$Al[PO_4]$ Structure: AB4C_hP72_168_2d_8d_2d-001

This structure originally had the label `AB4C_hP72_168_2d_8d_2d`. Calls to that address will be redirected here.

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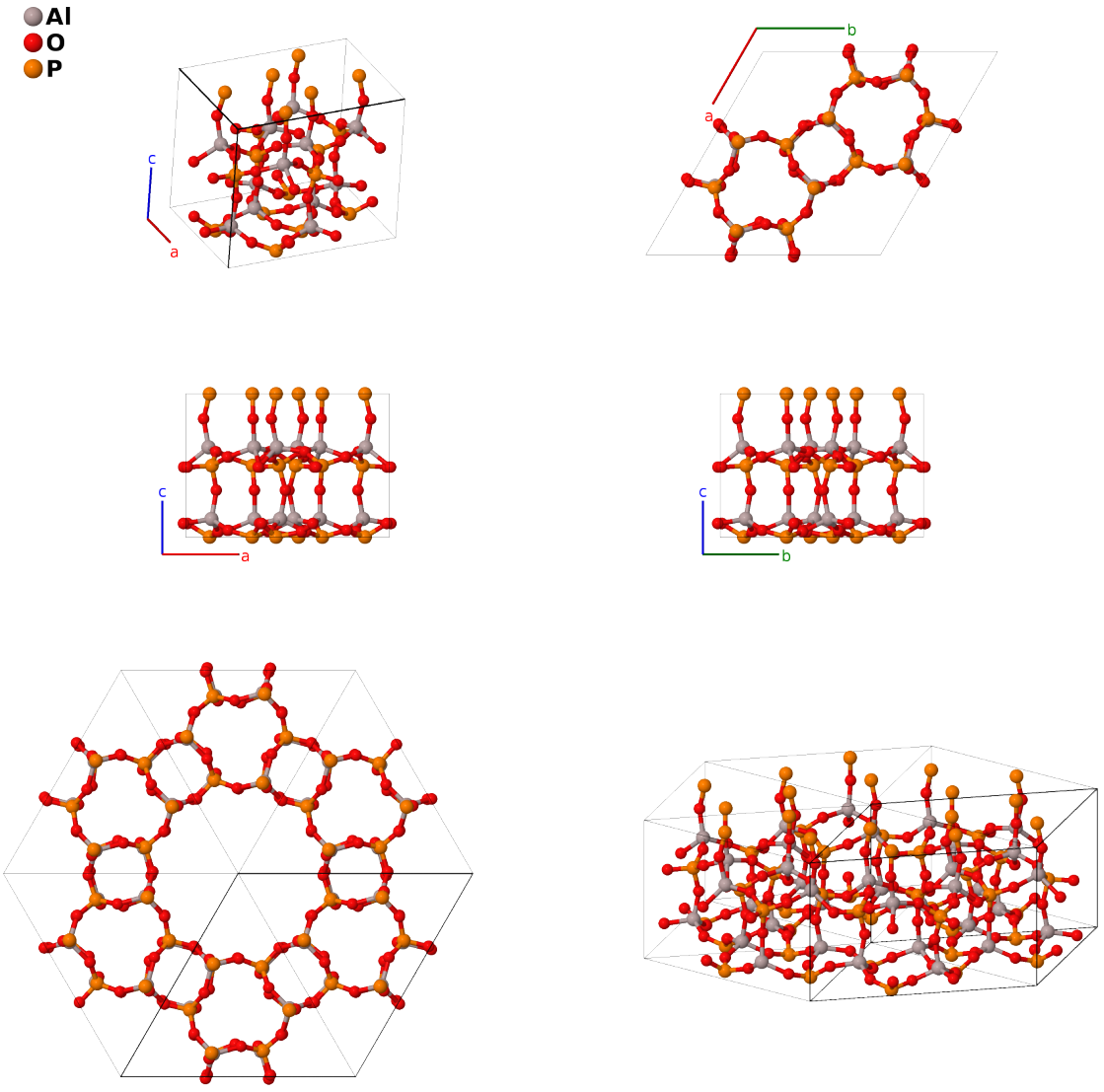
https://aflow.org/p/5X6W

https://aflow.org/p/AB4C_hP72_168_2d_8d_2d-001



Prototype	AlO_4P
AFLOW prototype label	AB4C_hP72_168_2d_8d_2d-001
ICSD	none
Pearson symbol	hP72
Space group number	168

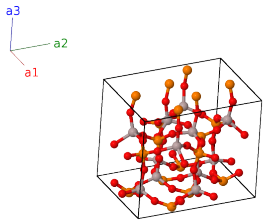
Space group symbol $P6$

AFLOW prototype command `aflow --proto=AB4C_hP72_168_2d_8d_2d-001 --params=`$a, c/a, x_1, y_1, z_1, x_2, y_2, z_2, x_3, y_3, z_3, x_4, y_4, z_4, x_5, y_5, z_5, x_6, y_6, z_6, x_7, y_7, z_7, x_8, y_8, z_8, x_9, y_9, z_9, x_{10}, y_{10}, z_{10}, x_{11}, y_{11}, z_{11}, x_{12}, y_{12}, z_{12}$

- Polytypes of this compound also appear in space groups $P6cc$ #184 (AB4C_hP72_184_d_4d_d) and $P6/mcc$ #192 (AB2_hP72_192_m_j2kl).

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
$\mathbf{B_1}$	=	$x_1\,\mathbf{a}_1 + y_1\,\mathbf{a}_2 + z_1\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(x_1 + y_1)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}a\,(x_1 - y_1)\,\hat{\mathbf{y}} + cz_1\,\hat{\mathbf{z}}$	(6d)	Al I
$\mathbf{B_2}$	=	$-y_1\,\mathbf{a}_1 + (x_1 - y_1)\,\mathbf{a}_2 + z_1\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(x_1 - 2y_1)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_1\,\hat{\mathbf{y}} + cz_1\,\hat{\mathbf{z}}$	(6d)	Al I
$\mathbf{B_3}$	=	$-(x_1 - y_1)\,\mathbf{a}_1 - x_1\,\mathbf{a}_2 + z_1\,\mathbf{a}_3$	=	$-\frac{1}{2}a\,(2x_1 - y_1)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ay_1\,\hat{\mathbf{y}} + cz_1\,\hat{\mathbf{z}}$	(6d)	Al I
$\mathbf{B_4}$	=	$-x_1\,\mathbf{a}_1 - y_1\,\mathbf{a}_2 + z_1\,\mathbf{a}_3$	=	$-\frac{1}{2}a\,(x_1 + y_1)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}a\,(x_1 - y_1)\,\hat{\mathbf{y}} + cz_1\,\hat{\mathbf{z}}$	(6d)	Al I
$\mathbf{B_5}$	=	$y_1\,\mathbf{a}_1 - (x_1 - y_1)\,\mathbf{a}_2 + z_1\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(-x_1 + 2y_1)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_1\,\hat{\mathbf{y}} + cz_1\,\hat{\mathbf{z}}$	(6d)	Al I
$\mathbf{B_6}$	=	$(x_1 - y_1)\,\mathbf{a}_1 + x_1\,\mathbf{a}_2 + z_1\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(2x_1 - y_1)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ay_1\,\hat{\mathbf{y}} + cz_1\,\hat{\mathbf{z}}$	(6d)	Al I
$\mathbf{B_7}$	=	$x_2\,\mathbf{a}_1 + y_2\,\mathbf{a}_2 + z_2\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(x_2 + y_2)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}a\,(x_2 - y_2)\,\hat{\mathbf{y}} + cz_2\,\hat{\mathbf{z}}$	(6d)	Al II
$\mathbf{B_8}$	=	$-y_2\,\mathbf{a}_1 + (x_2 - y_2)\,\mathbf{a}_2 + z_2\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(x_2 - 2y_2)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_2\,\hat{\mathbf{y}} + cz_2\,\hat{\mathbf{z}}$	(6d)	Al II
$\mathbf{B_9}$	=	$-(x_2 - y_2)\,\mathbf{a}_1 - x_2\,\mathbf{a}_2 + z_2\,\mathbf{a}_3$	=	$-\frac{1}{2}a\,(2x_2 - y_2)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ay_2\,\hat{\mathbf{y}} + cz_2\,\hat{\mathbf{z}}$	(6d)	Al II
$\mathbf{B_{10}}$	=	$-x_2\,\mathbf{a}_1 - y_2\,\mathbf{a}_2 + z_2\,\mathbf{a}_3$	=	$-\frac{1}{2}a\,(x_2 + y_2)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}a\,(x_2 - y_2)\,\hat{\mathbf{y}} + cz_2\,\hat{\mathbf{z}}$	(6d)	Al II
$\mathbf{B_{11}}$	=	$y_2\,\mathbf{a}_1 - (x_2 - y_2)\,\mathbf{a}_2 + z_2\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(-x_2 + 2y_2)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_2\,\hat{\mathbf{y}} + cz_2\,\hat{\mathbf{z}}$	(6d)	Al II
$\mathbf{B_{12}}$	=	$(x_2 - y_2)\,\mathbf{a}_1 + x_2\,\mathbf{a}_2 + z_2\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(2x_2 - y_2)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ay_2\,\hat{\mathbf{y}} + cz_2\,\hat{\mathbf{z}}$	(6d)	Al II
$\mathbf{B_{13}}$	=	$x_3\,\mathbf{a}_1 + y_3\,\mathbf{a}_2 + z_3\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(x_3 + y_3)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}a\,(x_3 - y_3)\,\hat{\mathbf{y}} + cz_3\,\hat{\mathbf{z}}$	(6d)	O I
$\mathbf{B_{14}}$	=	$-y_3\,\mathbf{a}_1 + (x_3 - y_3)\,\mathbf{a}_2 + z_3\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(x_3 - 2y_3)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_3\,\hat{\mathbf{y}} + cz_3\,\hat{\mathbf{z}}$	(6d)	O I
$\mathbf{B_{15}}$	=	$-(x_3 - y_3)\,\mathbf{a}_1 - x_3\,\mathbf{a}_2 + z_3\,\mathbf{a}_3$	=	$-\frac{1}{2}a\,(2x_3 - y_3)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ay_3\,\hat{\mathbf{y}} + cz_3\,\hat{\mathbf{z}}$	(6d)	O I
$\mathbf{B_{16}}$	=	$-x_3\,\mathbf{a}_1 - y_3\,\mathbf{a}_2 + z_3\,\mathbf{a}_3$	=	$-\frac{1}{2}a\,(x_3 + y_3)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}a\,(x_3 - y_3)\,\hat{\mathbf{y}} + cz_3\,\hat{\mathbf{z}}$	(6d)	O I
$\mathbf{B_{17}}$	=	$y_3\,\mathbf{a}_1 - (x_3 - y_3)\,\mathbf{a}_2 + z_3\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(-x_3 + 2y_3)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_3\,\hat{\mathbf{y}} + cz_3\,\hat{\mathbf{z}}$	(6d)	O I
$\mathbf{B_{18}}$	=	$(x_3 - y_3)\,\mathbf{a}_1 + x_3\,\mathbf{a}_2 + z_3\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(2x_3 - y_3)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ay_3\,\hat{\mathbf{y}} + cz_3\,\hat{\mathbf{z}}$	(6d)	O I
$\mathbf{B_{19}}$	=	$x_4\,\mathbf{a}_1 + y_4\,\mathbf{a}_2 + z_4\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(x_4 + y_4)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}a\,(x_4 - y_4)\,\hat{\mathbf{y}} + cz_4\,\hat{\mathbf{z}}$	(6d)	O II
$\mathbf{B_{20}}$	=	$-y_4\,\mathbf{a}_1 + (x_4 - y_4)\,\mathbf{a}_2 + z_4\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(x_4 - 2y_4)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_4\,\hat{\mathbf{y}} + cz_4\,\hat{\mathbf{z}}$	(6d)	O II
$\mathbf{B_{21}}$	=	$-(x_4 - y_4)\,\mathbf{a}_1 - x_4\,\mathbf{a}_2 + z_4\,\mathbf{a}_3$	=	$-\frac{1}{2}a\,(2x_4 - y_4)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ay_4\,\hat{\mathbf{y}} + cz_4\,\hat{\mathbf{z}}$	(6d)	O II
$\mathbf{B_{22}}$	=	$-x_4\,\mathbf{a}_1 - y_4\,\mathbf{a}_2 + z_4\,\mathbf{a}_3$	=	$-\frac{1}{2}a\,(x_4 + y_4)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}a\,(x_4 - y_4)\,\hat{\mathbf{y}} + cz_4\,\hat{\mathbf{z}}$	(6d)	O II
$\mathbf{B_{23}}$	=	$y_4\,\mathbf{a}_1 - (x_4 - y_4)\,\mathbf{a}_2 + z_4\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(-x_4 + 2y_4)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_4\,\hat{\mathbf{y}} + cz_4\,\hat{\mathbf{z}}$	(6d)	O II

$\mathbf{B_{24}}$	$=$	$(x_4 - y_4)\,\mathbf{a}_1 + x_4\,\mathbf{a}_2 + z_4\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(2x_4 - y_4)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ay_4\,\hat{\mathbf{y}} + cz_4\,\hat{\mathbf{z}}$	(6d)	O II
$\mathbf{B_{25}}$	$=$	$x_5\,\mathbf{a}_1 + y_5\,\mathbf{a}_2 + z_5\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(x_5 + y_5)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}a\,(x_5 - y_5)\,\hat{\mathbf{y}} + cz_5\,\hat{\mathbf{z}}$	(6d)	O III
$\mathbf{B_{26}}$	$=$	$-y_5\,\mathbf{a}_1 + (x_5 - y_5)\,\mathbf{a}_2 + z_5\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(x_5 - 2y_5)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_5\,\hat{\mathbf{y}} + cz_5\,\hat{\mathbf{z}}$	(6d)	O III
$\mathbf{B_{27}}$	$=$	$-(x_5 - y_5)\,\mathbf{a}_1 - x_5\,\mathbf{a}_2 + z_5\,\mathbf{a}_3$	$=$	$-\frac{1}{2}a\,(2x_5 - y_5)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ay_5\,\hat{\mathbf{y}} + cz_5\,\hat{\mathbf{z}}$	(6d)	O III
$\mathbf{B_{28}}$	$=$	$-x_5\,\mathbf{a}_1 - y_5\,\mathbf{a}_2 + z_5\,\mathbf{a}_3$	$=$	$-\frac{1}{2}a\,(x_5 + y_5)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}a\,(x_5 - y_5)\,\hat{\mathbf{y}} + cz_5\,\hat{\mathbf{z}}$	(6d)	O III
$\mathbf{B_{29}}$	$=$	$y_5\,\mathbf{a}_1 - (x_5 - y_5)\,\mathbf{a}_2 + z_5\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(-x_5 + 2y_5)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_5\,\hat{\mathbf{y}} + cz_5\,\hat{\mathbf{z}}$	(6d)	O III
$\mathbf{B_{30}}$	$=$	$(x_5 - y_5)\,\mathbf{a}_1 + x_5\,\mathbf{a}_2 + z_5\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(2x_5 - y_5)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ay_5\,\hat{\mathbf{y}} + cz_5\,\hat{\mathbf{z}}$	(6d)	O III
$\mathbf{B_{31}}$	$=$	$x_6\,\mathbf{a}_1 + y_6\,\mathbf{a}_2 + z_6\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(x_6 + y_6)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}a\,(x_6 - y_6)\,\hat{\mathbf{y}} + cz_6\,\hat{\mathbf{z}}$	(6d)	O IV
$\mathbf{B_{32}}$	$=$	$-y_6\,\mathbf{a}_1 + (x_6 - y_6)\,\mathbf{a}_2 + z_6\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(x_6 - 2y_6)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_6\,\hat{\mathbf{y}} + cz_6\,\hat{\mathbf{z}}$	(6d)	O IV
$\mathbf{B_{33}}$	$=$	$-(x_6 - y_6)\,\mathbf{a}_1 - x_6\,\mathbf{a}_2 + z_6\,\mathbf{a}_3$	$=$	$-\frac{1}{2}a\,(2x_6 - y_6)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ay_6\,\hat{\mathbf{y}} + cz_6\,\hat{\mathbf{z}}$	(6d)	O IV
$\mathbf{B_{34}}$	$=$	$-x_6\,\mathbf{a}_1 - y_6\,\mathbf{a}_2 + z_6\,\mathbf{a}_3$	$=$	$-\frac{1}{2}a\,(x_6 + y_6)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}a\,(x_6 - y_6)\,\hat{\mathbf{y}} + cz_6\,\hat{\mathbf{z}}$	(6d)	O IV
$\mathbf{B_{35}}$	$=$	$y_6\,\mathbf{a}_1 - (x_6 - y_6)\,\mathbf{a}_2 + z_6\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(-x_6 + 2y_6)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_6\,\hat{\mathbf{y}} + cz_6\,\hat{\mathbf{z}}$	(6d)	O IV
$\mathbf{B_{36}}$	$=$	$(x_6 - y_6)\,\mathbf{a}_1 + x_6\,\mathbf{a}_2 + z_6\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(2x_6 - y_6)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ay_6\,\hat{\mathbf{y}} + cz_6\,\hat{\mathbf{z}}$	(6d)	O IV
$\mathbf{B_{37}}$	$=$	$x_7\,\mathbf{a}_1 + y_7\,\mathbf{a}_2 + z_7\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(x_7 + y_7)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}a\,(x_7 - y_7)\,\hat{\mathbf{y}} + cz_7\,\hat{\mathbf{z}}$	(6d)	O V
$\mathbf{B_{38}}$	$=$	$-y_7\,\mathbf{a}_1 + (x_7 - y_7)\,\mathbf{a}_2 + z_7\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(x_7 - 2y_7)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_7\,\hat{\mathbf{y}} + cz_7\,\hat{\mathbf{z}}$	(6d)	O V
$\mathbf{B_{39}}$	$=$	$-(x_7 - y_7)\,\mathbf{a}_1 - x_7\,\mathbf{a}_2 + z_7\,\mathbf{a}_3$	$=$	$-\frac{1}{2}a\,(2x_7 - y_7)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ay_7\,\hat{\mathbf{y}} + cz_7\,\hat{\mathbf{z}}$	(6d)	O V
$\mathbf{B_{40}}$	$=$	$-x_7\,\mathbf{a}_1 - y_7\,\mathbf{a}_2 + z_7\,\mathbf{a}_3$	$=$	$-\frac{1}{2}a\,(x_7 + y_7)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}a\,(x_7 - y_7)\,\hat{\mathbf{y}} + cz_7\,\hat{\mathbf{z}}$	(6d)	O V
$\mathbf{B_{41}}$	$=$	$y_7\,\mathbf{a}_1 - (x_7 - y_7)\,\mathbf{a}_2 + z_7\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(-x_7 + 2y_7)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_7\,\hat{\mathbf{y}} + cz_7\,\hat{\mathbf{z}}$	(6d)	O V
$\mathbf{B_{42}}$	$=$	$(x_7 - y_7)\,\mathbf{a}_1 + x_7\,\mathbf{a}_2 + z_7\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(2x_7 - y_7)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ay_7\,\hat{\mathbf{y}} + cz_7\,\hat{\mathbf{z}}$	(6d)	O V
$\mathbf{B_{43}}$	$=$	$x_8\,\mathbf{a}_1 + y_8\,\mathbf{a}_2 + z_8\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(x_8 + y_8)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}a\,(x_8 - y_8)\,\hat{\mathbf{y}} + cz_8\,\hat{\mathbf{z}}$	(6d)	O VI
$\mathbf{B_{44}}$	$=$	$-y_8\,\mathbf{a}_1 + (x_8 - y_8)\,\mathbf{a}_2 + z_8\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(x_8 - 2y_8)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_8\,\hat{\mathbf{y}} + cz_8\,\hat{\mathbf{z}}$	(6d)	O VI
$\mathbf{B_{45}}$	$=$	$-(x_8 - y_8)\,\mathbf{a}_1 - x_8\,\mathbf{a}_2 + z_8\,\mathbf{a}_3$	$=$	$-\frac{1}{2}a\,(2x_8 - y_8)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ay_8\,\hat{\mathbf{y}} + cz_8\,\hat{\mathbf{z}}$	(6d)	O VI
$\mathbf{B_{46}}$	$=$	$-x_8\,\mathbf{a}_1 - y_8\,\mathbf{a}_2 + z_8\,\mathbf{a}_3$	$=$	$-\frac{1}{2}a\,(x_8 + y_8)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}a\,(x_8 - y_8)\,\hat{\mathbf{y}} + cz_8\,\hat{\mathbf{z}}$	(6d)	O VI
$\mathbf{B_{47}}$	$=$	$y_8\,\mathbf{a}_1 - (x_8 - y_8)\,\mathbf{a}_2 + z_8\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(-x_8 + 2y_8)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_8\,\hat{\mathbf{y}} + cz_8\,\hat{\mathbf{z}}$	(6d)	O VI
$\mathbf{B_{48}}$	$=$	$(x_8 - y_8)\,\mathbf{a}_1 + x_8\,\mathbf{a}_2 + z_8\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(2x_8 - y_8)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ay_8\,\hat{\mathbf{y}} + cz_8\,\hat{\mathbf{z}}$	(6d)	O VI
$\mathbf{B_{49}}$	$=$	$x_9\,\mathbf{a}_1 + y_9\,\mathbf{a}_2 + z_9\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(x_9 + y_9)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}a\,(x_9 - y_9)\,\hat{\mathbf{y}} + cz_9\,\hat{\mathbf{z}}$	(6d)	O VII
$\mathbf{B_{50}}$	$=$	$-y_9\,\mathbf{a}_1 + (x_9 - y_9)\,\mathbf{a}_2 + z_9\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(x_9 - 2y_9)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} + cz_9\,\hat{\mathbf{z}}$	(6d)	O VII
$\mathbf{B_{51}}$	$=$	$-(x_9 - y_9)\,\mathbf{a}_1 - x_9\,\mathbf{a}_2 + z_9\,\mathbf{a}_3$	$=$	$-\frac{1}{2}a\,(2x_9 - y_9)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ay_9\,\hat{\mathbf{y}} + cz_9\,\hat{\mathbf{z}}$	(6d)	O VII
$\mathbf{B_{52}}$	$=$	$-x_9\,\mathbf{a}_1 - y_9\,\mathbf{a}_2 + z_9\,\mathbf{a}_3$	$=$	$-\frac{1}{2}a\,(x_9 + y_9)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}a\,(x_9 - y_9)\,\hat{\mathbf{y}} + cz_9\,\hat{\mathbf{z}}$	(6d)	O VII
$\mathbf{B_{53}}$	$=$	$y_9\,\mathbf{a}_1 - (x_9 - y_9)\,\mathbf{a}_2 + z_9\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(-x_9 + 2y_9)\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_9\,\hat{\mathbf{y}} + cz_9\,\hat{\mathbf{z}}$	(6d)	O VII
$\mathbf{B_{54}}$	$=$	$(x_9 - y_9)\,\mathbf{a}_1 + x_9\,\mathbf{a}_2 + z_9\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(2x_9 - y_9)\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ay_9\,\hat{\mathbf{y}} + cz_9\,\hat{\mathbf{z}}$	(6d)	O VII
$\mathbf{B_{55}}$	$=$	$x_{10}\,\mathbf{a}_1 + y_{10}\,\mathbf{a}_2 + z_{10}\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(x_{10} + y_{10})\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}a\,(x_{10} - y_{10})\,\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}}$	(6d)	O VIII
$\mathbf{B_{56}}$	$=$	$-y_{10}\,\mathbf{a}_1 + (x_{10} - y_{10})\,\mathbf{a}_2 + z_{10}\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(x_{10} - 2y_{10})\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}}$	(6d)	O VIII
$\mathbf{B_{57}}$	$=$	$-(x_{10} - y_{10})\,\mathbf{a}_1 - x_{10}\,\mathbf{a}_2 + z_{10}\,\mathbf{a}_3$	$=$	$-\frac{1}{2}a\,(2x_{10} - y_{10})\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ay_{10}\,\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}}$	(6d)	O VIII
$\mathbf{B_{58}}$	$=$	$-x_{10}\,\mathbf{a}_1 - y_{10}\,\mathbf{a}_2 + z_{10}\,\mathbf{a}_3$	$=$	$-\frac{1}{2}a\,(x_{10} + y_{10})\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}a\,(x_{10} - y_{10})\,\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}}$	(6d)	O VIII
$\mathbf{B_{59}}$	$=$	$y_{10}\,\mathbf{a}_1 - (x_{10} - y_{10})\,\mathbf{a}_2 + z_{10}\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(-x_{10} + 2y_{10})\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}ax_{10}\,\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}}$	(6d)	O VIII
$\mathbf{B_{60}}$	$=$	$(x_{10} - y_{10})\,\mathbf{a}_1 + x_{10}\,\mathbf{a}_2 + z_{10}\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(2x_{10} - y_{10})\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ay_{10}\,\hat{\mathbf{y}} + cz_{10}\,\hat{\mathbf{z}}$	(6d)	O VIII
$\mathbf{B_{61}}$	$=$	$x_{11}\,\mathbf{a}_1 + y_{11}\,\mathbf{a}_2 + z_{11}\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(x_{11} + y_{11})\,\hat{\mathbf{x}} - \frac{\sqrt{3}}{2}a\,(x_{11} - y_{11})\,\hat{\mathbf{y}} + cz_{11}\,\hat{\mathbf{z}}$	(6d)	P I
$\mathbf{B_{62}}$	$=$	$-y_{11}\,\mathbf{a}_1 + (x_{11} - y_{11})\,\mathbf{a}_2 + z_{11}\,\mathbf{a}_3$	$=$	$\frac{1}{2}a\,(x_{11} - 2y_{11})\,\hat{\mathbf{x}} + \frac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}} + cz_{11}\,\hat{\mathbf{z}}$	(6d)	P I

$\mathbf{B_{63}}$	=	$-(x_{11}-y_{11})\,\mathbf{a}_1-x_{11}\,\mathbf{a}_2+z_{11}\,\mathbf{a}_3$	=	$-\frac{1}{2}a\,(2x_{11}-y_{11})\,\hat{\mathbf{x}}-\frac{\sqrt{3}}{2}ay_{11}\,\hat{\mathbf{y}}+cz_{11}\,\hat{\mathbf{z}}$	(6d)	P I
$\mathbf{B_{64}}$	=	$-x_{11}\,\mathbf{a}_1-y_{11}\,\mathbf{a}_2+z_{11}\,\mathbf{a}_3$	=	$-\frac{1}{2}a\,(x_{11}+y_{11})\,\hat{\mathbf{x}}+\frac{\sqrt{3}}{2}a\,(x_{11}-y_{11})\,\hat{\mathbf{y}}+cz_{11}\,\hat{\mathbf{z}}$	(6d)	P I
$\mathbf{B_{65}}$	=	$y_{11}\,\mathbf{a}_1-(x_{11}-y_{11})\,\mathbf{a}_2+z_{11}\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(-x_{11}+2y_{11})\,\hat{\mathbf{x}}-\frac{\sqrt{3}}{2}ax_{11}\,\hat{\mathbf{y}}+cz_{11}\,\hat{\mathbf{z}}$	(6d)	P I
$\mathbf{B_{66}}$	=	$(x_{11}-y_{11})\,\mathbf{a}_1+x_{11}\,\mathbf{a}_2+z_{11}\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(2x_{11}-y_{11})\,\hat{\mathbf{x}}+\frac{\sqrt{3}}{2}ay_{11}\,\hat{\mathbf{y}}+cz_{11}\,\hat{\mathbf{z}}$	(6d)	P I
$\mathbf{B_{67}}$	=	$x_{12}\,\mathbf{a}_1+y_{12}\,\mathbf{a}_2+z_{12}\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(x_{12}+y_{12})\,\hat{\mathbf{x}}-\frac{\sqrt{3}}{2}a\,(x_{12}-y_{12})\,\hat{\mathbf{y}}+cz_{12}\,\hat{\mathbf{z}}$	(6d)	P II
$\mathbf{B_{68}}$	=	$-y_{12}\,\mathbf{a}_1+(x_{12}-y_{12})\,\mathbf{a}_2+z_{12}\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(x_{12}-2y_{12})\,\hat{\mathbf{x}}+\frac{\sqrt{3}}{2}ax_{12}\,\hat{\mathbf{y}}+cz_{12}\,\hat{\mathbf{z}}$	(6d)	P II
$\mathbf{B_{69}}$	=	$-(x_{12}-y_{12})\,\mathbf{a}_1-x_{12}\,\mathbf{a}_2+z_{12}\,\mathbf{a}_3$	=	$-\frac{1}{2}a\,(2x_{12}-y_{12})\,\hat{\mathbf{x}}-\frac{\sqrt{3}}{2}ay_{12}\,\hat{\mathbf{y}}+cz_{12}\,\hat{\mathbf{z}}$	(6d)	P II
$\mathbf{B_{70}}$	=	$-x_{12}\,\mathbf{a}_1-y_{12}\,\mathbf{a}_2+z_{12}\,\mathbf{a}_3$	=	$-\frac{1}{2}a\,(x_{12}+y_{12})\,\hat{\mathbf{x}}+\frac{\sqrt{3}}{2}a\,(x_{12}-y_{12})\,\hat{\mathbf{y}}+cz_{12}\,\hat{\mathbf{z}}$	(6d)	P II
$\mathbf{B_{71}}$	=	$y_{12}\,\mathbf{a}_1-(x_{12}-y_{12})\,\mathbf{a}_2+z_{12}\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(-x_{12}+2y_{12})\,\hat{\mathbf{x}}-\frac{\sqrt{3}}{2}ax_{12}\,\hat{\mathbf{y}}+cz_{12}\,\hat{\mathbf{z}}$	(6d)	P II
$\mathbf{B_{72}}$	=	$(x_{12}-y_{12})\,\mathbf{a}_1+x_{12}\,\mathbf{a}_2+z_{12}\,\mathbf{a}_3$	=	$\frac{1}{2}a\,(2x_{12}-y_{12})\,\hat{\mathbf{x}}+\frac{\sqrt{3}}{2}ay_{12}\,\hat{\mathbf{y}}+cz_{12}\,\hat{\mathbf{z}}$	(6d)	P II

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