"A15" Fullerene (Ba_3C_{60}) Structure: AB20_cP126_223_c_k2l-001

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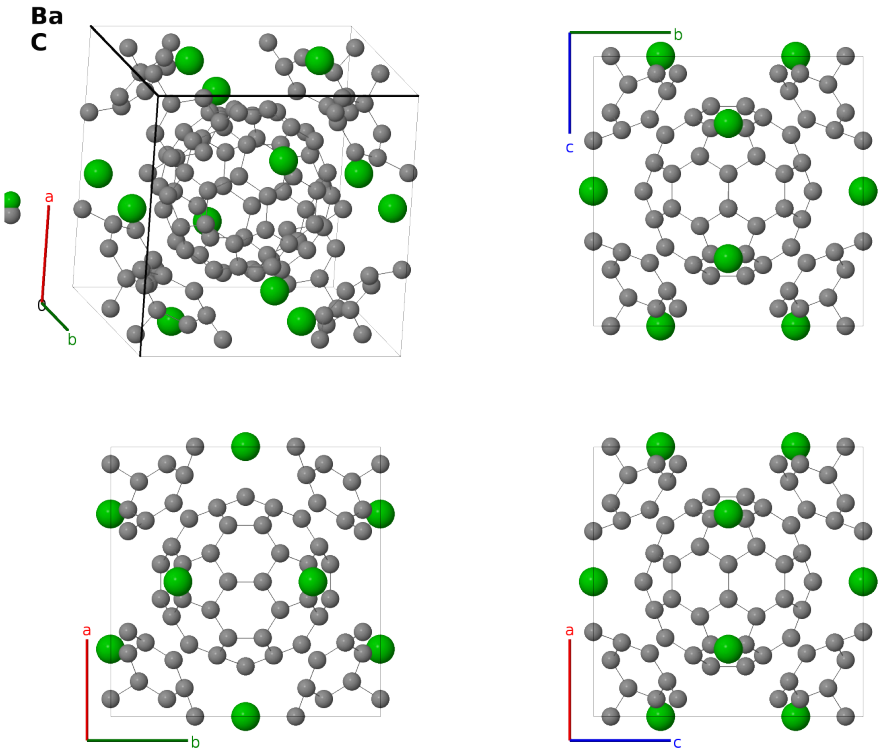
https://aflow.org/prototype-encyclopedia/HV0S

https://aflow.org/prototype-encyclopedia/AB20_cP126_223_c_k2l-001



Prototype	Ba_3C_{60}
AFLOW prototype label	AB20_cP126_223_c_k2l-001
ICSD	70063
CCDC	1631887
Pearson symbol	cP126
Space group number	223
Space group symbol	$Pm\bar{3}n$
AFLOW prototype command	`aflow --proto=AB20_cP126_223_c_k2l-001 --params=`$a, y_2, z_2, x_3, y_3, z_3, x_4, y_4, z_4$

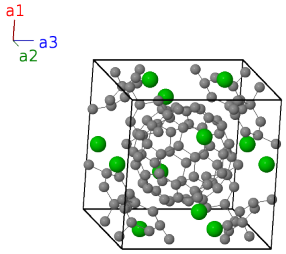
Other compounds with this structure

Sr_3C_{60}

- The barium atoms are on the chromium sites in the $A15$ (Cr_3Si) structure, while the fullerene molecules are centered on the silicon site.

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
$\mathbf{B_1}$	=	$\frac{1}{4}\,\mathbf{a}_1 + \frac{1}{2}\,\mathbf{a}_3$	=	$\frac{1}{4}a\,\hat{\mathbf{x}} + \frac{1}{2}a\,\hat{\mathbf{z}}$	(6c)	Ba I
$\mathbf{B_2}$	=	$\frac{3}{4}\,\mathbf{a}_1 + \frac{1}{2}\,\mathbf{a}_3$	=	$\frac{3}{4}a\,\hat{\mathbf{x}} + \frac{1}{2}a\,\hat{\mathbf{z}}$	(6c)	Ba I
$\mathbf{B_3}$	=	$\frac{1}{2}\,\mathbf{a}_1 + \frac{1}{4}\,\mathbf{a}_2$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} + \frac{1}{4}a\,\hat{\mathbf{y}}$	(6c)	Ba I
$\mathbf{B_4}$	=	$\frac{1}{2}\,\mathbf{a}_1 + \frac{3}{4}\,\mathbf{a}_2$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} + \frac{3}{4}a\,\hat{\mathbf{y}}$	(6c)	Ba I
$\mathbf{B_5}$	=	$\frac{1}{2}\,\mathbf{a}_2 + \frac{1}{4}\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{y}} + \frac{1}{4}a\,\hat{\mathbf{z}}$	(6c)	Ba I
$\mathbf{B_6}$	=	$\frac{1}{2}\,\mathbf{a}_2 + \frac{3}{4}\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{y}} + \frac{3}{4}a\,\hat{\mathbf{z}}$	(6c)	Ba I
$\mathbf{B_7}$	=	$y_2\,\mathbf{a}_2 + z_2\,\mathbf{a}_3$	=	$ay_2\,\hat{\mathbf{y}} + az_2\,\hat{\mathbf{z}}$	(24k)	C I
$\mathbf{B_8}$	=	$-y_2\,\mathbf{a}_2 + z_2\,\mathbf{a}_3$	=	$-ay_2\,\hat{\mathbf{y}} + az_2\,\hat{\mathbf{z}}$	(24k)	C I
$\mathbf{B_9}$	=	$y_2\,\mathbf{a}_2 - z_2\,\mathbf{a}_3$	=	$ay_2\,\hat{\mathbf{y}} - az_2\,\hat{\mathbf{z}}$	(24k)	C I
$\mathbf{B_{10}}$	=	$-y_2\,\mathbf{a}_2 - z_2\,\mathbf{a}_3$	=	$-ay_2\,\hat{\mathbf{y}} - az_2\,\hat{\mathbf{z}}$	(24k)	C I
$\mathbf{B_{11}}$	=	$z_2\,\mathbf{a}_1 + y_2\,\mathbf{a}_3$	=	$az_2\,\hat{\mathbf{x}} + ay_2\,\hat{\mathbf{z}}$	(24k)	C I
$\mathbf{B_{12}}$	=	$z_2\,\mathbf{a}_1 - y_2\,\mathbf{a}_3$	=	$az_2\,\hat{\mathbf{x}} - ay_2\,\hat{\mathbf{z}}$	(24k)	C I
$\mathbf{B_{13}}$	=	$-z_2\,\mathbf{a}_1 + y_2\,\mathbf{a}_3$	=	$-az_2\,\hat{\mathbf{x}} + ay_2\,\hat{\mathbf{z}}$	(24k)	C I
$\mathbf{B_{14}}$	=	$-z_2\,\mathbf{a}_1 - y_2\,\mathbf{a}_3$	=	$-az_2\,\hat{\mathbf{x}} - ay_2\,\hat{\mathbf{z}}$	(24k)	C I
$\mathbf{B_{15}}$	=	$y_2\,\mathbf{a}_1 + z_2\,\mathbf{a}_2$	=	$ay_2\,\hat{\mathbf{x}} + az_2\,\hat{\mathbf{y}}$	(24k)	C I
$\mathbf{B_{16}}$	=	$-y_2\,\mathbf{a}_1 + z_2\,\mathbf{a}_2$	=	$-ay_2\,\hat{\mathbf{x}} + az_2\,\hat{\mathbf{y}}$	(24k)	C I
$\mathbf{B_{17}}$	=	$y_2\,\mathbf{a}_1 - z_2\,\mathbf{a}_2$	=	$ay_2\,\hat{\mathbf{x}} - az_2\,\hat{\mathbf{y}}$	(24k)	C I
$\mathbf{B_{18}}$	=	$-y_2\,\mathbf{a}_1 - z_2\,\mathbf{a}_2$	=	$-ay_2\,\hat{\mathbf{x}} - az_2\,\hat{\mathbf{y}}$	(24k)	C I
$\mathbf{B_{19}}$	=	$\left(y_2 + \frac{1}{2}\right)\,\mathbf{a}_1 + \frac{1}{2}\,\mathbf{a}_2 - \left(z_2 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$a\left(y_2 + \frac{1}{2}\right)\,\hat{\mathbf{x}} + \frac{1}{2}a\,\hat{\mathbf{y}} - a\left(z_2 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(24k)	C I
$\mathbf{B_{20}}$	=	$-\left(y_2 - \frac{1}{2}\right)\,\mathbf{a}_1 + \frac{1}{2}\,\mathbf{a}_2 - \left(z_2 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-a\left(y_2 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + \frac{1}{2}a\,\hat{\mathbf{y}} - a\left(z_2 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(24k)	C I
$\mathbf{B_{21}}$	=	$\left(y_2 + \frac{1}{2}\right)\,\mathbf{a}_1 + \frac{1}{2}\,\mathbf{a}_2 + \left(z_2 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$a\left(y_2 + \frac{1}{2}\right)\,\hat{\mathbf{x}} + \frac{1}{2}a\,\hat{\mathbf{y}} + a\left(z_2 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(24k)	C I
$\mathbf{B_{22}}$	=	$-\left(y_2 - \frac{1}{2}\right)\,\mathbf{a}_1 + \frac{1}{2}\,\mathbf{a}_2 + \left(z_2 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$-a\left(y_2 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + \frac{1}{2}a\,\hat{\mathbf{y}} + a\left(z_2 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(24k)	C I
$\mathbf{B_{23}}$	=	$\frac{1}{2}\,\mathbf{a}_1 + \left(z_2 + \frac{1}{2}\right)\,\mathbf{a}_2 - \left(y_2 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} + a\left(z_2 + \frac{1}{2}\right)\,\hat{\mathbf{y}} - a\left(y_2 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(24k)	C I
$\mathbf{B_{24}}$	=	$\frac{1}{2}\,\mathbf{a}_1 + \left(z_2 + \frac{1}{2}\right)\,\mathbf{a}_2 + \left(y_2 + \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} + a\left(z_2 + \frac{1}{2}\right)\,\hat{\mathbf{y}} + a\left(y_2 + \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(24k)	C I
$\mathbf{B_{25}}$	=	$\frac{1}{2}\,\mathbf{a}_1 - \left(z_2 - \frac{1}{2}\right)\,\mathbf{a}_2 - \left(y_2 - \frac{1}{2}\right)\,\mathbf{a}_3$	=	$\frac{1}{2}a\,\hat{\mathbf{x}} - a\left(z_2 - \frac{1}{2}\right)\,\hat{\mathbf{y}} - a\left(y_2 - \frac{1}{2}\right)\,\hat{\mathbf{z}}$	(24k)	C I

$$
\begin{array}{lcccccc}
\mathbf{B_{26}} & = & \frac{1}{2}\,\mathbf{a}_1 - \left(z_2 - \frac{1}{2}\right)\,\mathbf{a}_2 + \left(y_2 + \frac{1}{2}\right)\,\mathbf{a}_3 & = & \frac{1}{2}a\,\hat{\mathbf{x}} - a\left(z_2 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + a\left(y_2 + \frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(24k)} & \text{C I} \\
\mathbf{B_{27}} & = & \left(z_2 + \frac{1}{2}\right)\,\mathbf{a}_1 + \left(y_2 + \frac{1}{2}\right)\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3 & = & a\left(z_2 + \frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(y_2 + \frac{1}{2}\right)\,\hat{\mathbf{y}} + \frac{1}{2}a\,\hat{\mathbf{z}} & \text{(24k)} & \text{C I} \\
\mathbf{B_{28}} & = & \left(z_2 + \frac{1}{2}\right)\,\mathbf{a}_1 - \left(y_2 - \frac{1}{2}\right)\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3 & = & a\left(z_2 + \frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(y_2 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + \frac{1}{2}a\,\hat{\mathbf{z}} & \text{(24k)} & \text{C I} \\
\mathbf{B_{29}} & = & -\left(z_2 - \frac{1}{2}\right)\,\mathbf{a}_1 + \left(y_2 + \frac{1}{2}\right)\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3 & = & -a\left(z_2 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(y_2 + \frac{1}{2}\right)\,\hat{\mathbf{y}} + \frac{1}{2}a\,\hat{\mathbf{z}} & \text{(24k)} & \text{C I} \\
\mathbf{B_{30}} & = & -\left(z_2 - \frac{1}{2}\right)\,\mathbf{a}_1 - \left(y_2 - \frac{1}{2}\right)\,\mathbf{a}_2 + \frac{1}{2}\,\mathbf{a}_3 & = & -a\left(z_2 - \frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(y_2 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + \frac{1}{2}a\,\hat{\mathbf{z}} & \text{(24k)} & \text{C I} \\
\mathbf{B_{31}} & = & x_3\,\mathbf{a}_1 + y_3\,\mathbf{a}_2 + z_3\,\mathbf{a}_3 & = & ax_3\,\hat{\mathbf{x}} + ay_3\,\hat{\mathbf{y}} + az_3\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{32}} & = & -x_3\,\mathbf{a}_1 - y_3\,\mathbf{a}_2 + z_3\,\mathbf{a}_3 & = & -ax_3\,\hat{\mathbf{x}} - ay_3\,\hat{\mathbf{y}} + az_3\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{33}} & = & -x_3\,\mathbf{a}_1 + y_3\,\mathbf{a}_2 - z_3\,\mathbf{a}_3 & = & -ax_3\,\hat{\mathbf{x}} + ay_3\,\hat{\mathbf{y}} - az_3\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{34}} & = & x_3\,\mathbf{a}_1 - y_3\,\mathbf{a}_2 - z_3\,\mathbf{a}_3 & = & ax_3\,\hat{\mathbf{x}} - ay_3\,\hat{\mathbf{y}} - az_3\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{35}} & = & z_3\,\mathbf{a}_1 + x_3\,\mathbf{a}_2 + y_3\,\mathbf{a}_3 & = & az_3\,\hat{\mathbf{x}} + ax_3\,\hat{\mathbf{y}} + ay_3\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{36}} & = & z_3\,\mathbf{a}_1 - x_3\,\mathbf{a}_2 - y_3\,\mathbf{a}_3 & = & az_3\,\hat{\mathbf{x}} - ax_3\,\hat{\mathbf{y}} - ay_3\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{37}} & = & -z_3\,\mathbf{a}_1 - x_3\,\mathbf{a}_2 + y_3\,\mathbf{a}_3 & = & -az_3\,\hat{\mathbf{x}} - ax_3\,\hat{\mathbf{y}} + ay_3\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{38}} & = & -z_3\,\mathbf{a}_1 + x_3\,\mathbf{a}_2 - y_3\,\mathbf{a}_3 & = & -az_3\,\hat{\mathbf{x}} + ax_3\,\hat{\mathbf{y}} - ay_3\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{39}} & = & y_3\,\mathbf{a}_1 + z_3\,\mathbf{a}_2 + x_3\,\mathbf{a}_3 & = & ay_3\,\hat{\mathbf{x}} + az_3\,\hat{\mathbf{y}} + ax_3\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{40}} & = & -y_3\,\mathbf{a}_1 + z_3\,\mathbf{a}_2 - x_3\,\mathbf{a}_3 & = & -ay_3\,\hat{\mathbf{x}} + az_3\,\hat{\mathbf{y}} - ax_3\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{41}} & = & y_3\,\mathbf{a}_1 - z_3\,\mathbf{a}_2 - x_3\,\mathbf{a}_3 & = & ay_3\,\hat{\mathbf{x}} - az_3\,\hat{\mathbf{y}} - ax_3\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{42}} & = & -y_3\,\mathbf{a}_1 - z_3\,\mathbf{a}_2 + x_3\,\mathbf{a}_3 & = & -ay_3\,\hat{\mathbf{x}} - az_3\,\hat{\mathbf{y}} + ax_3\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{43}} & = & \left(y_3 + \frac{1}{2}\right)\,\mathbf{a}_1 + \left(x_3 + \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_3 - \frac{1}{2}\right)\,\mathbf{a}_3 & = & a\left(y_3 + \frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(x_3 + \frac{1}{2}\right)\,\hat{\mathbf{y}} - a\left(z_3 - \frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{44}} & = & -\left(y_3 - \frac{1}{2}\right)\,\mathbf{a}_1 - \left(x_3 - \frac{1}{2}\right)\,\mathbf{a}_2 - \left(z_3 - \frac{1}{2}\right)\,\mathbf{a}_3 & = & -a\left(y_3 - \frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(x_3 - \frac{1}{2}\right)\,\hat{\mathbf{y}} - a\left(z_3 - \frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{45}} & = & \left(y_3 + \frac{1}{2}\right)\,\mathbf{a}_1 - \left(x_3 - \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_3 + \frac{1}{2}\right)\,\mathbf{a}_3 & = & a\left(y_3 + \frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(x_3 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + a\left(z_3 + \frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{46}} & = & -\left(y_3 - \frac{1}{2}\right)\,\mathbf{a}_1 + \left(x_3 + \frac{1}{2}\right)\,\mathbf{a}_2 + \left(z_3 + \frac{1}{2}\right)\,\mathbf{a}_3 & = & -a\left(y_3 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(x_3 + \frac{1}{2}\right)\,\hat{\mathbf{y}} + a\left(z_3 + \frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{47}} & = & \left(x_3 + \frac{1}{2}\right)\,\mathbf{a}_1 + \left(z_3 + \frac{1}{2}\right)\,\mathbf{a}_2 - \left(y_3 - \frac{1}{2}\right)\,\mathbf{a}_3 & = & a\left(x_3 + \frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(z_3 + \frac{1}{2}\right)\,\hat{\mathbf{y}} - a\left(y_3 - \frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{48}} & = & -\left(x_3 - \frac{1}{2}\right)\,\mathbf{a}_1 + \left(z_3 + \frac{1}{2}\right)\,\mathbf{a}_2 + \left(y_3 + \frac{1}{2}\right)\,\mathbf{a}_3 & = & -a\left(x_3 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(z_3 + \frac{1}{2}\right)\,\hat{\mathbf{y}} + a\left(y_3 + \frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{49}} & = & -\left(x_3 - \frac{1}{2}\right)\,\mathbf{a}_1 - \left(z_3 - \frac{1}{2}\right)\,\mathbf{a}_2 - \left(y_3 - \frac{1}{2}\right)\,\mathbf{a}_3 & = & -a\left(x_3 - \frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(z_3 - \frac{1}{2}\right)\,\hat{\mathbf{y}} - a\left(y_3 - \frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{50}} & = & \left(x_3 + \frac{1}{2}\right)\,\mathbf{a}_1 - \left(z_3 - \frac{1}{2}\right)\,\mathbf{a}_2 + \left(y_3 + \frac{1}{2}\right)\,\mathbf{a}_3 & = & a\left(x_3 + \frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(z_3 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + a\left(y_3 + \frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{51}} & = & \left(z_3 + \frac{1}{2}\right)\,\mathbf{a}_1 + \left(y_3 + \frac{1}{2}\right)\,\mathbf{a}_2 - \left(x_3 - \frac{1}{2}\right)\,\mathbf{a}_3 & = & a\left(z_3 + \frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(y_3 + \frac{1}{2}\right)\,\hat{\mathbf{y}} - a\left(x_3 - \frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{52}} & = & \left(z_3 + \frac{1}{2}\right)\,\mathbf{a}_1 - \left(y_3 - \frac{1}{2}\right)\,\mathbf{a}_2 + \left(x_3 + \frac{1}{2}\right)\,\mathbf{a}_3 & = & a\left(z_3 + \frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(y_3 - \frac{1}{2}\right)\,\hat{\mathbf{y}} + a\left(x_3 + \frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{53}} & = & -\left(z_3 - \frac{1}{2}\right)\,\mathbf{a}_1 + \left(y_3 + \frac{1}{2}\right)\,\mathbf{a}_2 + \left(x_3 + \frac{1}{2}\right)\,\mathbf{a}_3 & = & -a\left(z_3 - \frac{1}{2}\right)\,\hat{\mathbf{x}} + a\left(y_3 + \frac{1}{2}\right)\,\hat{\mathbf{y}} + a\left(x_3 + \frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{54}} & = & -\left(z_3 - \frac{1}{2}\right)\,\mathbf{a}_1 - \left(y_3 - \frac{1}{2}\right)\,\mathbf{a}_2 - \left(x_3 - \frac{1}{2}\right)\,\mathbf{a}_3 & = & -a\left(z_3 - \frac{1}{2}\right)\,\hat{\mathbf{x}} - a\left(y_3 - \frac{1}{2}\right)\,\hat{\mathbf{y}} - a\left(x_3 - \frac{1}{2}\right)\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II} \\
\mathbf{B_{55}} & = & -x_3\,\mathbf{a}_1 - y_3\,\mathbf{a}_2 - z_3\,\mathbf{a}_3 & = & -ax_3\,\hat{\mathbf{x}} - ay_3\,\hat{\mathbf{y}} - az_3\,\hat{\mathbf{z}} & \text{(48l)} & \text{C II}
\end{array}
$$

$$\mathbf{B_{56}} = x_3\,\mathbf{a}_1 + y_3\,\mathbf{a}_2 - z_3\,\mathbf{a}_3 = ax_3\,\hat{\mathbf{x}} + ay_3\,\hat{\mathbf{y}} - az_3\,\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{57}} = x_3\,\mathbf{a}_1 - y_3\,\mathbf{a}_2 + z_3\,\mathbf{a}_3 = ax_3\,\hat{\mathbf{x}} - ay_3\,\hat{\mathbf{y}} + az_3\,\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{58}} = -x_3\,\mathbf{a}_1 + y_3\,\mathbf{a}_2 + z_3\,\mathbf{a}_3 = -ax_3\,\hat{\mathbf{x}} + ay_3\,\hat{\mathbf{y}} + az_3\,\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{59}} = -z_3\,\mathbf{a}_1 - x_3\,\mathbf{a}_2 - y_3\,\mathbf{a}_3 = -az_3\,\hat{\mathbf{x}} - ax_3\,\hat{\mathbf{y}} - ay_3\,\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{60}} = -z_3\,\mathbf{a}_1 + x_3\,\mathbf{a}_2 + y_3\,\mathbf{a}_3 = -az_3\,\hat{\mathbf{x}} + ax_3\,\hat{\mathbf{y}} + ay_3\,\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{61}} = z_3\,\mathbf{a}_1 + x_3\,\mathbf{a}_2 - y_3\,\mathbf{a}_3 = az_3\,\hat{\mathbf{x}} + ax_3\,\hat{\mathbf{y}} - ay_3\,\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{62}} = z_3\,\mathbf{a}_1 - x_3\,\mathbf{a}_2 + y_3\,\mathbf{a}_3 = az_3\,\hat{\mathbf{x}} - ax_3\,\hat{\mathbf{y}} + ay_3\,\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{63}} = -y_3\,\mathbf{a}_1 - z_3\,\mathbf{a}_2 - x_3\,\mathbf{a}_3 = -ay_3\,\hat{\mathbf{x}} - az_3\,\hat{\mathbf{y}} - ax_3\,\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{64}} = y_3\,\mathbf{a}_1 - z_3\,\mathbf{a}_2 + x_3\,\mathbf{a}_3 = ay_3\,\hat{\mathbf{x}} - az_3\,\hat{\mathbf{y}} + ax_3\,\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{65}} = -y_3\,\mathbf{a}_1 + z_3\,\mathbf{a}_2 + x_3\,\mathbf{a}_3 = -ay_3\,\hat{\mathbf{x}} + az_3\,\hat{\mathbf{y}} + ax_3\,\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{66}} = y_3\,\mathbf{a}_1 + z_3\,\mathbf{a}_2 - x_3\,\mathbf{a}_3 = ay_3\,\hat{\mathbf{x}} + az_3\,\hat{\mathbf{y}} - ax_3\,\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{67}} = -\left(y_3-\tfrac{1}{2}\right)\mathbf{a}_1 - \left(x_3-\tfrac{1}{2}\right)\mathbf{a}_2 + \left(z_3+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(y_3-\tfrac{1}{2}\right)\hat{\mathbf{x}} - a\left(x_3-\tfrac{1}{2}\right)\hat{\mathbf{y}} + a\left(z_3+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{68}} = \left(y_3+\tfrac{1}{2}\right)\mathbf{a}_1 + \left(x_3+\tfrac{1}{2}\right)\mathbf{a}_2 + \left(z_3+\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(y_3+\tfrac{1}{2}\right)\hat{\mathbf{x}} + a\left(x_3+\tfrac{1}{2}\right)\hat{\mathbf{y}} + a\left(z_3+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{69}} = -\left(y_3-\tfrac{1}{2}\right)\mathbf{a}_1 + \left(x_3+\tfrac{1}{2}\right)\mathbf{a}_2 - \left(z_3-\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(y_3-\tfrac{1}{2}\right)\hat{\mathbf{x}} + a\left(x_3+\tfrac{1}{2}\right)\hat{\mathbf{y}} - a\left(z_3-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{70}} = \left(y_3+\tfrac{1}{2}\right)\mathbf{a}_1 - \left(x_3-\tfrac{1}{2}\right)\mathbf{a}_2 - \left(z_3-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(y_3+\tfrac{1}{2}\right)\hat{\mathbf{x}} - a\left(x_3-\tfrac{1}{2}\right)\hat{\mathbf{y}} - a\left(z_3-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{71}} = -\left(x_3-\tfrac{1}{2}\right)\mathbf{a}_1 - \left(z_3-\tfrac{1}{2}\right)\mathbf{a}_2 + \left(y_3+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_3-\tfrac{1}{2}\right)\hat{\mathbf{x}} - a\left(z_3-\tfrac{1}{2}\right)\hat{\mathbf{y}} + a\left(y_3+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{72}} = \left(x_3+\tfrac{1}{2}\right)\mathbf{a}_1 - \left(z_3-\tfrac{1}{2}\right)\mathbf{a}_2 - \left(y_3-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_3+\tfrac{1}{2}\right)\hat{\mathbf{x}} - a\left(z_3-\tfrac{1}{2}\right)\hat{\mathbf{y}} - a\left(y_3-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{73}} = \left(x_3+\tfrac{1}{2}\right)\mathbf{a}_1 + \left(z_3+\tfrac{1}{2}\right)\mathbf{a}_2 + \left(y_3+\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_3+\tfrac{1}{2}\right)\hat{\mathbf{x}} + a\left(z_3+\tfrac{1}{2}\right)\hat{\mathbf{y}} + a\left(y_3+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{74}} = -\left(x_3-\tfrac{1}{2}\right)\mathbf{a}_1 + \left(z_3+\tfrac{1}{2}\right)\mathbf{a}_2 - \left(y_3-\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_3-\tfrac{1}{2}\right)\hat{\mathbf{x}} + a\left(z_3+\tfrac{1}{2}\right)\hat{\mathbf{y}} - a\left(y_3-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{75}} = -\left(z_3-\tfrac{1}{2}\right)\mathbf{a}_1 - \left(y_3-\tfrac{1}{2}\right)\mathbf{a}_2 + \left(x_3+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(z_3-\tfrac{1}{2}\right)\hat{\mathbf{x}} - a\left(y_3-\tfrac{1}{2}\right)\hat{\mathbf{y}} + a\left(x_3+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{76}} = -\left(z_3-\tfrac{1}{2}\right)\mathbf{a}_1 + \left(y_3+\tfrac{1}{2}\right)\mathbf{a}_2 - \left(x_3-\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(z_3-\tfrac{1}{2}\right)\hat{\mathbf{x}} + a\left(y_3+\tfrac{1}{2}\right)\hat{\mathbf{y}} - a\left(x_3-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{77}} = \left(z_3+\tfrac{1}{2}\right)\mathbf{a}_1 - \left(y_3-\tfrac{1}{2}\right)\mathbf{a}_2 - \left(x_3-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(z_3+\tfrac{1}{2}\right)\hat{\mathbf{x}} - a\left(y_3-\tfrac{1}{2}\right)\hat{\mathbf{y}} - a\left(x_3-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{78}} = \left(z_3+\tfrac{1}{2}\right)\mathbf{a}_1 + \left(y_3+\tfrac{1}{2}\right)\mathbf{a}_2 + \left(x_3+\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(z_3+\tfrac{1}{2}\right)\hat{\mathbf{x}} + a\left(y_3+\tfrac{1}{2}\right)\hat{\mathbf{y}} + a\left(x_3+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C II}$$

$$\mathbf{B_{79}} = x_4\,\mathbf{a}_1 + y_4\,\mathbf{a}_2 + z_4\,\mathbf{a}_3 = ax_4\,\hat{\mathbf{x}} + ay_4\,\hat{\mathbf{y}} + az_4\,\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$$\mathbf{B_{80}} = -x_4\,\mathbf{a}_1 - y_4\,\mathbf{a}_2 + z_4\,\mathbf{a}_3 = -ax_4\,\hat{\mathbf{x}} - ay_4\,\hat{\mathbf{y}} + az_4\,\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$$\mathbf{B_{81}} = -x_4\,\mathbf{a}_1 + y_4\,\mathbf{a}_2 - z_4\,\mathbf{a}_3 = -ax_4\,\hat{\mathbf{x}} + ay_4\,\hat{\mathbf{y}} - az_4\,\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$$\mathbf{B_{82}} = x_4\,\mathbf{a}_1 - y_4\,\mathbf{a}_2 - z_4\,\mathbf{a}_3 = ax_4\,\hat{\mathbf{x}} - ay_4\,\hat{\mathbf{y}} - az_4\,\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$$\mathbf{B_{83}} = z_4\,\mathbf{a}_1 + x_4\,\mathbf{a}_2 + y_4\,\mathbf{a}_3 = az_4\,\hat{\mathbf{x}} + ax_4\,\hat{\mathbf{y}} + ay_4\,\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$$\mathbf{B_{84}} = z_4\,\mathbf{a}_1 - x_4\,\mathbf{a}_2 - y_4\,\mathbf{a}_3 = az_4\,\hat{\mathbf{x}} - ax_4\,\hat{\mathbf{y}} - ay_4\,\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$$\mathbf{B_{85}} = -z_4\,\mathbf{a}_1 - x_4\,\mathbf{a}_2 + y_4\,\mathbf{a}_3 = -az_4\,\hat{\mathbf{x}} - ax_4\,\hat{\mathbf{y}} + ay_4\,\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$$\mathbf{B_{86}} = -z_4\,\mathbf{a}_1 + x_4\,\mathbf{a}_2 - y_4\,\mathbf{a}_3 = -az_4\,\hat{\mathbf{x}} + ax_4\,\hat{\mathbf{y}} - ay_4\,\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$$\mathbf{B_{87}} = y_4\,\mathbf{a}_1 + z_4\,\mathbf{a}_2 + x_4\,\mathbf{a}_3 = ay_4\,\hat{\mathbf{x}} + az_4\,\hat{\mathbf{y}} + ax_4\,\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$\mathbf{B_{88}} = -y_4\,\mathbf{a}_1 + z_4\,\mathbf{a}_2 - x_4\,\mathbf{a}_3 = -ay_4\,\hat{\mathbf{x}} + az_4\,\hat{\mathbf{y}} - ax_4\,\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{89}} = y_4\,\mathbf{a}_1 - z_4\,\mathbf{a}_2 - x_4\,\mathbf{a}_3 = ay_4\,\hat{\mathbf{x}} - az_4\,\hat{\mathbf{y}} - ax_4\,\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{90}} = -y_4\,\mathbf{a}_1 - z_4\,\mathbf{a}_2 + x_4\,\mathbf{a}_3 = -ay_4\,\hat{\mathbf{x}} - az_4\,\hat{\mathbf{y}} + ax_4\,\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{91}} = \left(y_4+\frac{1}{2}\right)\mathbf{a}_1 + \left(x_4+\frac{1}{2}\right)\mathbf{a}_2 - \left(z_4-\frac{1}{2}\right)\mathbf{a}_3 = a\left(y_4+\frac{1}{2}\right)\hat{\mathbf{x}} + a\left(x_4+\frac{1}{2}\right)\hat{\mathbf{y}} - a\left(z_4-\frac{1}{2}\right)\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{92}} = -\left(y_4-\frac{1}{2}\right)\mathbf{a}_1 - \left(x_4-\frac{1}{2}\right)\mathbf{a}_2 - \left(z_4-\frac{1}{2}\right)\mathbf{a}_3 = -a\left(y_4-\frac{1}{2}\right)\hat{\mathbf{x}} - a\left(x_4-\frac{1}{2}\right)\hat{\mathbf{y}} - a\left(z_4-\frac{1}{2}\right)\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{93}} = \left(y_4+\frac{1}{2}\right)\mathbf{a}_1 - \left(x_4-\frac{1}{2}\right)\mathbf{a}_2 + \left(z_4+\frac{1}{2}\right)\mathbf{a}_3 = a\left(y_4+\frac{1}{2}\right)\hat{\mathbf{x}} - a\left(x_4-\frac{1}{2}\right)\hat{\mathbf{y}} + a\left(z_4+\frac{1}{2}\right)\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{94}} = -\left(y_4-\frac{1}{2}\right)\mathbf{a}_1 + \left(x_4+\frac{1}{2}\right)\mathbf{a}_2 + \left(z_4+\frac{1}{2}\right)\mathbf{a}_3 = -a\left(y_4-\frac{1}{2}\right)\hat{\mathbf{x}} + a\left(x_4+\frac{1}{2}\right)\hat{\mathbf{y}} + a\left(z_4+\frac{1}{2}\right)\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{95}} = \left(x_4+\frac{1}{2}\right)\mathbf{a}_1 + \left(z_4+\frac{1}{2}\right)\mathbf{a}_2 - \left(y_4-\frac{1}{2}\right)\mathbf{a}_3 = a\left(x_4+\frac{1}{2}\right)\hat{\mathbf{x}} + a\left(z_4+\frac{1}{2}\right)\hat{\mathbf{y}} - a\left(y_4-\frac{1}{2}\right)\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{96}} = -\left(x_4-\frac{1}{2}\right)\mathbf{a}_1 + \left(z_4+\frac{1}{2}\right)\mathbf{a}_2 + \left(y_4+\frac{1}{2}\right)\mathbf{a}_3 = -a\left(x_4-\frac{1}{2}\right)\hat{\mathbf{x}} + a\left(z_4+\frac{1}{2}\right)\hat{\mathbf{y}} + a\left(y_4+\frac{1}{2}\right)\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{97}} = -\left(x_4-\frac{1}{2}\right)\mathbf{a}_1 - \left(z_4-\frac{1}{2}\right)\mathbf{a}_2 - \left(y_4-\frac{1}{2}\right)\mathbf{a}_3 = -a\left(x_4-\frac{1}{2}\right)\hat{\mathbf{x}} - a\left(z_4-\frac{1}{2}\right)\hat{\mathbf{y}} - a\left(y_4-\frac{1}{2}\right)\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{98}} = \left(x_4+\frac{1}{2}\right)\mathbf{a}_1 - \left(z_4-\frac{1}{2}\right)\mathbf{a}_2 + \left(y_4+\frac{1}{2}\right)\mathbf{a}_3 = a\left(x_4+\frac{1}{2}\right)\hat{\mathbf{x}} - a\left(z_4-\frac{1}{2}\right)\hat{\mathbf{y}} + a\left(y_4+\frac{1}{2}\right)\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{99}} = \left(z_4+\frac{1}{2}\right)\mathbf{a}_1 + \left(y_4+\frac{1}{2}\right)\mathbf{a}_2 - \left(x_4-\frac{1}{2}\right)\mathbf{a}_3 = a\left(z_4+\frac{1}{2}\right)\hat{\mathbf{x}} + a\left(y_4+\frac{1}{2}\right)\hat{\mathbf{y}} - a\left(x_4-\frac{1}{2}\right)\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{100}} = \left(z_4+\frac{1}{2}\right)\mathbf{a}_1 - \left(y_4-\frac{1}{2}\right)\mathbf{a}_2 + \left(x_4+\frac{1}{2}\right)\mathbf{a}_3 = a\left(z_4+\frac{1}{2}\right)\hat{\mathbf{x}} - a\left(y_4-\frac{1}{2}\right)\hat{\mathbf{y}} + a\left(x_4+\frac{1}{2}\right)\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{101}} = -\left(z_4-\frac{1}{2}\right)\mathbf{a}_1 + \left(y_4+\frac{1}{2}\right)\mathbf{a}_2 + \left(x_4+\frac{1}{2}\right)\mathbf{a}_3 = -a\left(z_4-\frac{1}{2}\right)\hat{\mathbf{x}} + a\left(y_4+\frac{1}{2}\right)\hat{\mathbf{y}} + a\left(x_4+\frac{1}{2}\right)\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{102}} = -\left(z_4-\frac{1}{2}\right)\mathbf{a}_1 - \left(y_4-\frac{1}{2}\right)\mathbf{a}_2 - \left(x_4-\frac{1}{2}\right)\mathbf{a}_3 = -a\left(z_4-\frac{1}{2}\right)\hat{\mathbf{x}} - a\left(y_4-\frac{1}{2}\right)\hat{\mathbf{y}} - a\left(x_4-\frac{1}{2}\right)\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{103}} = -x_4\,\mathbf{a}_1 - y_4\,\mathbf{a}_2 - z_4\,\mathbf{a}_3 = -ax_4\,\hat{\mathbf{x}} - ay_4\,\hat{\mathbf{y}} - az_4\,\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{104}} = x_4\,\mathbf{a}_1 + y_4\,\mathbf{a}_2 - z_4\,\mathbf{a}_3 = ax_4\,\hat{\mathbf{x}} + ay_4\,\hat{\mathbf{y}} - az_4\,\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{105}} = x_4\,\mathbf{a}_1 - y_4\,\mathbf{a}_2 + z_4\,\mathbf{a}_3 = ax_4\,\hat{\mathbf{x}} - ay_4\,\hat{\mathbf{y}} + az_4\,\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{106}} = -x_4\,\mathbf{a}_1 + y_4\,\mathbf{a}_2 + z_4\,\mathbf{a}_3 = -ax_4\,\hat{\mathbf{x}} + ay_4\,\hat{\mathbf{y}} + az_4\,\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{107}} = -z_4\,\mathbf{a}_1 - x_4\,\mathbf{a}_2 - y_4\,\mathbf{a}_3 = -az_4\,\hat{\mathbf{x}} - ax_4\,\hat{\mathbf{y}} - ay_4\,\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{108}} = -z_4\,\mathbf{a}_1 + x_4\,\mathbf{a}_2 + y_4\,\mathbf{a}_3 = -az_4\,\hat{\mathbf{x}} + ax_4\,\hat{\mathbf{y}} + ay_4\,\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{109}} = z_4\,\mathbf{a}_1 + x_4\,\mathbf{a}_2 - y_4\,\mathbf{a}_3 = az_4\,\hat{\mathbf{x}} + ax_4\,\hat{\mathbf{y}} - ay_4\,\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{110}} = z_4\,\mathbf{a}_1 - x_4\,\mathbf{a}_2 + y_4\,\mathbf{a}_3 = az_4\,\hat{\mathbf{x}} - ax_4\,\hat{\mathbf{y}} + ay_4\,\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{111}} = -y_4\,\mathbf{a}_1 - z_4\,\mathbf{a}_2 - x_4\,\mathbf{a}_3 = -ay_4\,\hat{\mathbf{x}} - az_4\,\hat{\mathbf{y}} - ax_4\,\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{112}} = y_4\,\mathbf{a}_1 - z_4\,\mathbf{a}_2 + x_4\,\mathbf{a}_3 = ay_4\,\hat{\mathbf{x}} - az_4\,\hat{\mathbf{y}} + ax_4\,\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{113}} = -y_4\,\mathbf{a}_1 + z_4\,\mathbf{a}_2 + x_4\,\mathbf{a}_3 = -ay_4\,\hat{\mathbf{x}} + az_4\,\hat{\mathbf{y}} + ax_4\,\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{114}} = y_4\,\mathbf{a}_1 + z_4\,\mathbf{a}_2 - x_4\,\mathbf{a}_3 = ay_4\,\hat{\mathbf{x}} + az_4\,\hat{\mathbf{y}} - ax_4\,\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{115}} = -\left(y_4-\frac{1}{2}\right)\mathbf{a}_1 - \left(x_4-\frac{1}{2}\right)\mathbf{a}_2 + \left(z_4+\frac{1}{2}\right)\mathbf{a}_3 = -a\left(y_4-\frac{1}{2}\right)\hat{\mathbf{x}} - a\left(x_4-\frac{1}{2}\right)\hat{\mathbf{y}} + a\left(z_4+\frac{1}{2}\right)\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{116}} = \left(y_4+\frac{1}{2}\right)\mathbf{a}_1 + \left(x_4+\frac{1}{2}\right)\mathbf{a}_2 + \left(z_4+\frac{1}{2}\right)\mathbf{a}_3 = a\left(y_4+\frac{1}{2}\right)\hat{\mathbf{x}} + a\left(x_4+\frac{1}{2}\right)\hat{\mathbf{y}} + a\left(z_4+\frac{1}{2}\right)\hat{\mathbf{z}}$ (48l) C III

$\mathbf{B_{117}} = -\left(y_4-\frac{1}{2}\right)\mathbf{a}_1 + \left(x_4+\frac{1}{2}\right)\mathbf{a}_2 - \left(z_4-\frac{1}{2}\right)\mathbf{a}_3 = -a\left(y_4-\frac{1}{2}\right)\hat{\mathbf{x}} + a\left(x_4+\frac{1}{2}\right)\hat{\mathbf{y}} - a\left(z_4-\frac{1}{2}\right)\hat{\mathbf{z}}$ (48l) C III

$$\mathbf{B_{118}} = \left(y_4+\tfrac{1}{2}\right)\mathbf{a}_1 - \left(x_4-\tfrac{1}{2}\right)\mathbf{a}_2 - \left(z_4-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(y_4+\tfrac{1}{2}\right)\hat{\mathbf{x}} - a\left(x_4-\tfrac{1}{2}\right)\hat{\mathbf{y}} - a\left(z_4-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$$\mathbf{B_{119}} = -\left(x_4-\tfrac{1}{2}\right)\mathbf{a}_1 - \left(z_4-\tfrac{1}{2}\right)\mathbf{a}_2 + \left(y_4+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_4-\tfrac{1}{2}\right)\hat{\mathbf{x}} - a\left(z_4-\tfrac{1}{2}\right)\hat{\mathbf{y}} + a\left(y_4+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$$\mathbf{B_{120}} = \left(x_4+\tfrac{1}{2}\right)\mathbf{a}_1 - \left(z_4-\tfrac{1}{2}\right)\mathbf{a}_2 - \left(y_4-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_4+\tfrac{1}{2}\right)\hat{\mathbf{x}} - a\left(z_4-\tfrac{1}{2}\right)\hat{\mathbf{y}} - a\left(y_4-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$$\mathbf{B_{121}} = \left(x_4+\tfrac{1}{2}\right)\mathbf{a}_1 + \left(z_4+\tfrac{1}{2}\right)\mathbf{a}_2 + \left(y_4+\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(x_4+\tfrac{1}{2}\right)\hat{\mathbf{x}} + a\left(z_4+\tfrac{1}{2}\right)\hat{\mathbf{y}} + a\left(y_4+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$$\mathbf{B_{122}} = -\left(x_4-\tfrac{1}{2}\right)\mathbf{a}_1 + \left(z_4+\tfrac{1}{2}\right)\mathbf{a}_2 - \left(y_4-\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(x_4-\tfrac{1}{2}\right)\hat{\mathbf{x}} + a\left(z_4+\tfrac{1}{2}\right)\hat{\mathbf{y}} - a\left(y_4-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$$\mathbf{B_{123}} = -\left(z_4-\tfrac{1}{2}\right)\mathbf{a}_1 - \left(y_4-\tfrac{1}{2}\right)\mathbf{a}_2 + \left(x_4+\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(z_4-\tfrac{1}{2}\right)\hat{\mathbf{x}} - a\left(y_4-\tfrac{1}{2}\right)\hat{\mathbf{y}} + a\left(x_4+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$$\mathbf{B_{124}} = -\left(z_4-\tfrac{1}{2}\right)\mathbf{a}_1 + \left(y_4+\tfrac{1}{2}\right)\mathbf{a}_2 - \left(x_4-\tfrac{1}{2}\right)\mathbf{a}_3 = -a\left(z_4-\tfrac{1}{2}\right)\hat{\mathbf{x}} + a\left(y_4+\tfrac{1}{2}\right)\hat{\mathbf{y}} - a\left(x_4-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$$\mathbf{B_{125}} = \left(z_4+\tfrac{1}{2}\right)\mathbf{a}_1 - \left(y_4-\tfrac{1}{2}\right)\mathbf{a}_2 - \left(x_4-\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(z_4+\tfrac{1}{2}\right)\hat{\mathbf{x}} - a\left(y_4-\tfrac{1}{2}\right)\hat{\mathbf{y}} - a\left(x_4-\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

$$\mathbf{B_{126}} = \left(z_4+\tfrac{1}{2}\right)\mathbf{a}_1 + \left(y_4+\tfrac{1}{2}\right)\mathbf{a}_2 + \left(x_4+\tfrac{1}{2}\right)\mathbf{a}_3 = a\left(z_4+\tfrac{1}{2}\right)\hat{\mathbf{x}} + a\left(y_4+\tfrac{1}{2}\right)\hat{\mathbf{y}} + a\left(x_4+\tfrac{1}{2}\right)\hat{\mathbf{z}} \quad (48l) \quad \text{C III}$$

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