

Ca₃Al₂O₆ Structure:

A2B3C6_cP264_205_2d_ab2c2d_6d-001

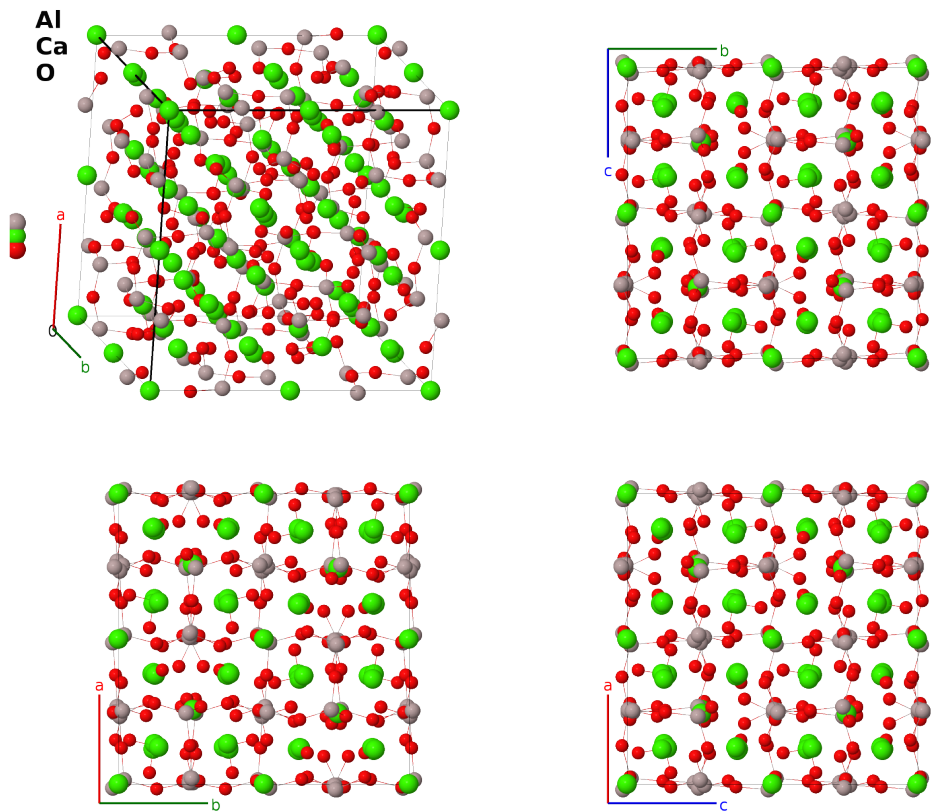
This structure previously used the label(s) **A2B3C6_cP264_205_2d_ab2c2d_6d**. Calls to these addresses will be redirected here.

Cite this page as:

- H. Eckert, S. Divilov, M. J. Mehl, D. Hicks, A. C. Zettl, M. Esters, X. Campilongo, and S. Curtarolo, *The AFLOW Library of Crystallographic Prototypes: Part 4*, Comput. Mater. Sci. **240**, 112988 (2024), doi: 10.1016/j.commatsci.2024.112988.
- 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/prototype-encyclopedia/Q2JD>

https://aflow.org/prototype-encyclopedia/A2B3C6_cP264_205_2d_ab2c2d_6d-001



Prototype	Al ₂ Ca ₃ O ₆
AFLOW prototype label	A2B3C6_cP264_205_2d_ab2c2d_6d-001
ICSD	1841
CCDC	1591814
Pearson symbol	cP264
Space group number	205
Space group symbol	$P\bar{a}3$

AFLOW prototype command `aflow --proto=A2B3C6_cP264_205_2d_ab2c2d_6d-001`
 `--params=a, x3, x4, x5, y5, z5, x6, y6, z6, x7, y7, z7, x8, y8, z8, x9, y9, z9, x10, y10, z10, x11,`
 `y11, z11, x12, y12, z12, x13, y13, z13, x14, y14, z14`

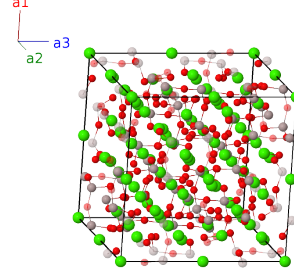
- This is a redetermination of the $E9_1$ ($\text{Ca}_3\text{Al}_2\text{O}_6$) structure. The lattice constant of the new unit cell is twice the original, giving a volume eight times larger.
-

Simple Cubic primitive vectors

$$\mathbf{a}_1 = a \hat{\mathbf{x}}$$

$$\mathbf{a}_2 = a \hat{\mathbf{y}}$$

$$\mathbf{a}_3 = a \hat{\mathbf{z}}$$



Basis vectors

	Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B}_1$	$=$	0	$=$	0	Ca I
$\mathbf{B}_2$	$=$	$\frac{1}{2} \mathbf{a}_1 + \frac{1}{2} \mathbf{a}_3$	$=$	$\frac{1}{2} a \hat{\mathbf{x}} + \frac{1}{2} a \hat{\mathbf{z}}$	Ca I
$\mathbf{B}_3$	$=$	$\frac{1}{2} \mathbf{a}_2 + \frac{1}{2} \mathbf{a}_3$	$=$	$\frac{1}{2} a \hat{\mathbf{y}} + \frac{1}{2} a \hat{\mathbf{z}}$	Ca I
$\mathbf{B}_4$	$=$	$\frac{1}{2} \mathbf{a}_1 + \frac{1}{2} \mathbf{a}_2$	$=$	$\frac{1}{2} a \hat{\mathbf{x}} + \frac{1}{2} a \hat{\mathbf{y}}$	Ca I
$\mathbf{B}_5$	$=$	$\frac{1}{2} \mathbf{a}_1 + \frac{1}{2} \mathbf{a}_2 + \frac{1}{2} \mathbf{a}_3$	$=$	$\frac{1}{2} a \hat{\mathbf{x}} + \frac{1}{2} a \hat{\mathbf{y}} + \frac{1}{2} a \hat{\mathbf{z}}$	Ca II
$\mathbf{B}_6$	$=$	$\frac{1}{2} \mathbf{a}_2$	$=$	$\frac{1}{2} a \hat{\mathbf{y}}$	Ca II
$\mathbf{B}_7$	$=$	$\frac{1}{2} \mathbf{a}_1$	$=$	$\frac{1}{2} a \hat{\mathbf{x}}$	Ca II
$\mathbf{B}_8$	$=$	$\frac{1}{2} \mathbf{a}_3$	$=$	$\frac{1}{2} a \hat{\mathbf{z}}$	Ca II
$\mathbf{B}_9$	$=$	$x_3 \mathbf{a}_1 + x_3 \mathbf{a}_2 + x_3 \mathbf{a}_3$	$=$	$ax_3 \hat{\mathbf{x}} + ax_3 \hat{\mathbf{y}} + ax_3 \hat{\mathbf{z}}$	Ca III
$\mathbf{B}_{10}$	$=$	$-(x_3 - \frac{1}{2}) \mathbf{a}_1 - x_3 \mathbf{a}_2 + (x_3 + \frac{1}{2}) \mathbf{a}_3$	$=$	$-a(x_3 - \frac{1}{2}) \hat{\mathbf{x}} - ax_3 \hat{\mathbf{y}} + a(x_3 + \frac{1}{2}) \hat{\mathbf{z}}$	Ca III
$\mathbf{B}_{11}$	$=$	$-x_3 \mathbf{a}_1 + (x_3 + \frac{1}{2}) \mathbf{a}_2 - (x_3 - \frac{1}{2}) \mathbf{a}_3$	$=$	$-ax_3 \hat{\mathbf{x}} + a(x_3 + \frac{1}{2}) \hat{\mathbf{y}} - a(x_3 - \frac{1}{2}) \hat{\mathbf{z}}$	Ca III
$\mathbf{B}_{12}$	$=$	$(x_3 + \frac{1}{2}) \mathbf{a}_1 - (x_3 - \frac{1}{2}) \mathbf{a}_2 - x_3 \mathbf{a}_3$	$=$	$a(x_3 + \frac{1}{2}) \hat{\mathbf{x}} - a(x_3 - \frac{1}{2}) \hat{\mathbf{y}} - ax_3 \hat{\mathbf{z}}$	Ca III
$\mathbf{B}_{13}$	$=$	$-x_3 \mathbf{a}_1 - x_3 \mathbf{a}_2 - x_3 \mathbf{a}_3$	$=$	$-ax_3 \hat{\mathbf{x}} - ax_3 \hat{\mathbf{y}} - ax_3 \hat{\mathbf{z}}$	Ca III
$\mathbf{B}_{14}$	$=$	$(x_3 + \frac{1}{2}) \mathbf{a}_1 + x_3 \mathbf{a}_2 - (x_3 - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(x_3 + \frac{1}{2}) \hat{\mathbf{x}} + ax_3 \hat{\mathbf{y}} - a(x_3 - \frac{1}{2}) \hat{\mathbf{z}}$	Ca III
$\mathbf{B}_{15}$	$=$	$x_3 \mathbf{a}_1 - (x_3 - \frac{1}{2}) \mathbf{a}_2 + (x_3 + \frac{1}{2}) \mathbf{a}_3$	$=$	$ax_3 \hat{\mathbf{x}} - a(x_3 - \frac{1}{2}) \hat{\mathbf{y}} + a(x_3 + \frac{1}{2}) \hat{\mathbf{z}}$	Ca III
$\mathbf{B}_{16}$	$=$	$-(x_3 - \frac{1}{2}) \mathbf{a}_1 + (x_3 + \frac{1}{2}) \mathbf{a}_2 + x_3 \mathbf{a}_3$	$=$	$-a(x_3 - \frac{1}{2}) \hat{\mathbf{x}} + a(x_3 + \frac{1}{2}) \hat{\mathbf{y}} + ax_3 \hat{\mathbf{z}}$	Ca III
$\mathbf{B}_{17}$	$=$	$x_4 \mathbf{a}_1 + x_4 \mathbf{a}_2 + x_4 \mathbf{a}_3$	$=$	$ax_4 \hat{\mathbf{x}} + ax_4 \hat{\mathbf{y}} + ax_4 \hat{\mathbf{z}}$	Ca IV
$\mathbf{B}_{18}$	$=$	$-(x_4 - \frac{1}{2}) \mathbf{a}_1 - x_4 \mathbf{a}_2 + (x_4 + \frac{1}{2}) \mathbf{a}_3$	$=$	$-a(x_4 - \frac{1}{2}) \hat{\mathbf{x}} - ax_4 \hat{\mathbf{y}} + a(x_4 + \frac{1}{2}) \hat{\mathbf{z}}$	Ca IV

$\mathbf{B}_{19} =$	$-x_4 \mathbf{a}_1 + (x_4 + \frac{1}{2}) \mathbf{a}_2 -$	$=$	$-ax_4 \hat{\mathbf{x}} + a(x_4 + \frac{1}{2}) \hat{\mathbf{y}} - a(x_4 - \frac{1}{2}) \hat{\mathbf{z}}$	(8c)	Ca IV
	$(x_4 - \frac{1}{2}) \mathbf{a}_3$				
$\mathbf{B}_{20} =$	$(x_4 + \frac{1}{2}) \mathbf{a}_1 - (x_4 - \frac{1}{2}) \mathbf{a}_2 - x_4 \mathbf{a}_3$	$=$	$a(x_4 + \frac{1}{2}) \hat{\mathbf{x}} - a(x_4 - \frac{1}{2}) \hat{\mathbf{y}} - ax_4 \hat{\mathbf{z}}$	(8c)	Ca IV
$\mathbf{B}_{21} =$	$-x_4 \mathbf{a}_1 - x_4 \mathbf{a}_2 - x_4 \mathbf{a}_3$	$=$	$-ax_4 \hat{\mathbf{x}} - ax_4 \hat{\mathbf{y}} - ax_4 \hat{\mathbf{z}}$	(8c)	Ca IV
$\mathbf{B}_{22} =$	$(x_4 + \frac{1}{2}) \mathbf{a}_1 + x_4 \mathbf{a}_2 - (x_4 - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(x_4 + \frac{1}{2}) \hat{\mathbf{x}} + ax_4 \hat{\mathbf{y}} - a(x_4 - \frac{1}{2}) \hat{\mathbf{z}}$	(8c)	Ca IV
$\mathbf{B}_{23} =$	$x_4 \mathbf{a}_1 - (x_4 - \frac{1}{2}) \mathbf{a}_2 + (x_4 + \frac{1}{2}) \mathbf{a}_3$	$=$	$ax_4 \hat{\mathbf{x}} - a(x_4 - \frac{1}{2}) \hat{\mathbf{y}} + a(x_4 + \frac{1}{2}) \hat{\mathbf{z}}$	(8c)	Ca IV
$\mathbf{B}_{24} =$	$-(x_4 - \frac{1}{2}) \mathbf{a}_1 + (x_4 + \frac{1}{2}) \mathbf{a}_2 +$	$=$	$-a(x_4 - \frac{1}{2}) \hat{\mathbf{x}} + a(x_4 + \frac{1}{2}) \hat{\mathbf{y}} + ax_4 \hat{\mathbf{z}}$	(8c)	Ca IV
	$x_4 \mathbf{a}_3$				
$\mathbf{B}_{25} =$	$x_5 \mathbf{a}_1 + y_5 \mathbf{a}_2 + z_5 \mathbf{a}_3$	$=$	$ax_5 \hat{\mathbf{x}} + ay_5 \hat{\mathbf{y}} + az_5 \hat{\mathbf{z}}$	(24d)	Al I
$\mathbf{B}_{26} =$	$-(x_5 - \frac{1}{2}) \mathbf{a}_1 - y_5 \mathbf{a}_2 +$	$=$	$-a(x_5 - \frac{1}{2}) \hat{\mathbf{x}} - ay_5 \hat{\mathbf{y}} + a(z_5 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Al I
	$(z_5 + \frac{1}{2}) \mathbf{a}_3$				
$\mathbf{B}_{27} =$	$-x_5 \mathbf{a}_1 + (y_5 + \frac{1}{2}) \mathbf{a}_2 -$	$=$	$-ax_5 \hat{\mathbf{x}} + a(y_5 + \frac{1}{2}) \hat{\mathbf{y}} - a(z_5 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Al I
	$(z_5 - \frac{1}{2}) \mathbf{a}_3$				
$\mathbf{B}_{28} =$	$(x_5 + \frac{1}{2}) \mathbf{a}_1 - (y_5 - \frac{1}{2}) \mathbf{a}_2 - z_5 \mathbf{a}_3$	$=$	$a(x_5 + \frac{1}{2}) \hat{\mathbf{x}} - a(y_5 - \frac{1}{2}) \hat{\mathbf{y}} - az_5 \hat{\mathbf{z}}$	(24d)	Al I
$\mathbf{B}_{29} =$	$z_5 \mathbf{a}_1 + x_5 \mathbf{a}_2 + y_5 \mathbf{a}_3$	$=$	$az_5 \hat{\mathbf{x}} + ax_5 \hat{\mathbf{y}} + ay_5 \hat{\mathbf{z}}$	(24d)	Al I
$\mathbf{B}_{30} =$	$(z_5 + \frac{1}{2}) \mathbf{a}_1 - (x_5 - \frac{1}{2}) \mathbf{a}_2 - y_5 \mathbf{a}_3$	$=$	$a(z_5 + \frac{1}{2}) \hat{\mathbf{x}} - a(x_5 - \frac{1}{2}) \hat{\mathbf{y}} - ay_5 \hat{\mathbf{z}}$	(24d)	Al I
$\mathbf{B}_{31} =$	$-(z_5 - \frac{1}{2}) \mathbf{a}_1 - x_5 \mathbf{a}_2 +$	$=$	$-a(z_5 - \frac{1}{2}) \hat{\mathbf{x}} - ax_5 \hat{\mathbf{y}} + a(y_5 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Al I
	$(y_5 + \frac{1}{2}) \mathbf{a}_3$				
$\mathbf{B}_{32} =$	$-z_5 \mathbf{a}_1 + (x_5 + \frac{1}{2}) \mathbf{a}_2 -$	$=$	$-az_5 \hat{\mathbf{x}} + a(x_5 + \frac{1}{2}) \hat{\mathbf{y}} - a(y_5 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Al I
	$(y_5 - \frac{1}{2}) \mathbf{a}_3$				
$\mathbf{B}_{33} =$	$y_5 \mathbf{a}_1 + z_5 \mathbf{a}_2 + x_5 \mathbf{a}_3$	$=$	$ay_5 \hat{\mathbf{x}} + az_5 \hat{\mathbf{y}} + ax_5 \hat{\mathbf{z}}$	(24d)	Al I
$\mathbf{B}_{34} =$	$-y_5 \mathbf{a}_1 + (z_5 + \frac{1}{2}) \mathbf{a}_2 -$	$=$	$-ay_5 \hat{\mathbf{x}} + a(z_5 + \frac{1}{2}) \hat{\mathbf{y}} - a(x_5 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Al I
	$(x_5 - \frac{1}{2}) \mathbf{a}_3$				
$\mathbf{B}_{35} =$	$(y_5 + \frac{1}{2}) \mathbf{a}_1 - (z_5 - \frac{1}{2}) \mathbf{a}_2 - x_5 \mathbf{a}_3$	$=$	$a(y_5 + \frac{1}{2}) \hat{\mathbf{x}} - a(z_5 - \frac{1}{2}) \hat{\mathbf{y}} - ax_5 \hat{\mathbf{z}}$	(24d)	Al I
$\mathbf{B}_{36} =$	$-(y_5 - \frac{1}{2}) \mathbf{a}_1 - z_5 \mathbf{a}_2 +$	$=$	$-a(y_5 - \frac{1}{2}) \hat{\mathbf{x}} - az_5 \hat{\mathbf{y}} + a(x_5 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Al I
	$(x_5 + \frac{1}{2}) \mathbf{a}_3$				
$\mathbf{B}_{37} =$	$-x_5 \mathbf{a}_1 - y_5 \mathbf{a}_2 - z_5 \mathbf{a}_3$	$=$	$-ax_5 \hat{\mathbf{x}} - ay_5 \hat{\mathbf{y}} - az_5 \hat{\mathbf{z}}$	(24d)	Al I
$\mathbf{B}_{38} =$	$(x_5 + \frac{1}{2}) \mathbf{a}_1 + y_5 \mathbf{a}_2 - (z_5 - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(x_5 + \frac{1}{2}) \hat{\mathbf{x}} + ay_5 \hat{\mathbf{y}} - a(z_5 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Al I
$\mathbf{B}_{39} =$	$x_5 \mathbf{a}_1 - (y_5 - \frac{1}{2}) \mathbf{a}_2 + (z_5 + \frac{1}{2}) \mathbf{a}_3$	$=$	$ax_5 \hat{\mathbf{x}} - a(y_5 - \frac{1}{2}) \hat{\mathbf{y}} + a(z_5 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Al I
$\mathbf{B}_{40} =$	$-(x_5 - \frac{1}{2}) \mathbf{a}_1 + (y_5 + \frac{1}{2}) \mathbf{a}_2 +$	$=$	$-a(x_5 - \frac{1}{2}) \hat{\mathbf{x}} + a(y_5 + \frac{1}{2}) \hat{\mathbf{y}} + az_5 \hat{\mathbf{z}}$	(24d)	Al I
	$z_5 \mathbf{a}_3$				
$\mathbf{B}_{41} =$	$-z_5 \mathbf{a}_1 - x_5 \mathbf{a}_2 - y_5 \mathbf{a}_3$	$=$	$-az_5 \hat{\mathbf{x}} - ax_5 \hat{\mathbf{y}} - ay_5 \hat{\mathbf{z}}$	(24d)	Al I
$\mathbf{B}_{42} =$	$-(z_5 - \frac{1}{2}) \mathbf{a}_1 + (x_5 + \frac{1}{2}) \mathbf{a}_2 +$	$=$	$-a(z_5 - \frac{1}{2}) \hat{\mathbf{x}} + a(x_5 + \frac{1}{2}) \hat{\mathbf{y}} + ay_5 \hat{\mathbf{z}}$	(24d)	Al I
	$y_5 \mathbf{a}_3$ </				

$\mathbf{B}_{82} =$	$-y_7 \mathbf{a}_1 + (z_7 + \frac{1}{2}) \mathbf{a}_2 -$	$=$	$-ay_7 \hat{\mathbf{x}} + a(z_7 + \frac{1}{2}) \hat{\mathbf{y}} - a(x_7 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca V
	$(x_7 - \frac{1}{2}) \mathbf{a}_3$				
$\mathbf{B}_{83} =$	$(y_7 + \frac{1}{2}) \mathbf{a}_1 - (z_7 - \frac{1}{2}) \mathbf{a}_2 - x_7 \mathbf{a}_3$	$=$	$a(y_7 + \frac{1}{2}) \hat{\mathbf{x}} - a(z_7 - \frac{1}{2}) \hat{\mathbf{y}} - ax_7 \hat{\mathbf{z}}$	(24d)	Ca V
$\mathbf{B}_{84} =$	$-(y_7 - \frac{1}{2}) \mathbf{a}_1 - z_7 \mathbf{a}_2 +$	$=$	$-a(y_7 - \frac{1}{2}) \hat{\mathbf{x}} - az_7 \hat{\mathbf{y}} + a(x_7 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca V
	$(x_7 + \frac{1}{2}) \mathbf{a}_3$				
$\mathbf{B}_{85} =$	$-x_7 \mathbf{a}_1 - y_7 \mathbf{a}_2 - z_7 \mathbf{a}_3$	$=$	$-ax_7 \hat{\mathbf{x}} - ay_7 \hat{\mathbf{y}} - az_7 \hat{\mathbf{z}}$	(24d)	Ca V
$\mathbf{B}_{86} =$	$(x_7 + \frac{1}{2}) \mathbf{a}_1 + y_7 \mathbf{a}_2 - (z_7 - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(x_7 + \frac{1}{2}) \hat{\mathbf{x}} + ay_7 \hat{\mathbf{y}} - a(z_7 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca V
$\mathbf{B}_{87} =$	$x_7 \mathbf{a}_1 - (y_7 - \frac{1}{2}) \mathbf{a}_2 + (z_7 + \frac{1}{2}) \mathbf{a}_3$	$=$	$ax_7 \hat{\mathbf{x}} - a(y_7 - \frac{1}{2}) \hat{\mathbf{y}} + a(z_7 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca V
$\mathbf{B}_{88} =$	$-(x_7 - \frac{1}{2}) \mathbf{a}_1 + (y_7 + \frac{1}{2}) \mathbf{a}_2 +$	$=$	$-a(x_7 - \frac{1}{2}) \hat{\mathbf{x}} + a(y_7 + \frac{1}{2}) \hat{\mathbf{y}} + az_7 \hat{\mathbf{z}}$	(24d)	Ca V
	$z_7 \mathbf{a}_3$				
$\mathbf{B}_{89} =$	$-z_7 \mathbf{a}_1 - x_7 \mathbf{a}_2 - y_7 \mathbf{a}_3$	$=$	$-az_7 \hat{\mathbf{x}} - ax_7 \hat{\mathbf{y}} - ay_7 \hat{\mathbf{z}}$	(24d)	Ca V
$\mathbf{B}_{90} =$	$-(z_7 - \frac{1}{2}) \mathbf{a}_1 + (x_7 + \frac{1}{2}) \mathbf{a}_2 +$	$=$	$-a(z_7 - \frac{1}{2}) \hat{\mathbf{x}} + a(x_7 + \frac{1}{2}) \hat{\mathbf{y}} + ay_7 \hat{\mathbf{z}}$	(24d)	Ca V
	$y_7 \mathbf{a}_3$				
$\mathbf{B}_{91} =$	$(z_7 + \frac{1}{2}) \mathbf{a}_1 + x_7 \mathbf{a}_2 - (y_7 - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(z_7 + \frac{1}{2}) \hat{\mathbf{x}} + ax_7 \hat{\mathbf{y}} - a(y_7 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca V
$\mathbf{B}_{92} =$	$z_7 \mathbf{a}_1 - (x_7 - \frac{1}{2}) \mathbf{a}_2 + (y_7 + \frac{1}{2}) \mathbf{a}_3$	$=$	$az_7 \hat{\mathbf{x}} - a(x_7 - \frac{1}{2}) \hat{\mathbf{y}} + a(y_7 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca V
$\mathbf{B}_{93} =$	$-y_7 \mathbf{a}_1 - z_7 \mathbf{a}_2 - x_7 \mathbf{a}_3$	$=$	$-ay_7 \hat{\mathbf{x}} - az_7 \hat{\mathbf{y}} - ax_7 \hat{\mathbf{z}}$	(24d)	Ca V
$\mathbf{B}_{94} =$	$y_7 \mathbf{a}_1 - (z_7 - \frac{1}{2}) \mathbf{a}_2 + (x_7 + \frac{1}{2}) \mathbf{a}_3$	$=$	$ay_7 \hat{\mathbf{x}} - a(z_7 - \frac{1}{2}) \hat{\mathbf{y}} + a(x_7 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca V
$\mathbf{B}_{95} =$	$-(y_7 - \frac{1}{2}) \mathbf{a}_1 + (z_7 + \frac{1}{2}) \mathbf{a}_2 +$	$=$	$-a(y_7 - \frac{1}{2}) \hat{\mathbf{x}} + a(z_7 + \frac{1}{2}) \hat{\mathbf{y}} + ax_7 \hat{\mathbf{z}}$	(24d)	Ca V
	$x_7 \mathbf{a}_3$				
$\mathbf{B}_{96} =$	$(y_7 + \frac{1}{2}) \mathbf{a}_1 + z_7 \mathbf{a}_2 - (x_7 - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(y_7 + \frac{1}{2}) \hat{\mathbf{x}} + az_7 \hat{\mathbf{y}} - a(x_7 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca V
$\mathbf{B}_{97} =$	$x_8 \mathbf{a}_1 + y_8 \mathbf{a}_2 + z_8 \mathbf{a}_3$	$=$	$ax_8 \hat{\mathbf{x}} + ay_8 \hat{\mathbf{y}} + az_8 \hat{\mathbf{z}}$	(24d)	Ca VI
$\mathbf{B}_{98} =$	$-(x_8 - \frac{1}{2}) \mathbf{a}_1 - y_8 \mathbf{a}_2 +$	$=$	$-a(x_8 - \frac{1}{2}) \hat{\mathbf{x}} - ay_8 \hat{\mathbf{y}} + a(z_8 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca VI
	$(z_8 + \frac{1}{2}) \mathbf{a}_3$				
$\mathbf{B}_{99} =$	$-x_8 \mathbf{a}_1 + (y_8 + \frac{1}{2}) \mathbf{a}_2 -$	$=$	$-ax_8 \hat{\mathbf{x}} + a(y_8 + \frac{1}{2}) \hat{\mathbf{y}} - a(z_8 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca VI
	$(z_8 - \frac{1}{2}) \mathbf{a}_3$				
$\mathbf{B}_{100} =$	$(x_8 + \frac{1}{2}) \mathbf{a}_1 - (y_8 - \frac{1}{2}) \mathbf{a}_2 - z_8 \mathbf{a}_3$	$=$	$a(x_8 + \frac{1}{2}) \hat{\mathbf{x}} - a(y_8 - \frac{1}{2}) \hat{\mathbf{y}} - az_8 \hat{\mathbf{z}}$	(24d)	Ca VI
$\mathbf{B}_{101} =$	$z_8 \mathbf{a}_1 + x_8 \mathbf{a}_2 + y_8 \mathbf{a}_3$	$=$	$az_8 \hat{\mathbf{x}} + ax_8 \hat{\mathbf{y}} + ay_8 \hat{\mathbf{z}}$	(24d)	Ca VI
$\mathbf{B}_{102} =$	$(z_8 + \frac{1}{2}) \mathbf{a}_1 - (x_8 - \frac{1}{2}) \mathbf{a}_2 - y_8 \mathbf{a}_3$	$=$	$a(z_8 + \frac{1}{2}) \hat{\mathbf{x}} - a(x_8 - \frac{1}{2}) \hat{\mathbf{y}} - ay_8 \hat{\mathbf{z}}$	(24d)	Ca VI
$\mathbf{B}_{103} =$	$-(z_8 - \frac{1}{2}) \mathbf{a}_1 - x_8 \mathbf{a}_2 +$	$=$	$-a(z_8 - \frac{1}{2}) \hat{\mathbf{x}} - ax_8 \hat{\mathbf{y}} + a(y_8 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca VI
	$(y_8 + \frac{1}{2}) \mathbf{a}_3$				
$\mathbf{B}_{104} =$	$-z_8 \mathbf{a}_1 + (x_8 + \frac{1}{2}) \mathbf{a}_2 -$	$=$	$-az_8 \hat{\mathbf{x}} + a(x_8 + \frac{1}{2}) \hat{\mathbf{y}} - a(y_8 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca VI
	$(y_8 - \frac{1}{2}) \mathbf{a}_3$				
$\mathbf{B}_{105} =$	$y_8 \mathbf{a}_1 + z_8 \mathbf{a}_2 + x_8 \mathbf{a}_3$	$=$	$ay_8 \hat{\mathbf{x}} + az_8 \hat{\mathbf{y}} + ax_8 \hat{\mathbf{z}}$	(24d)	Ca VI
$\mathbf{B}_{106} =$	$-y_8 \mathbf{a}_1 + (z_8 + \frac{1}{2}) \mathbf{a}_2 -$	$=$	$-ay_8 \hat{\mathbf{x}} + a(z_8 + \frac{1}{2}) \hat{\mathbf{y}} - a(x_8 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca VI
	$(x_8 - \frac{1}{2}) \mathbf{a}_3$				
$\mathbf{B}_{107} =$	$(y_8 + \frac{1}{2}) \mathbf{a}_1 - (z_8 - \frac{1}{2}) \mathbf{a}_2 - x_8 \mathbf{a}_3$	$=$	$a(y_8 + \frac{1}{2}) \hat{\mathbf{x}} - a(z_8 - \frac{1}{2}) \hat{\mathbf{y}} - ax_8 \hat{\mathbf{z}}$	(24d)	Ca VI
$\mathbf{B}_{108} =$	$-(y_8 - \frac{1}{2}) \mathbf{a}_1 - z_8 \mathbf{a}_2 +$	$=$	$-a(y_8 - \frac{1}{2}) \hat{\mathbf{x}} - az_8 \hat{\mathbf{y}} + a(x_8 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca VI
	$(x_8 + \frac{1}{2}) \mathbf{a}_3$				
$\mathbf{B}_{109} =$	$-x_8 \mathbf{a}_1 - y_8 \mathbf{a}_2 - z_8 \mathbf{a}_3$	$=$	$-ax_8 \hat{\mathbf{x}} - ay_8 \hat{\mathbf{y}} - az_8 \hat{\mathbf{z}}$	(24d)	Ca VI
$\mathbf{B}_{110} =$	$(x_8 + \frac{1}{2}) \mathbf{a}_1 + y_8 \mathbf{a}_2 - (z_8 - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(x_8 + \frac{1}{2}) \hat{\mathbf{x}} + ay_8 \hat{\mathbf{y}} - a(z_8 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca VI
$\mathbf{B}_{111} =$	$x_8 \mathbf{a}_1 - (y_8 - \frac{1}{2}) \mathbf{a}_2 + (z_8 + \frac{1}{2}) \mathbf{a}_3$	$=$	$ax_8 \hat{\mathbf{x}} - a(y_8 - \frac{1}{2}) \hat{\mathbf{y}} + a(z_8 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca VI
$\mathbf{B}_{112} =$	$-(x_8 - \frac{1}{2}) \mathbf{a}_1 + (y_8 + \frac{1}{2}) \mathbf{a}_2 +$	$=$	$-a(x_8 - \frac{1}{2}) \hat{\mathbf{x}} + a(y_8 + \frac{1}{2}) \hat{\mathbf{y}} + az_8 \hat{\mathbf{z}}$	(24d)	Ca VI
	$z_8 \mathbf{a}_3$				
$\mathbf{B}_{113} =$	$-z_8 \mathbf{a}_1 - x_8 \mathbf{a}_2 - y_8 \mathbf{a}_3$	$=$	$-az_8 \hat{\mathbf{x}} - ax_8 \hat{\mathbf{y}} - ay_8 \hat{\mathbf{z}}$	(24d)	Ca VI

$\mathbf{B}_{114} =$	$-(z_8 - \frac{1}{2}) \mathbf{a}_1 + (x_8 + \frac{1}{2}) \mathbf{a}_2 + y_8 \mathbf{a}_3$	$=$	$-a(z_8 - \frac{1}{2}) \hat{\mathbf{x}} + a(x_8 + \frac{1}{2}) \hat{\mathbf{y}} + ay_8 \hat{\mathbf{z}}$	(24d)	Ca VI
$\mathbf{B}_{115} =$	$(z_8 + \frac{1}{2}) \mathbf{a}_1 + x_8 \mathbf{a}_2 - (y_8 - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(z_8 + \frac{1}{2}) \hat{\mathbf{x}} + ax_8 \hat{\mathbf{y}} - a(y_8 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca VI
$\mathbf{B}_{116} =$	$z_8 \mathbf{a}_1 - (x_8 - \frac{1}{2}) \mathbf{a}_2 + (y_8 + \frac{1}{2}) \mathbf{a}_3$	$=$	$az_8 \hat{\mathbf{x}} - a(x_8 - \frac{1}{2}) \hat{\mathbf{y}} + a(y_8 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca VI
$\mathbf{B}_{117} =$	$-y_8 \mathbf{a}_1 - z_8 \mathbf{a}_2 - x_8 \mathbf{a}_3$	$=$	$-ay_8 \hat{\mathbf{x}} - az_8 \hat{\mathbf{y}} - ax_8 \hat{\mathbf{z}}$	(24d)	Ca VI
$\mathbf{B}_{118} =$	$y_8 \mathbf{a}_1 - (z_8 - \frac{1}{2}) \mathbf{a}_2 + (x_8 + \frac{1}{2}) \mathbf{a}_3$	$=$	$ay_8 \hat{\mathbf{x}} - a(z_8 - \frac{1}{2}) \hat{\mathbf{y}} + a(x_8 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca VI
$\mathbf{B}_{119} =$	$-(y_8 - \frac{1}{2}) \mathbf{a}_1 + (z_8 + \frac{1}{2}) \mathbf{a}_2 + x_8 \mathbf{a}_3$	$=$	$-a(y_8 - \frac{1}{2}) \hat{\mathbf{x}} + a(z_8 + \frac{1}{2}) \hat{\mathbf{y}} + ax_8 \hat{\mathbf{z}}$	(24d)	Ca VI
$\mathbf{B}_{120} =$	$(y_8 + \frac{1}{2}) \mathbf{a}_1 + z_8 \mathbf{a}_2 - (x_8 - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(y_8 + \frac{1}{2}) \hat{\mathbf{x}} + az_8 \hat{\mathbf{y}} - a(x_8 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	Ca VI
$\mathbf{B}_{121} =$	$x_9 \mathbf{a}_1 + y_9 \mathbf{a}_2 + z_9 \mathbf{a}_3$	$=$	$ax_9 \hat{\mathbf{x}} + ay_9 \hat{\mathbf{y}} + az_9 \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{122} =$	$-(x_9 - \frac{1}{2}) \mathbf{a}_1 - y_9 \mathbf{a}_2 + (z_9 + \frac{1}{2}) \mathbf{a}_3$	$=$	$-a(x_9 - \frac{1}{2}) \hat{\mathbf{x}} - ay_9 \hat{\mathbf{y}} + a(z_9 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{123} =$	$-x_9 \mathbf{a}_1 + (y_9 + \frac{1}{2}) \mathbf{a}_2 - (z_9 - \frac{1}{2}) \mathbf{a}_3$	$=$	$-ax_9 \hat{\mathbf{x}} + a(y_9 + \frac{1}{2}) \hat{\mathbf{y}} - a(z_9 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{124} =$	$(x_9 + \frac{1}{2}) \mathbf{a}_1 - (y_9 - \frac{1}{2}) \mathbf{a}_2 - z_9 \mathbf{a}_3$	$=$	$a(x_9 + \frac{1}{2}) \hat{\mathbf{x}} - a(y_9 - \frac{1}{2}) \hat{\mathbf{y}} - az_9 \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{125} =$	$z_9 \mathbf{a}_1 + x_9 \mathbf{a}_2 + y_9 \mathbf{a}_3$	$=$	$az_9 \hat{\mathbf{x}} + ax_9 \hat{\mathbf{y}} + ay_9 \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{126} =$	$(z_9 + \frac{1}{2}) \mathbf{a}_1 - (x_9 - \frac{1}{2}) \mathbf{a}_2 - y_9 \mathbf{a}_3$	$=$	$a(z_9 + \frac{1}{2}) \hat{\mathbf{x}} - a(x_9 - \frac{1}{2}) \hat{\mathbf{y}} - ay_9 \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{127} =$	$-(z_9 - \frac{1}{2}) \mathbf{a}_1 - x_9 \mathbf{a}_2 + (y_9 + \frac{1}{2}) \mathbf{a}_3$	$=$	$-a(z_9 - \frac{1}{2}) \hat{\mathbf{x}} - ax_9 \hat{\mathbf{y}} + a(y_9 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{128} =$	$-z_9 \mathbf{a}_1 + (x_9 + \frac{1}{2}) \mathbf{a}_2 - (y_9 - \frac{1}{2}) \mathbf{a}_3$	$=$	$-az_9 \hat{\mathbf{x}} + a(x_9 + \frac{1}{2}) \hat{\mathbf{y}} - a(y_9 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{129} =$	$y_9 \mathbf{a}_1 + z_9 \mathbf{a}_2 + x_9 \mathbf{a}_3$	$=$	$ay_9 \hat{\mathbf{x}} + az_9 \hat{\mathbf{y}} + ax_9 \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{130} =$	$-y_9 \mathbf{a}_1 + (z_9 + \frac{1}{2}) \mathbf{a}_2 - (x_9 - \frac{1}{2}) \mathbf{a}_3$	$=$	$-ay_9 \hat{\mathbf{x}} + a(z_9 + \frac{1}{2}) \hat{\mathbf{y}} - a(x_9 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{131} =$	$(y_9 + \frac{1}{2}) \mathbf{a}_1 - (z_9 - \frac{1}{2}) \mathbf{a}_2 - x_9 \mathbf{a}_3$	$=$	$a(y_9 + \frac{1}{2}) \hat{\mathbf{x}} - a(z_9 - \frac{1}{2}) \hat{\mathbf{y}} - ax_9 \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{132} =$	$-(y_9 - \frac{1}{2}) \mathbf{a}_1 - z_9 \mathbf{a}_2 + (x_9 + \frac{1}{2}) \mathbf{a}_3$	$=$	$-a(y_9 - \frac{1}{2}) \hat{\mathbf{x}} - az_9 \hat{\mathbf{y}} + a(x_9 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{133} =$	$-x_9 \mathbf{a}_1 - y_9 \mathbf{a}_2 - z_9 \mathbf{a}_3$	$=$	$-ax_9 \hat{\mathbf{x}} - ay_9 \hat{\mathbf{y}} - az_9 \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{134} =$	$(x_9 + \frac{1}{2}) \mathbf{a}_1 + y_9 \mathbf{a}_2 - (z_9 - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(x_9 + \frac{1}{2}) \hat{\mathbf{x}} + ay_9 \hat{\mathbf{y}} - a(z_9 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{135} =$	$x_9 \mathbf{a}_1 - (y_9 - \frac{1}{2}) \mathbf{a}_2 + (z_9 + \frac{1}{2}) \mathbf{a}_3$	$=$	$ax_9 \hat{\mathbf{x}} - a(y_9 - \frac{1}{2}) \hat{\mathbf{y}} + a(z_9 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{136} =$	$-(x_9 - \frac{1}{2}) \mathbf{a}_1 + (y_9 + \frac{1}{2}) \mathbf{a}_2 + z_9 \mathbf{a}_3$	$=$	$-a(x_9 - \frac{1}{2}) \hat{\mathbf{x}} + a(y_9 + \frac{1}{2}) \hat{\mathbf{y}} + az_9 \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{137} =$	$-z_9 \mathbf{a}_1 - x_9 \mathbf{a}_2 - y_9 \mathbf{a}_3$	$=$	$-az_9 \hat{\mathbf{x}} - ax_9 \hat{\mathbf{y}} - ay_9 \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{138} =$	$-(z_9 - \frac{1}{2}) \mathbf{a}_1 + (x_9 + \frac{1}{2}) \mathbf{a}_2 + y_9 \mathbf{a}_3$	$=$	$-a(z_9 - \frac{1}{2}) \hat{\mathbf{x}} + a(x_9 + \frac{1}{2}) \hat{\mathbf{y}} + ay_9 \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{139} =$	$(z_9 + \frac{1}{2}) \mathbf{a}_1 + x_9 \mathbf{a}_2 - (y_9 - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(z_9 + \frac{1}{2}) \hat{\mathbf{x}} + ax_9 \hat{\mathbf{y}} - a(y_9 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{140} =$	$z_9 \mathbf{a}_1 - (x_9 - \frac{1}{2}) \mathbf{a}_2 + (y_9 + \frac{1}{2}) \mathbf{a}_3$	$=$	$az_9 \hat{\mathbf{x}} - a(x_9 - \frac{1}{2}) \hat{\mathbf{y}} + a(y_9 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{141} =$	$-y_9 \mathbf{a}_1 - z_9 \mathbf{a}_2 - x_9 \mathbf{a}_3$	$=$	$-ay_9 \hat{\mathbf{x}} - az_9 \hat{\mathbf{y}} - ax_9 \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{142} =$	$y_9 \mathbf{a}_1 - (z_9 - \frac{1}{2}) \mathbf{a}_2 + (x_9 + \frac{1}{2}) \mathbf{a}_3$	$=$	$ay_9 \hat{\mathbf{x}} - a(z_9 - \frac{1}{2}) \hat{\mathbf{y}} + a(x_9 + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{143} =$	$-(y_9 - \frac{1}{2}) \mathbf{a}_1 + (z_9 + \frac{1}{2}) \mathbf{a}_2 + x_9 \mathbf{a}_3$	$=$	$-a(y_9 - \frac{1}{2}) \hat{\mathbf{x}} + a(z_9 + \frac{1}{2}) \hat{\mathbf{y}} + ax_9 \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{144} =$	$(y_9 + \frac{1}{2}) \mathbf{a}_1 + z_9 \mathbf{a}_2 - (x_9 - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(y_9 + \frac{1}{2}) \hat{\mathbf{x}} + az_9 \hat{\mathbf{y}} - a(x_9 - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O I
$\mathbf{B}_{145} =$	$x_{10} \mathbf{a}_1 + y_{10} \mathbf{a}_2 + z_{10} \mathbf{a}_3$	$=$	$ax_{10} \hat{\mathbf{x}} + ay_{10} \hat{\mathbf{y}} + az_{10} \hat{\mathbf{z}}$	(24d)	O II

$$\begin{aligned}
\mathbf{B}_{172} &= (x_{11} + \frac{1}{2}) \mathbf{a}_1 - (y_{11} - \frac{1}{2}) \mathbf{a}_2 - z_{11} \mathbf{a}_3 = a(x_{11} + \frac{1}{2}) \hat{\mathbf{x}} - a(y_{11} - \frac{1}{2}) \hat{\mathbf{y}} - az_{11} \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{173} &= z_{11} \mathbf{a}_1 + x_{11} \mathbf{a}_2 + y_{11} \mathbf{a}_3 = az_{11} \hat{\mathbf{x}} + ax_{11} \hat{\mathbf{y}} + ay_{11} \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{174} &= (z_{11} + \frac{1}{2}) \mathbf{a}_1 - (x_{11} - \frac{1}{2}) \mathbf{a}_2 - y_{11} \mathbf{a}_3 = a(z_{11} + \frac{1}{2}) \hat{\mathbf{x}} - a(x_{11} - \frac{1}{2}) \hat{\mathbf{y}} - ay_{11} \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{175} &= -(z_{11} - \frac{1}{2}) \mathbf{a}_1 - x_{11} \mathbf{a}_2 + (y_{11} + \frac{1}{2}) \mathbf{a}_3 = -a(z_{11} - \frac{1}{2}) \hat{\mathbf{x}} - ax_{11} \hat{\mathbf{y}} + a(y_{11} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{176} &= -z_{11} \mathbf{a}_1 + (x_{11} + \frac{1}{2}) \mathbf{a}_2 - (y_{11} - \frac{1}{2}) \mathbf{a}_3 = -az_{11} \hat{\mathbf{x}} + a(x_{11} + \frac{1}{2}) \hat{\mathbf{y}} - a(y_{11} - \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{177} &= y_{11} \mathbf{a}_1 + z_{11} \mathbf{a}_2 + x_{11} \mathbf{a}_3 = ay_{11} \hat{\mathbf{x}} + az_{11} \hat{\mathbf{y}} + ax_{11} \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{178} &= -y_{11} \mathbf{a}_1 + (z_{11} + \frac{1}{2}) \mathbf{a}_2 - (x_{11} - \frac{1}{2}) \mathbf{a}_3 = -ay_{11} \hat{\mathbf{x}} + a(z_{11} + \frac{1}{2}) \hat{\mathbf{y}} - a(x_{11} - \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{179} &= (y_{11} + \frac{1}{2}) \mathbf{a}_1 - (z_{11} - \frac{1}{2}) \mathbf{a}_2 - x_{11} \mathbf{a}_3 = a(y_{11} + \frac{1}{2}) \hat{\mathbf{x}} - a(z_{11} - \frac{1}{2}) \hat{\mathbf{y}} - ax_{11} \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{180} &= -(y_{11} - \frac{1}{2}) \mathbf{a}_1 - z_{11} \mathbf{a}_2 + (x_{11} + \frac{1}{2}) \mathbf{a}_3 = -a(y_{11} - \frac{1}{2}) \hat{\mathbf{x}} - az_{11} \hat{\mathbf{y}} + a(x_{11} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{181} &= -x_{11} \mathbf{a}_1 - y_{11} \mathbf{a}_2 - z_{11} \mathbf{a}_3 = -ax_{11} \hat{\mathbf{x}} - ay_{11} \hat{\mathbf{y}} - az_{11} \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{182} &= (x_{11} + \frac{1}{2}) \mathbf{a}_1 + y_{11} \mathbf{a}_2 - (z_{11} - \frac{1}{2}) \mathbf{a}_3 = a(x_{11} + \frac{1}{2}) \hat{\mathbf{x}} + ay_{11} \hat{\mathbf{y}} - a(z_{11} - \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{183} &= x_{11} \mathbf{a}_1 - (y_{11} - \frac{1}{2}) \mathbf{a}_2 + (z_{11} + \frac{1}{2}) \mathbf{a}_3 = ax_{11} \hat{\mathbf{x}} - a(y_{11} - \frac{1}{2}) \hat{\mathbf{y}} + a(z_{11} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{184} &= -(x_{11} - \frac{1}{2}) \mathbf{a}_1 + (y_{11} + \frac{1}{2}) \mathbf{a}_2 + z_{11} \mathbf{a}_3 = -a(x_{11} - \frac{1}{2}) \hat{\mathbf{x}} + a(y_{11} + \frac{1}{2}) \hat{\mathbf{y}} + az_{11} \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{185} &= -z_{11} \mathbf{a}_1 - x_{11} \mathbf{a}_2 - y_{11} \mathbf{a}_3 = -az_{11} \hat{\mathbf{x}} - ax_{11} \hat{\mathbf{y}} - ay_{11} \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{186} &= -(z_{11} - \frac{1}{2}) \mathbf{a}_1 + (x_{11} + \frac{1}{2}) \mathbf{a}_2 + y_{11} \mathbf{a}_3 = -a(z_{11} - \frac{1}{2}) \hat{\mathbf{x}} + a(x_{11} + \frac{1}{2}) \hat{\mathbf{y}} + ay_{11} \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{187} &= (z_{11} + \frac{1}{2}) \mathbf{a}_1 + x_{11} \mathbf{a}_2 - (y_{11} - \frac{1}{2}) \mathbf{a}_3 = a(z_{11} + \frac{1}{2}) \hat{\mathbf{x}} + ax_{11} \hat{\mathbf{y}} - a(y_{11} - \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{188} &= z_{11} \mathbf{a}_1 - (x_{11} - \frac{1}{2}) \mathbf{a}_2 + (y_{11} + \frac{1}{2}) \mathbf{a}_3 = az_{11} \hat{\mathbf{x}} - a(x_{11} - \frac{1}{2}) \hat{\mathbf{y}} + a(y_{11} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{189} &= -y_{11} \mathbf{a}_1 - z_{11} \mathbf{a}_2 - x_{11} \mathbf{a}_3 = -ay_{11} \hat{\mathbf{x}} - az_{11} \hat{\mathbf{y}} - ax_{11} \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{190} &= y_{11} \mathbf{a}_1 - (z_{11} - \frac{1}{2}) \mathbf{a}_2 + (x_{11} + \frac{1}{2}) \mathbf{a}_3 = ay_{11} \hat{\mathbf{x}} - a(z_{11} - \frac{1}{2}) \hat{\mathbf{y}} + a(x_{11} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{191} &= -(y_{11} - \frac{1}{2}) \mathbf{a}_1 + (z_{11} + \frac{1}{2}) \mathbf{a}_2 + x_{11} \mathbf{a}_3 = -a(y_{11} - \frac{1}{2}) \hat{\mathbf{x}} + a(z_{11} + \frac{1}{2}) \hat{\mathbf{y}} + ax_{11} \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{192} &= (y_{11} + \frac{1}{2}) \mathbf{a}_1 + z_{11} \mathbf{a}_2 - (x_{11} - \frac{1}{2}) \mathbf{a}_3 = a(y_{11} + \frac{1}{2}) \hat{\mathbf{x}} + az_{11} \hat{\mathbf{y}} - a(x_{11} - \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O III} \\
\mathbf{B}_{193} &= x_{12} \mathbf{a}_1 + y_{12} \mathbf{a}_2 + z_{12} \mathbf{a}_3 = ax_{12} \hat{\mathbf{x}} + ay_{12} \hat{\mathbf{y}} + az_{12} \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{194} &= -(x_{12} - \frac{1}{2}) \mathbf{a}_1 - y_{12} \mathbf{a}_2 + (z_{12} + \frac{1}{2}) \mathbf{a}_3 = -a(x_{12} - \frac{1}{2}) \hat{\mathbf{x}} - ay_{12} \hat{\mathbf{y}} + a(z_{12} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{195} &= -x_{12} \mathbf{a}_1 + (y_{12} + \frac{1}{2}) \mathbf{a}_2 - (z_{12} - \frac{1}{2}) \mathbf{a}_3 = -ax_{12} \hat{\mathbf{x}} + a(y_{12} + \frac{1}{2}) \hat{\mathbf{y}} - a(z_{12} - \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{196} &= (x_{12} + \frac{1}{2}) \mathbf{a}_1 - (y_{12} - \frac{1}{2}) \mathbf{a}_2 - z_{12} \mathbf{a}_3 = a(x_{12} + \frac{1}{2}) \hat{\mathbf{x}} - a(y_{12} - \frac{1}{2}) \hat{\mathbf{y}} - az_{12} \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{197} &= z_{12} \mathbf{a}_1 + x_{12} \mathbf{a}_2 + y_{12} \mathbf{a}_3 = az_{12} \hat{\mathbf{x}} + ax_{12} \hat{\mathbf{y}} + ay_{12} \hat{\mathbf{z}} & (24d) & \text{O IV}
\end{aligned}$$

$$\begin{aligned}
\mathbf{B}_{198} &= (z_{12} + \frac{1}{2}) \mathbf{a}_1 - (x_{12} - \frac{1}{2}) \mathbf{a}_2 - y_{12} \mathbf{a}_3 = a(z_{12} + \frac{1}{2}) \hat{\mathbf{x}} - a(x_{12} - \frac{1}{2}) \hat{\mathbf{y}} - ay_{12} \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{199} &= -(z_{12} - \frac{1}{2}) \mathbf{a}_1 - x_{12} \mathbf{a}_2 + (y_{12} + \frac{1}{2}) \mathbf{a}_3 = -a(z_{12} - \frac{1}{2}) \hat{\mathbf{x}} - ax_{12} \hat{\mathbf{y}} + a(y_{12} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{200} &= -z_{12} \mathbf{a}_1 + (x_{12} + \frac{1}{2}) \mathbf{a}_2 - (y_{12} - \frac{1}{2}) \mathbf{a}_3 = -az_{12} \hat{\mathbf{x}} + a(x_{12} + \frac{1}{2}) \hat{\mathbf{y}} - a(y_{12} - \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{201} &= y_{12} \mathbf{a}_1 + z_{12} \mathbf{a}_2 + x_{12} \mathbf{a}_3 = ay_{12} \hat{\mathbf{x}} + az_{12} \hat{\mathbf{y}} + ax_{12} \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{202} &= -y_{12} \mathbf{a}_1 + (z_{12} + \frac{1}{2}) \mathbf{a}_2 - (x_{12} - \frac{1}{2}) \mathbf{a}_3 = -ay_{12} \hat{\mathbf{x}} + a(z_{12} + \frac{1}{2}) \hat{\mathbf{y}} - a(x_{12} - \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{203} &= (y_{12} + \frac{1}{2}) \mathbf{a}_1 - (z_{12} - \frac{1}{2}) \mathbf{a}_2 - x_{12} \mathbf{a}_3 = a(y_{12} + \frac{1}{2}) \hat{\mathbf{x}} - a(z_{12} - \frac{1}{2}) \hat{\mathbf{y}} - ax_{12} \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{204} &= -(y_{12} - \frac{1}{2}) \mathbf{a}_1 - z_{12} \mathbf{a}_2 + (x_{12} + \frac{1}{2}) \mathbf{a}_3 = -a(y_{12} - \frac{1}{2}) \hat{\mathbf{x}} - az_{12} \hat{\mathbf{y}} + a(x_{12} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{205} &= -x_{12} \mathbf{a}_1 - y_{12} \mathbf{a}_2 - z_{12} \mathbf{a}_3 = -ax_{12} \hat{\mathbf{x}} - ay_{12} \hat{\mathbf{y}} - az_{12} \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{206} &= (x_{12} + \frac{1}{2}) \mathbf{a}_1 + y_{12} \mathbf{a}_2 - (z_{12} - \frac{1}{2}) \mathbf{a}_3 = a(x_{12} + \frac{1}{2}) \hat{\mathbf{x}} + ay_{12} \hat{\mathbf{y}} - a(z_{12} - \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{207} &= x_{12} \mathbf{a}_1 - (y_{12} - \frac{1}{2}) \mathbf{a}_2 + (z_{12} + \frac{1}{2}) \mathbf{a}_3 = ax_{12} \hat{\mathbf{x}} - a(y_{12} - \frac{1}{2}) \hat{\mathbf{y}} + a(z_{12} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{208} &= -(x_{12} - \frac{1}{2}) \mathbf{a}_1 + (y_{12} + \frac{1}{2}) \mathbf{a}_2 + z_{12} \mathbf{a}_3 = -a(x_{12} - \frac{1}{2}) \hat{\mathbf{x}} + a(y_{12} + \frac{1}{2}) \hat{\mathbf{y}} + az_{12} \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{209} &= -z_{12} \mathbf{a}_1 - x_{12} \mathbf{a}_2 - y_{12} \mathbf{a}_3 = -az_{12} \hat{\mathbf{x}} - ax_{12} \hat{\mathbf{y}} - ay_{12} \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{210} &= -(z_{12} - \frac{1}{2}) \mathbf{a}_1 + (x_{12} + \frac{1}{2}) \mathbf{a}_2 + y_{12} \mathbf{a}_3 = -a(z_{12} - \frac{1}{2}) \hat{\mathbf{x}} + a(x_{12} + \frac{1}{2}) \hat{\mathbf{y}} + ay_{12} \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{211} &= (z_{12} + \frac{1}{2}) \mathbf{a}_1 + x_{12} \mathbf{a}_2 - (y_{12} - \frac{1}{2}) \mathbf{a}_3 = a(z_{12} + \frac{1}{2}) \hat{\mathbf{x}} + ax_{12} \hat{\mathbf{y}} - a(y_{12} - \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{212} &= z_{12} \mathbf{a}_1 - (x_{12} - \frac{1}{2}) \mathbf{a}_2 + (y_{12} + \frac{1}{2}) \mathbf{a}_3 = az_{12} \hat{\mathbf{x}} - a(x_{12} - \frac{1}{2}) \hat{\mathbf{y}} + a(y_{12} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{213} &= -y_{12} \mathbf{a}_1 - z_{12} \mathbf{a}_2 - x_{12} \mathbf{a}_3 = -ay_{12} \hat{\mathbf{x}} - az_{12} \hat{\mathbf{y}} - ax_{12} \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{214} &= y_{12} \mathbf{a}_1 - (z_{12} - \frac{1}{2}) \mathbf{a}_2 + (x_{12} + \frac{1}{2}) \mathbf{a}_3 = ay_{12} \hat{\mathbf{x}} - a(z_{12} - \frac{1}{2}) \hat{\mathbf{y}} + a(x_{12} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{215} &= -(y_{12} - \frac{1}{2}) \mathbf{a}_1 + (z_{12} + \frac{1}{2}) \mathbf{a}_2 + x_{12} \mathbf{a}_3 = -a(y_{12} - \frac{1}{2}) \hat{\mathbf{x}} + a(z_{12} + \frac{1}{2}) \hat{\mathbf{y}} + ax_{12} \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{216} &= (y_{12} + \frac{1}{2}) \mathbf{a}_1 + z_{12} \mathbf{a}_2 - (x_{12} - \frac{1}{2}) \mathbf{a}_3 = a(y_{12} + \frac{1}{2}) \hat{\mathbf{x}} + az_{12} \hat{\mathbf{y}} - a(x_{12} - \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O IV} \\
\mathbf{B}_{217} &= x_{13} \mathbf{a}_1 + y_{13} \mathbf{a}_2 + z_{13} \mathbf{a}_3 = ax_{13} \hat{\mathbf{x}} + ay_{13} \hat{\mathbf{y}} + az_{13} \hat{\mathbf{z}} & (24d) & \text{O V} \\
\mathbf{B}_{218} &= -(x_{13} - \frac{1}{2}) \mathbf{a}_1 - y_{13} \mathbf{a}_2 + (z_{13} + \frac{1}{2}) \mathbf{a}_3 = -a(x_{13} - \frac{1}{2}) \hat{\mathbf{x}} - ay_{13} \hat{\mathbf{y}} + a(z_{13} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O V} \\
\mathbf{B}_{219} &= -x_{13} \mathbf{a}_1 + (y_{13} + \frac{1}{2}) \mathbf{a}_2 - (z_{13} - \frac{1}{2}) \mathbf{a}_3 = -ax_{13} \hat{\mathbf{x}} + a(y_{13} + \frac{1}{2}) \hat{\mathbf{y}} - a(z_{13} - \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O V} \\
\mathbf{B}_{220} &= (x_{13} + \frac{1}{2}) \mathbf{a}_1 - (y_{13} - \frac{1}{2}) \mathbf{a}_2 - z_{13} \mathbf{a}_3 = a(x_{13} + \frac{1}{2}) \hat{\mathbf{x}} - a(y_{13} - \frac{1}{2}) \hat{\mathbf{y}} - az_{13} \hat{\mathbf{z}} & (24d) & \text{O V} \\
\mathbf{B}_{221} &= z_{13} \mathbf{a}_1 + x_{13} \mathbf{a}_2 + y_{13} \mathbf{a}_3 = az_{13} \hat{\mathbf{x}} + ax_{13} \hat{\mathbf{y}} + ay_{13} \hat{\mathbf{z}} & (24d) & \text{O V} \\
\mathbf{B}_{222} &= (z_{13} + \frac{1}{2}) \mathbf{a}_1 - (x_{13} - \frac{1}{2}) \mathbf{a}_2 - y_{13} \mathbf{a}_3 = a(z_{13} + \frac{1}{2}) \hat{\mathbf{x}} - a(x_{13} - \frac{1}{2}) \hat{\mathbf{y}} - ay_{13} \hat{\mathbf{z}} & (24d) & \text{O V} \\
\mathbf{B}_{223} &= -(z_{13} - \frac{1}{2}) \mathbf{a}_1 - x_{13} \mathbf{a}_2 + (y_{13} + \frac{1}{2}) \mathbf{a}_3 = -a(z_{13} - \frac{1}{2}) \hat{\mathbf{x}} - ax_{13} \hat{\mathbf{y}} + a(y_{13} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O V}
\end{aligned}$$

$\mathbf{B}_{224} =$	$-z_{13} \mathbf{a}_1 + (x_{13} + \frac{1}{2}) \mathbf{a}_2 -$ $(y_{13} - \frac{1}{2}) \mathbf{a}_3$	$=$	$-az_{13} \hat{\mathbf{x}} + a(x_{13} + \frac{1}{2}) \hat{\mathbf{y}} - a(y_{13} - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{225} =$	$y_{13} \mathbf{a}_1 + z_{13} \mathbf{a}_2 + x_{13} \mathbf{a}_3$	$=$	$ay_{13} \hat{\mathbf{x}} + az_{13} \hat{\mathbf{y}} + ax_{13} \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{226} =$	$-y_{13} \mathbf{a}_1 + (z_{13} + \frac{1}{2}) \mathbf{a}_2 -$ $(x_{13} - \frac{1}{2}) \mathbf{a}_3$	$=$	$-ay_{13} \hat{\mathbf{x}} + a(z_{13} + \frac{1}{2}) \hat{\mathbf{y}} - a(x_{13} - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{227} =$	$(y_{13} + \frac{1}{2}) \mathbf{a}_1 - (z_{13} - \frac{1}{2}) \mathbf{a}_2 -$ $x_{13} \mathbf{a}_3$	$=$	$a(y_{13} + \frac{1}{2}) \hat{\mathbf{x}} - a(z_{13} - \frac{1}{2}) \hat{\mathbf{y}} - ax_{13} \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{228} =$	$-(y_{13} - \frac{1}{2}) \mathbf{a}_1 - z_{13} \mathbf{a}_2 +$ $(x_{13} + \frac{1}{2}) \mathbf{a}_3$	$=$	$-a(y_{13} - \frac{1}{2}) \hat{\mathbf{x}} - az_{13} \hat{\mathbf{y}} + a(x_{13} + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{229} =$	$-x_{13} \mathbf{a}_1 - y_{13} \mathbf{a}_2 - z_{13} \mathbf{a}_3$	$=$	$-ax_{13} \hat{\mathbf{x}} - ay_{13} \hat{\mathbf{y}} - az_{13} \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{230} =$	$(x_{13} + \frac{1}{2}) \mathbf{a}_1 + y_{13} \mathbf{a}_2 -$ $(z_{13} - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(x_{13} + \frac{1}{2}) \hat{\mathbf{x}} + ay_{13} \hat{\mathbf{y}} - a(z_{13} - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{231} =$	$x_{13} \mathbf{a}_1 - (y_{13} - \frac{1}{2}) \mathbf{a}_2 +$ $(z_{13} + \frac{1}{2}) \mathbf{a}_3$	$=$	$ax_{13} \hat{\mathbf{x}} - a(y_{13} - \frac{1}{2}) \hat{\mathbf{y}} + a(z_{13} + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{232} =$	$-(x_{13} - \frac{1}{2}) \mathbf{a}_1 + (y_{13} + \frac{1}{2}) \mathbf{a}_2 +$ $z_{13} \mathbf{a}_3$	$=$	$-a(x_{13} - \frac{1}{2}) \hat{\mathbf{x}} + a(y_{13} + \frac{1}{2}) \hat{\mathbf{y}} + az_{13} \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{233} =$	$-z_{13} \mathbf{a}_1 - x_{13} \mathbf{a}_2 - y_{13} \mathbf{a}_3$	$=$	$-az_{13} \hat{\mathbf{x}} - ax_{13} \hat{\mathbf{y}} - ay_{13} \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{234} =$	$-(z_{13} - \frac{1}{2}) \mathbf{a}_1 + (x_{13} + \frac{1}{2}) \mathbf{a}_2 +$ $y_{13} \mathbf{a}_3$	$=$	$-a(z_{13} - \frac{1}{2}) \hat{\mathbf{x}} + a(x_{13} + \frac{1}{2}) \hat{\mathbf{y}} + ay_{13} \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{235} =$	$(z_{13} + \frac{1}{2}) \mathbf{a}_1 + x_{13} \mathbf{a}_2 -$ $(y_{13} - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(z_{13} + \frac{1}{2}) \hat{\mathbf{x}} + ax_{13} \hat{\mathbf{y}} - a(y_{13} - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{236} =$	$z_{13} \mathbf{a}_1 - (x_{13} - \frac{1}{2}) \mathbf{a}_2 +$ $(y_{13} + \frac{1}{2}) \mathbf{a}_3$	$=$	$az_{13} \hat{\mathbf{x}} - a(x_{13} - \frac{1}{2}) \hat{\mathbf{y}} + a(y_{13} + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{237} =$	$-y_{13} \mathbf{a}_1 - z_{13} \mathbf{a}_2 - x_{13} \mathbf{a}_3$	$=$	$-ay_{13} \hat{\mathbf{x}} - az_{13} \hat{\mathbf{y}} - ax_{13} \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{238} =$	$y_{13} \mathbf{a}_1 - (z_{13} - \frac{1}{2}) \mathbf{a}_2 +$ $(x_{13} + \frac{1}{2}) \mathbf{a}_3$	$=$	$ay_{13} \hat{\mathbf{x}} - a(z_{13} - \frac{1}{2}) \hat{\mathbf{y}} + a(x_{13} + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{239} =$	$-(y_{13} - \frac{1}{2}) \mathbf{a}_1 + (z_{13} + \frac{1}{2}) \mathbf{a}_2 +$ $x_{13} \mathbf{a}_3$	$=$	$-a(y_{13} - \frac{1}{2}) \hat{\mathbf{x}} + a(z_{13} + \frac{1}{2}) \hat{\mathbf{y}} + ax_{13} \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{240} =$	$(y_{13} + \frac{1}{2}) \mathbf{a}_1 + z_{13} \mathbf{a}_2 -$ $(x_{13} - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(y_{13} + \frac{1}{2}) \hat{\mathbf{x}} + az_{13} \hat{\mathbf{y}} - a(x_{13} - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O V
$\mathbf{B}_{241} =$	$x_{14} \mathbf{a}_1 + y_{14} \mathbf{a}_2 + z_{14} \mathbf{a}_3$	$=$	$ax_{14} \hat{\mathbf{x}} + ay_{14} \hat{\mathbf{y}} + az_{14} \hat{\mathbf{z}}$	(24d)	O VI
$\mathbf{B}_{242} =$	$-(x_{14} - \frac{1}{2}) \mathbf{a}_1 - y_{14} \mathbf{a}_2 +$ $(z_{14} + \frac{1}{2}) \mathbf{a}_3$	$=$	$-a(x_{14} - \frac{1}{2}) \hat{\mathbf{x}} - ay_{14} \hat{\mathbf{y}} + a(z_{14} + \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O VI
$\mathbf{B}_{243} =$	$-x_{14} \mathbf{a}_1 + (y_{14} + \frac{1}{2}) \mathbf{a}_2 -$ $(z_{14} - \frac{1}{2}) \mathbf{a}_3$	$=$	$-ax_{14} \hat{\mathbf{x}} + a(y_{14} + \frac{1}{2}) \hat{\mathbf{y}} - a(z_{14} - \frac{1}{2}) \hat{\mathbf{z}}$	(24d)	O VI
$\mathbf{B}_{244} =$	$(x_{14} + \frac{1}{2}) \mathbf{a}_1 - (y_{14} - \frac{1}{2}) \mathbf{a}_2 -$ $z_{14} \mathbf{a}_3$	$=$	$a(x_{14} + \frac{1}{2}) \hat{\mathbf{x}} - a(y_{14} - \frac{1}{2}) \hat{\mathbf{y}} - az_{14} \hat{\mathbf{z}}$	(24d)	O VI
$\mathbf{B}_{245} =$	$z_{14} \mathbf{a}_1 + x_{14} \mathbf{a}_2 + y_{14} \mathbf{a}_3$	$=$	$az_{14} \hat{\mathbf{x}} + ax_{14} \hat{\mathbf{y}} + ay_{14} \hat{\mathbf{z}}$	(24d)	O VI
$\mathbf{B}_{246} =$	$(z_{14} + \frac{1}{2}) \mathbf{a}_1 - (x_{14} - \frac{1}{2}) \mathbf{a}_2 -$ $y_{14} \mathbf{a}_3$	$=$	$a(z_{14} + \frac{1}{2}) \hat{\mathbf{x}} - a$		

$$\begin{aligned}
\mathbf{B}_{250} &= \begin{matrix} -y_{14} \mathbf{a}_1 + (z_{14} + \frac{1}{2}) \mathbf{a}_2 - \\ (x_{14} - \frac{1}{2}) \mathbf{a}_3 \end{matrix} = -ay_{14} \hat{\mathbf{x}} + a(z_{14} + \frac{1}{2}) \hat{\mathbf{y}} - a(x_{14} - \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O VI} \\
\mathbf{B}_{251} &= \begin{matrix} (y_{14} + \frac{1}{2}) \mathbf{a}_1 - (z_{14} - \frac{1}{2}) \mathbf{a}_2 - \\ x_{14} \mathbf{a}_3 \end{matrix} = a(y_{14} + \frac{1}{2}) \hat{\mathbf{x}} - a(z_{14} - \frac{1}{2}) \hat{\mathbf{y}} - ax_{14} \hat{\mathbf{z}} & (24d) & \text{O VI} \\
\mathbf{B}_{252} &= \begin{matrix} -(y_{14} - \frac{1}{2}) \mathbf{a}_1 - z_{14} \mathbf{a}_2 + \\ (x_{14} + \frac{1}{2}) \mathbf{a}_3 \end{matrix} = -a(y_{14} - \frac{1}{2}) \hat{\mathbf{x}} - az_{14} \hat{\mathbf{y}} + a(x_{14} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O VI} \\
\mathbf{B}_{253} &= -x_{14} \mathbf{a}_1 - y_{14} \mathbf{a}_2 - z_{14} \mathbf{a}_3 = -ax_{14} \hat{\mathbf{x}} - ay_{14} \hat{\mathbf{y}} - az_{14} \hat{\mathbf{z}} & (24d) & \text{O VI} \\
\mathbf{B}_{254} &= \begin{matrix} (x_{14} + \frac{1}{2}) \mathbf{a}_1 + y_{14} \mathbf{a}_2 - \\ (z_{14} - \frac{1}{2}) \mathbf{a}_3 \end{matrix} = a(x_{14} + \frac{1}{2}) \hat{\mathbf{x}} + ay_{14} \hat{\mathbf{y}} - a(z_{14} - \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O VI} \\
\mathbf{B}_{255} &= \begin{matrix} x_{14} \mathbf{a}_1 - (y_{14} - \frac{1}{2}) \mathbf{a}_2 + \\ (z_{14} + \frac{1}{2}) \mathbf{a}_3 \end{matrix} = ax_{14} \hat{\mathbf{x}} - a(y_{14} - \frac{1}{2}) \hat{\mathbf{y}} + a(z_{14} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O VI} \\
\mathbf{B}_{256} &= \begin{matrix} -(x_{14} - \frac{1}{2}) \mathbf{a}_1 + (y_{14} + \frac{1}{2}) \mathbf{a}_2 + \\ z_{14} \mathbf{a}_3 \end{matrix} = -a(x_{14} - \frac{1}{2}) \hat{\mathbf{x}} + a(y_{14} + \frac{1}{2}) \hat{\mathbf{y}} + az_{14} \hat{\mathbf{z}} & (24d) & \text{O VI} \\
\mathbf{B}_{257} &= -z_{14} \mathbf{a}_1 - x_{14} \mathbf{a}_2 - y_{14} \mathbf{a}_3 = -az_{14} \hat{\mathbf{x}} - ax_{14} \hat{\mathbf{y}} - ay_{14} \hat{\mathbf{z}} & (24d) & \text{O VI} \\
\mathbf{B}_{258} &= \begin{matrix} -(z_{14} - \frac{1}{2}) \mathbf{a}_1 + (x_{14} + \frac{1}{2}) \mathbf{a}_2 + \\ y_{14} \mathbf{a}_3 \end{matrix} = -a(z_{14} - \frac{1}{2}) \hat{\mathbf{x}} + a(x_{14} + \frac{1}{2}) \hat{\mathbf{y}} + ay_{14} \hat{\mathbf{z}} & (24d) & \text{O VI} \\
\mathbf{B}_{259} &= \begin{matrix} (z_{14} + \frac{1}{2}) \mathbf{a}_1 + x_{14} \mathbf{a}_2 - \\ (y_{14} - \frac{1}{2}) \mathbf{a}_3 \end{matrix} = a(z_{14} + \frac{1}{2}) \hat{\mathbf{x}} + ax_{14} \hat{\mathbf{y}} - a(y_{14} - \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O VI} \\
\mathbf{B}_{260} &= \begin{matrix} z_{14} \mathbf{a}_1 - (x_{14} - \frac{1}{2}) \mathbf{a}_2 + \\ (y_{14} + \frac{1}{2}) \mathbf{a}_3 \end{matrix} = az_{14} \hat{\mathbf{x}} - a(x_{14} - \frac{1}{2}) \hat{\mathbf{y}} + a(y_{14} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O VI} \\
\mathbf{B}_{261} &= -y_{14} \mathbf{a}_1 - z_{14} \mathbf{a}_2 - x_{14} \mathbf{a}_3 = -ay_{14} \hat{\mathbf{x}} - az_{14} \hat{\mathbf{y}} - ax_{14} \hat{\mathbf{z}} & (24d) & \text{O VI} \\
\mathbf{B}_{262} &= \begin{matrix} y_{14} \mathbf{a}_1 - (z_{14} - \frac{1}{2}) \mathbf{a}_2 + \\ (x_{14} + \frac{1}{2}) \mathbf{a}_3 \end{matrix} = ay_{14} \hat{\mathbf{x}} - a(z_{14} - \frac{1}{2}) \hat{\mathbf{y}} + a(x_{14} + \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O VI} \\
\mathbf{B}_{263} &= \begin{matrix} -(y_{14} - \frac{1}{2}) \mathbf{a}_1 + (z_{14} + \frac{1}{2}) \mathbf{a}_2 + \\ x_{14} \mathbf{a}_3 \end{matrix} = -a(y_{14} - \frac{1}{2}) \hat{\mathbf{x}} + a(z_{14} + \frac{1}{2}) \hat{\mathbf{y}} + ax_{14} \hat{\mathbf{z}} & (24d) & \text{O VI} \\
\mathbf{B}_{264} &= \begin{matrix} (y_{14} + \frac{1}{2}) \mathbf{a}_1 + z_{14} \mathbf{a}_2 - \\ (x_{14} - \frac{1}{2}) \mathbf{a}_3 \end{matrix} = a(y_{14} + \frac{1}{2}) \hat{\mathbf{x}} + az_{14} \hat{\mathbf{y}} - a(x_{14} - \frac{1}{2}) \hat{\mathbf{z}} & (24d) & \text{O VI}
\end{aligned}$$

References

- [1] P. Mondal and J. W. Jeffery, *The crystal structure of tricalcium aluminate, $\text{Ca}_3\text{Al}_2\text{O}_6$* , Acta Crystallogr. Sect. B **31**, 689–697 (1975), doi:10.1107/S0567740875003639.

First cited in

D. Hicks, M. J. Mehl, E. Gossett, C. Toher, O. Levy, R. M. Hanson, G. Hart, and S. Curtarolo, *The AFLOW Library of Crystallographic Prototypes: Part 2*, Comput. Mater. Sci. **161**, S1 (2019). doi: 10.1016/j.commatsci.2018.10.043