - cz_{11}\,\hat{\mathbf{z}}$	(12k)	O V
$\mathbf{B_{62}}$	$= -2x_{11}\,\mathbf{a}_1 - x_{11}\,\mathbf{a}_2 - \left(z_{11} - \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$-\frac{3}{2}ax_{11}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} - c\left(z_{11} - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	O V
$\mathbf{B_{63}}$	$= x_{11}\,\mathbf{a}_1 + 2x_{11}\,\mathbf{a}_2 - \left(z_{11} - \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$\frac{3}{2}ax_{11}\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} - c\left(z_{11} - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	O V
$\mathbf{B_{64}}$	$= x_{11}\,\mathbf{a}_1 - x_{11}\,\mathbf{a}_2 - \left(z_{11} - \frac{1}{2}\right)\,\mathbf{a}_3$	$=$	$-\sqrt{3}ax_{11}\,\hat{\mathbf{y}} - c\left(z_{11} - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(12k)	O V

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