

KGe Structure:

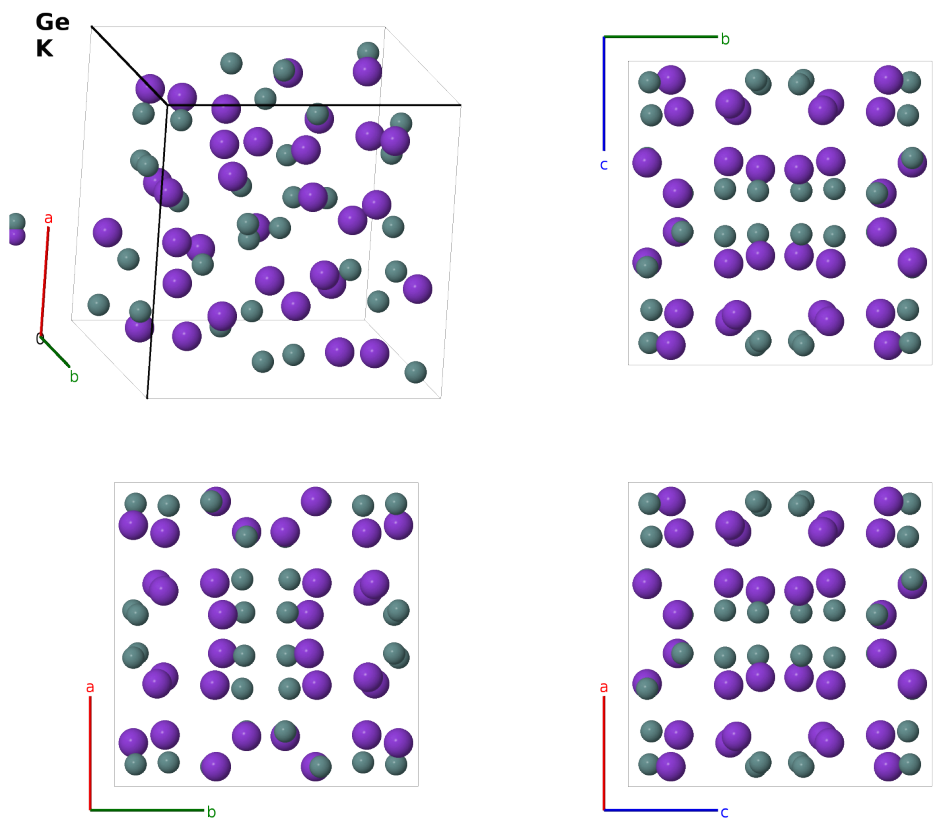
AB_cP64_218_ei_ei-001

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- 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/RUTB>

https://aflow.org/prototype-encyclopedia/AB_cP64_218_ei_ei-001



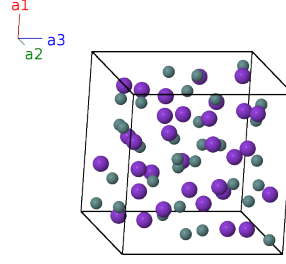
Prototype	GeK
AFLOW prototype label	AB_cP64_218_ei_ei-001
ICSD	43515
CCDC	1612999
Pearson symbol	cP64
Space group number	218
Space group symbol	$P\bar{4}3n$
AFLOW prototype command	<code>aflow --proto=AB_cP64_218_ei_ei-001</code> <code>--params=$a, x_1, x_2, x_3, y_3, z_3, x_4, y_4, z_4$</code>

Other compounds with this structure

CsGe, CsSi, KSi, RbGe, RbSi

Simple Cubic primitive vectors

$$\begin{aligned} \mathbf{a}_1 &= a \hat{\mathbf{x}} \\ \mathbf{a}_2 &= a \hat{\mathbf{y}} \\ \mathbf{a}_3 &= a \hat{\mathbf{z}} \end{aligned}$$



Basis vectors

	Lattice coordinates		Cartesian coordinates	Wyckoff position	Atom type
$\mathbf{B}_1$	$= x_1 \mathbf{a}_1 + x_1 \mathbf{a}_2 + x_1 \mathbf{a}_3$	$=$	$ax_1 \hat{\mathbf{x}} + ax_1 \hat{\mathbf{y}} + ax_1 \hat{\mathbf{z}}$	(8e)	Ge I
$\mathbf{B}_2$	$= -x_1 \mathbf{a}_1 - x_1 \mathbf{a}_2 + x_1 \mathbf{a}_3$	$=$	$-ax_1 \hat{\mathbf{x}} - ax_1 \hat{\mathbf{y}} + ax_1 \hat{\mathbf{z}}$	(8e)	Ge I
$\mathbf{B}_3$	$= -x_1 \mathbf{a}_1 + x_1 \mathbf{a}_2 - x_1 \mathbf{a}_3$	$=$	$-ax_1 \hat{\mathbf{x}} + ax_1 \hat{\mathbf{y}} - ax_1 \hat{\mathbf{z}}$	(8e)	Ge I
$\mathbf{B}_4$	$= x_1 \mathbf{a}_1 - x_1 \mathbf{a}_2 - x_1 \mathbf{a}_3$	$=$	$ax_1 \hat{\mathbf{x}} - ax_1 \hat{\mathbf{y}} - ax_1 \hat{\mathbf{z}}$	(8e)	Ge I
$\mathbf{B}_5$	$= \left(x_1 + \frac{1}{2}\right) \mathbf{a}_1 + \left(x_1 + \frac{1}{2}\right) \mathbf{a}_2 + \left(x_1 + \frac{1}{2}\right) \mathbf{a}_3$	$=$	$a \left(x_1 + \frac{1}{2}\right) \hat{\mathbf{x}} + a \left(x_1 + \frac{1}{2}\right) \hat{\mathbf{y}} + a \left(x_1 + \frac{1}{2}\right) \hat{\mathbf{z}}$	(8e)	Ge I
$\mathbf{B}_6$	$= -\left(x_1 - \frac{1}{2}\right) \mathbf{a}_1 - \left(x_1 - \frac{1}{2}\right) \mathbf{a}_2 + \left(x_1 + \frac{1}{2}\right) \mathbf{a}_3$	$=$	$-a \left(x_1 - \frac{1}{2}\right) \hat{\mathbf{x}} - a \left(x_1 - \frac{1}{2}\right) \hat{\mathbf{y}} + a \left(x_1 + \frac{1}{2}\right) \hat{\mathbf{z}}$	(8e)	Ge I
$\mathbf{B}_7$	$= \left(x_1 + \frac{1}{2}\right) \mathbf{a}_1 - \left(x_1 - \frac{1}{2}\right) \mathbf{a}_2 - \left(x_1 - \frac{1}{2}\right) \mathbf{a}_3$	$=$	$a \left(x_1 + \frac{1}{2}\right) \hat{\mathbf{x}} - a \left(x_1 - \frac{1}{2}\right) \hat{\mathbf{y}} - a \left(x_1 - \frac{1}{2}\right) \hat{\mathbf{z}}$	(8e)	Ge I
$\mathbf{B}_8$	$= -\left(x_1 - \frac{1}{2}\right) \mathbf{a}_1 + \left(x_1 + \frac{1}{2}\right) \mathbf{a}_2 - \left(x_1 - \frac{1}{2}\right) \mathbf{a}_3$	$=$	$-a \left(x_1 - \frac{1}{2}\right) \hat{\mathbf{x}} + a \left(x_1 + \frac{1}{2}\right) \hat{\mathbf{y}} - a \left(x_1 - \frac{1}{2}\right) \hat{\mathbf{z}}$	(8e)	Ge I
$\mathbf{B}_9$	$= x_2 \mathbf{a}_1 + x_2 \mathbf{a}_2 + x_2 \mathbf{a}_3$	$=$	$ax_2 \hat{\mathbf{x}} + ax_2 \hat{\mathbf{y}} + ax_2 \hat{\mathbf{z}}$	(8e)	K I
$\mathbf{B}_{10}$	$= -x_2 \mathbf{a}_1 - x_2 \mathbf{a}_2 + x_2 \mathbf{a}_3$	$=$	$-ax_2 \hat{\mathbf{x}} - ax_2 \hat{\mathbf{y}} + ax_2 \hat{\mathbf{z}}$	(8e)	K I
$\mathbf{B}_{11}$	$= -x_2 \mathbf{a}_1 + x_2 \mathbf{a}_2 - x_2 \mathbf{a}_3$	$=$	$-ax_2 \hat{\mathbf{x}} + ax_2 \hat{\mathbf{y}} - ax_2 \hat{\mathbf{z}}$	(8e)	K I
$\mathbf{B}_{12}$	$= x_2 \mathbf{a}_1 - x_2 \mathbf{a}_2 - x_2 \mathbf{a}_3$	$=$	$ax_2 \hat{\mathbf{x}} - ax_2 \hat{\mathbf{y}} - ax_2 \hat{\mathbf{z}}$	(8e)	K I
$\mathbf{B}_{13}$	$= \left(x_2 + \frac{1}{2}\right) \mathbf{a}_1 + \left(x_2 + \frac{1}{2}\right) \mathbf{a}_2 + \left(x_2 + \frac{1}{2}\right) \mathbf{a}_3$	$=$	$a \left(x_2 + \frac{1}{2}\right) \hat{\mathbf{x}} + a \left(x_2 + \frac{1}{2}\right) \hat{\mathbf{y}} + a \left(x_2 + \frac{1}{2}\right) \hat{\mathbf{z}}$	(8e)	K I
$\mathbf{B}_{14}$	$= -\left(x_2 - \frac{1}{2}\right) \mathbf{a}_1 - \left(x_2 - \frac{1}{2}\right) \mathbf{a}_2 + \left(x_2 + \frac{1}{2}\right) \mathbf{a}_3$	$=$	$-a \left(x_2 - \frac{1}{2}\right) \hat{\mathbf{x}} - a \left(x_2 - \frac{1}{2}\right) \hat{\mathbf{y}} + a \left(x_2 + \frac{1}{2}\right) \hat{\mathbf{z}}$	(8e)	K I
$\mathbf{B}_{15}$	$= \left(x_2 + \frac{1}{2}\right) \mathbf{a}_1 - \left(x_2 - \frac{1}{2}\right) \mathbf{a}_2 - \left(x_2 - \frac{1}{2}\right) \mathbf{a}_3$	$=$	$a \left(x_2 + \frac{1}{2}\right) \hat{\mathbf{x}} - a \left(x_2 - \frac{1}{2}\right) \hat{\mathbf{y}} - a \left(x_2 - \frac{1}{2}\right) \hat{\mathbf{z}}$	(8e)	K I
$\mathbf{B}_{16}$	$= -\left(x_2 - \frac{1}{2}\right) \mathbf{a}_1 + \left(x_2 + \frac{1}{2}\right) \mathbf{a}_2 - \left(x_2 - \frac{1}{2}\right) \mathbf{a}_3$	$=$	$-a \left(x_2 - \frac{1}{2}\right) \hat{\mathbf{x}} + a \left(x_2 + \frac{1}{2}\right) \hat{\mathbf{y}} - a \left(x_2 - \frac{1}{2}\right) \hat{\mathbf{z}}$	(8e)	K I
$\mathbf{B}_{17}$	$= x_3 \mathbf{a}_1 + y_3 \mathbf{a}_2 + z_3 \mathbf{a}_3$	$=$	$ax_3 \hat{\mathbf{x}} + ay_3 \hat{\mathbf{y}} + az_3 \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{18}$	$= -x_3 \mathbf{a}_1 - y_3 \mathbf{a}_2 + z_3 \mathbf{a}_3$	$=$	$-ax_3 \hat{\mathbf{x}} - ay_3 \hat{\mathbf{y}} + az_3 \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{19}$	$= -x_3 \mathbf{a}_1 + y_3 \mathbf{a}_2 - z_3 \mathbf{a}_3$	$=$	$-ax_3 \hat{\mathbf{x}} + ay_3 \hat{\mathbf{y}} - az_3 \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{20}$	$= x_3 \mathbf{a}_1 - y_3 \mathbf{a}_2 - z_3 \mathbf{a}_3$	$=$	$ax_3 \hat{\mathbf{x}} - ay_3 \hat{\mathbf{y}} - az_3 \hat{\mathbf{z}}$	(24i)	Ge II

$\mathbf{B}_{21} =$	$z_3 \mathbf{a}_1 + x_3 \mathbf{a}_2 + y_3 \mathbf{a}_3$	$=$	$az_3 \hat{\mathbf{x}} + ax_3 \hat{\mathbf{y}} + ay_3 \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{22} =$	$z_3 \mathbf{a}_1 - x_3 \mathbf{a}_2 - y_3 \mathbf{a}_3$	$=$	$az_3 \hat{\mathbf{x}} - ax_3 \hat{\mathbf{y}} - ay_3 \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{23} =$	$-z_3 \mathbf{a}_1 - x_3 \mathbf{a}_2 + y_3 \mathbf{a}_3$	$=$	$-az_3 \hat{\mathbf{x}} - ax_3 \hat{\mathbf{y}} + ay_3 \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{24} =$	$-z_3 \mathbf{a}_1 + x_3 \mathbf{a}_2 - y_3 \mathbf{a}_3$	$=$	$-az_3 \hat{\mathbf{x}} + ax_3 \hat{\mathbf{y}} - ay_3 \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{25} =$	$y_3 \mathbf{a}_1 + z_3 \mathbf{a}_2 + x_3 \mathbf{a}_3$	$=$	$ay_3 \hat{\mathbf{x}} + az_3 \hat{\mathbf{y}} + ax_3 \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{26} =$	$-y_3 \mathbf{a}_1 + z_3 \mathbf{a}_2 - x_3 \mathbf{a}_3$	$=$	$-ay_3 \hat{\mathbf{x}} + az_3 \hat{\mathbf{y}} - ax_3 \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{27} =$	$y_3 \mathbf{a}_1 - z_3 \mathbf{a}_2 - x_3 \mathbf{a}_3$	$=$	$ay_3 \hat{\mathbf{x}} - az_3 \hat{\mathbf{y}} - ax_3 \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{28} =$	$-y_3 \mathbf{a}_1 - z_3 \mathbf{a}_2 + x_3 \mathbf{a}_3$	$=$	$-ay_3 \hat{\mathbf{x}} - az_3 \hat{\mathbf{y}} + ax_3 \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{29} =$	$(y_3 + \frac{1}{2}) \mathbf{a}_1 + (x_3 + \frac{1}{2}) \mathbf{a}_2 + (z_3 + \frac{1}{2}) \mathbf{a}_3$	$=$	$a(y_3 + \frac{1}{2}) \hat{\mathbf{x}} + a(x_3 + \frac{1}{2}) \hat{\mathbf{y}} + a(z_3 + \frac{1}{2}) \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{30} =$	$-(y_3 - \frac{1}{2}) \mathbf{a}_1 - (x_3 - \frac{1}{2}) \mathbf{a}_2 + (z_3 + \frac{1}{2}) \mathbf{a}_3$	$=$	$-a(y_3 - \frac{1}{2}) \hat{\mathbf{x}} - a(x_3 - \frac{1}{2}) \hat{\mathbf{y}} + a(z_3 + \frac{1}{2}) \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{31} =$	$(y_3 + \frac{1}{2}) \mathbf{a}_1 - (x_3 - \frac{1}{2}) \mathbf{a}_2 - (z_3 - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(y_3 + \frac{1}{2}) \hat{\mathbf{x}} - a(x_3 - \frac{1}{2}) \hat{\mathbf{y}} - a(z_3 - \frac{1}{2}) \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{32} =$	$-(y_3 - \frac{1}{2}) \mathbf{a}_1 + (x_3 + \frac{1}{2}) \mathbf{a}_2 - (z_3 - \frac{1}{2}) \mathbf{a}_3$	$=$	$-a(y_3 - \frac{1}{2}) \hat{\mathbf{x}} + a(x_3 + \frac{1}{2}) \hat{\mathbf{y}} - a(z_3 - \frac{1}{2}) \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{33} =$	$(x_3 + \frac{1}{2}) \mathbf{a}_1 + (z_3 + \frac{1}{2}) \mathbf{a}_2 + (y_3 + \frac{1}{2}) \mathbf{a}_3$	$=$	$a(x_3 + \frac{1}{2}) \hat{\mathbf{x}} + a(z_3 + \frac{1}{2}) \hat{\mathbf{y}} + a(y_3 + \frac{1}{2}) \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{34} =$	$-(x_3 - \frac{1}{2}) \mathbf{a}_1 + (z_3 + \frac{1}{2}) \mathbf{a}_2 - (y_3 - \frac{1}{2}) \mathbf{a}_3$	$=$	$-a(x_3 - \frac{1}{2}) \hat{\mathbf{x}} + a(z_3 + \frac{1}{2}) \hat{\mathbf{y}} - a(y_3 - \frac{1}{2}) \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{35} =$	$-(x_3 - \frac{1}{2}) \mathbf{a}_1 - (z_3 - \frac{1}{2}) \mathbf{a}_2 + (y_3 + \frac{1}{2}) \mathbf{a}_3$	$=$	$-a(x_3 - \frac{1}{2}) \hat{\mathbf{x}} - a(z_3 - \frac{1}{2}) \hat{\mathbf{y}} + a(y_3 + \frac{1}{2}) \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{36} =$	$(x_3 + \frac{1}{2}) \mathbf{a}_1 - (z_3 - \frac{1}{2}) \mathbf{a}_2 - (y_3 - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(x_3 + \frac{1}{2}) \hat{\mathbf{x}} - a(z_3 - \frac{1}{2}) \hat{\mathbf{y}} - a(y_3 - \frac{1}{2}) \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{37} =$	$(z_3 + \frac{1}{2}) \mathbf{a}_1 + (y_3 + \frac{1}{2}) \mathbf{a}_2 + (x_3 + \frac{1}{2}) \mathbf{a}_3$	$=$	$a(z_3 + \frac{1}{2}) \hat{\mathbf{x}} + a(y_3 + \frac{1}{2}) \hat{\mathbf{y}} + a(x_3 + \frac{1}{2}) \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{38} =$	$(z_3 + \frac{1}{2}) \mathbf{a}_1 - (y_3 - \frac{1}{2}) \mathbf{a}_2 - (x_3 - \frac{1}{2}) \mathbf{a}_3$	$=$	$a(z_3 + \frac{1}{2}) \hat{\mathbf{x}} - a(y_3 - \frac{1}{2}) \hat{\mathbf{y}} - a(x_3 - \frac{1}{2}) \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{39} =$	$-(z_3 - \frac{1}{2}) \mathbf{a}_1 + (y_3 + \frac{1}{2}) \mathbf{a}_2 - (x_3 - \frac{1}{2}) \mathbf{a}_3$	$=$	$-a(z_3 - \frac{1}{2}) \hat{\mathbf{x}} + a(y_3 + \frac{1}{2}) \hat{\mathbf{y}} - a(x_3 - \frac{1}{2}) \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{40} =$	$-(z_3 - \frac{1}{2}) \mathbf{a}_1 - (y_3 - \frac{1}{2}) \mathbf{a}_2 + (x_3 + \frac{1}{2}) \mathbf{a}_3$	$=$	$-a(z_3 - \frac{1}{2}) \hat{\mathbf{x}} - a(y_3 - \frac{1}{2}) \hat{\mathbf{y}} + a(x_3 + \frac{1}{2}) \hat{\mathbf{z}}$	(24i)	Ge II
$\mathbf{B}_{41} =$	$x_4 \mathbf{a}_1 + y_4 \mathbf{a}_2 + z_4 \mathbf{a}_3$	$=$	$ax_4 \hat{\mathbf{x}} + ay_4 \hat{\mathbf{y}} + az_4 \hat{\mathbf{z}}$	(24i)	K II
$\mathbf{B}_{42} =$	$-x_4 \mathbf{a}_1 - y_4 \mathbf{a}_2 + z_4 \mathbf{a}_3$	$=$	$-ax_4 \hat{\mathbf{x}} - ay_4 \hat{\mathbf{y}} + az_4 \hat{\mathbf{z}}$	(24i)	K II
$\mathbf{B}_{43} =$	$-x_4 \mathbf{a}_1 + y_4 \mathbf{a}_2 - z_4 \mathbf{a}_3$	$=$	$-ax_4 \hat{\mathbf{x}} + ay_4 \hat{\mathbf{y}} - az_4 \hat{\mathbf{z}}$	(24i)	K II
$\mathbf{B}_{44} =$	$x_4 \mathbf{a}_1 - y_4 \mathbf{a}_2 - z_4 \mathbf{a}_3$	$=$	$ax_4 \hat{\mathbf{x}} - ay_4 \hat{\mathbf{y}} - az_4 \hat{\mathbf{z}}$	(24i)	K II
$\mathbf{B}_{45} =$	$z_4 \mathbf{a}_1 + x_4 \mathbf{a}_2 + y_4 \mathbf{a}_3$	$=$	$az_4 \hat{\mathbf{x}} + ax_4 \hat{\mathbf{y}} + ay_4 \hat{\mathbf{z}}$	(24i)	K II
$\mathbf{$					

$$\begin{aligned}
\mathbf{B}_{53} &= \begin{pmatrix} (y_4 + \frac{1}{2}) \mathbf{a}_1 + (x_4 + \frac{1}{2}) \mathbf{a}_2 + \\ (z_4 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a \begin{pmatrix} (y_4 + \frac{1}{2}) \hat{\mathbf{x}} + a (x_4 + \frac{1}{2}) \hat{\mathbf{y}} + a (z_4 + \frac{1}{2}) \hat{\mathbf{z}} \end{pmatrix} & (24i) & \text{K II} \\
\mathbf{B}_{54} &= \begin{pmatrix} -(y_4 - \frac{1}{2}) \mathbf{a}_1 - (x_4 - \frac{1}{2}) \mathbf{a}_2 + \\ (z_4 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = \begin{pmatrix} -a (y_4 - \frac{1}{2}) \hat{\mathbf{x}} - a (x_4 - \frac{1}{2}) \hat{\mathbf{y}} + a (z_4 + \frac{1}{2}) \hat{\mathbf{z}} \end{pmatrix} & (24i) & \text{K II} \\
\mathbf{B}_{55} &= \begin{pmatrix} (y_4 + \frac{1}{2}) \mathbf{a}_1 - (x_4 - \frac{1}{2}) \mathbf{a}_2 - \\ (z_4 - \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a \begin{pmatrix} (y_4 + \frac{1}{2}) \hat{\mathbf{x}} - a (x_4 - \frac{1}{2}) \hat{\mathbf{y}} - a (z_4 - \frac{1}{2}) \hat{\mathbf{z}} \end{pmatrix} & (24i) & \text{K II} \\
\mathbf{B}_{56} &= \begin{pmatrix} -(y_4 - \frac{1}{2}) \mathbf{a}_1 + (x_4 + \frac{1}{2}) \mathbf{a}_2 - \\ (z_4 - \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = \begin{pmatrix} -a (y_4 - \frac{1}{2}) \hat{\mathbf{x}} + a (x_4 + \frac{1}{2}) \hat{\mathbf{y}} - a (z_4 - \frac{1}{2}) \hat{\mathbf{z}} \end{pmatrix} & (24i) & \text{K II} \\
\mathbf{B}_{57} &= \begin{pmatrix} (x_4 + \frac{1}{2}) \mathbf{a}_1 + (z_4 + \frac{1}{2}) \mathbf{a}_2 + \\ (y_4 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a \begin{pmatrix} (x_4 + \frac{1}{2}) \hat{\mathbf{x}} + a (z_4 + \frac{1}{2}) \hat{\mathbf{y}} + a (y_4 + \frac{1}{2}) \hat{\mathbf{z}} \end{pmatrix} & (24i) & \text{K II} \\
\mathbf{B}_{58} &= \begin{pmatrix} -(x_4 - \frac{1}{2}) \mathbf{a}_1 + (z_4 + \frac{1}{2}) \mathbf{a}_2 - \\ (y_4 - \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = \begin{pmatrix} -a (x_4 - \frac{1}{2}) \hat{\mathbf{x}} + a (z_4 + \frac{1}{2}) \hat{\mathbf{y}} - a (y_4 - \frac{1}{2}) \hat{\mathbf{z}} \end{pmatrix} & (24i) & \text{K II} \\
\mathbf{B}_{59} &= \begin{pmatrix} -(x_4 - \frac{1}{2}) \mathbf{a}_1 - (z_4 - \frac{1}{2}) \mathbf{a}_2 + \\ (y_4 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = \begin{pmatrix} -a (x_4 - \frac{1}{2}) \hat{\mathbf{x}} - a (z_4 - \frac{1}{2}) \hat{\mathbf{y}} + a (y_4 + \frac{1}{2}) \hat{\mathbf{z}} \end{pmatrix} & (24i) & \text{K II} \\
\mathbf{B}_{60} &= \begin{pmatrix} (x_4 + \frac{1}{2}) \mathbf{a}_1 - (z_4 - \frac{1}{2}) \mathbf{a}_2 - \\ (y_4 - \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a \begin{pmatrix} (x_4 + \frac{1}{2}) \hat{\mathbf{x}} - a (z_4 - \frac{1}{2}) \hat{\mathbf{y}} - a (y_4 - \frac{1}{2}) \hat{\mathbf{z}} \end{pmatrix} & (24i) & \text{K II} \\
\mathbf{B}_{61} &= \begin{pmatrix} (z_4 + \frac{1}{2}) \mathbf{a}_1 + (y_4 + \frac{1}{2}) \mathbf{a}_2 + \\ (x_4 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a \begin{pmatrix} (z_4 + \frac{1}{2}) \hat{\mathbf{x}} + a (y_4 + \frac{1}{2}) \hat{\mathbf{y}} + a (x_4 + \frac{1}{2}) \hat{\mathbf{z}} \end{pmatrix} & (24i) & \text{K II} \\
\mathbf{B}_{62} &= \begin{pmatrix} (z_4 + \frac{1}{2}) \mathbf{a}_1 - (y_4 - \frac{1}{2}) \mathbf{a}_2 - \\ (x_4 - \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = a \begin{pmatrix} (z_4 + \frac{1}{2}) \hat{\mathbf{x}} - a (y_4 - \frac{1}{2}) \hat{\mathbf{y}} - a (x_4 - \frac{1}{2}) \hat{\mathbf{z}} \end{pmatrix} & (24i) & \text{K II} \\
\mathbf{B}_{63} &= \begin{pmatrix} -(z_4 - \frac{1}{2}) \mathbf{a}_1 + (y_4 + \frac{1}{2}) \mathbf{a}_2 - \\ (x_4 - \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = \begin{pmatrix} -a (z_4 - \frac{1}{2}) \hat{\mathbf{x}} + a (y_4 + \frac{1}{2}) \hat{\mathbf{y}} - a (x_4 - \frac{1}{2}) \hat{\mathbf{z}} \end{pmatrix} & (24i) & \text{K II} \\
\mathbf{B}_{64} &= \begin{pmatrix} -(z_4 - \frac{1}{2}) \mathbf{a}_1 - (y_4 - \frac{1}{2}) \mathbf{a}_2 + \\ (x_4 + \frac{1}{2}) \mathbf{a}_3 \end{pmatrix} = \begin{pmatrix} -a (z_4 - \frac{1}{2}) \hat{\mathbf{x}} - a (y_4 - \frac{1}{2}) \hat{\mathbf{y}} + a (x_4 + \frac{1}{2}) \hat{\mathbf{z}} \end{pmatrix} & (24i) & \text{K II}
\end{aligned}$$

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