

$Ia\bar{3}d$

O_h^{10}

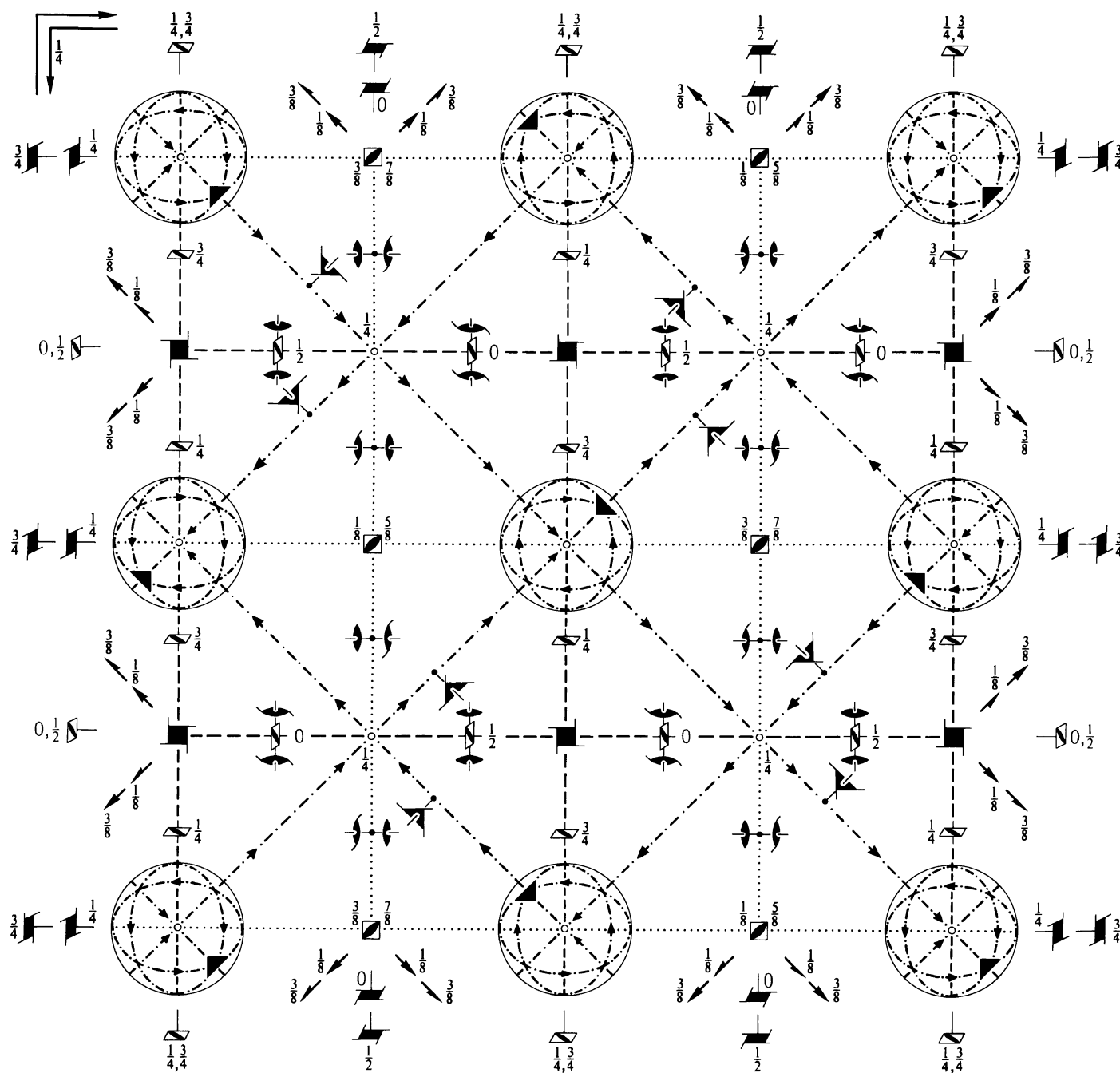
$m\bar{3}m$

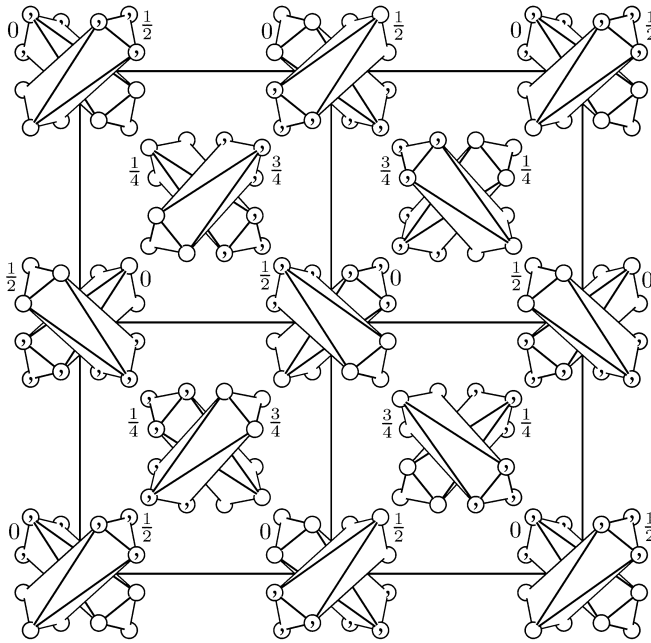
Cubic

No. 230

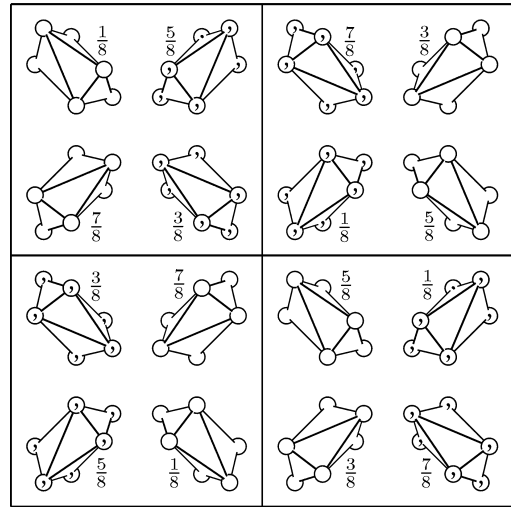
$I 4_1/a \bar{3} 2/d$

Patterson symmetry $Im\bar{3}m$





Polyhedron centre at 0, 0, 0



Polyhedron centre at $\frac{1}{8}, \frac{1}{8}, \frac{1}{8}$

Origin at centre ($\bar{3}$)

Asymmetric unit $-\frac{1}{8} \leq x \leq \frac{1}{8}; -\frac{1}{8} \leq y \leq \frac{1}{8}; 0 \leq z \leq \frac{1}{4}; \max(x, -x, y, -y) \leq z$
Vertices $0, 0, 0$ $\frac{1}{8}, \frac{1}{8}, \frac{1}{8}$ $-\frac{1}{8}, \frac{1}{8}, \frac{1}{8}$ $-\frac{1}{8}, -\frac{1}{8}, \frac{1}{8}$ $\frac{1}{8}, -\frac{1}{8}, \frac{1}{8}$
 $\frac{1}{8}, \frac{1}{8}, \frac{1}{4}$ $-\frac{1}{8}, \frac{1}{8}, \frac{1}{4}$ $-\frac{1}{8}, -\frac{1}{8}, \frac{1}{4}$ $\frac{1}{8}, -\frac{1}{8}, \frac{1}{4}$

Symmetry operations

For (0,0,0)+ set

- | | | | |
|---|---|---|---|
| (1) 1 | (2) $2(0, 0, \frac{1}{2})$ $\frac{1}{4}, 0, z$ | (3) $2(0, \frac{1}{2}, 0)$ $0, y, \frac{1}{4}$ | (4) $2(\frac{1}{2}, 0, 0)$ $x, \frac{1}{4}, 0$ |
| (5) 3^+ x, x, x | (6) 3^+ $\bar{x} + \frac{1}{2}, x, \bar{x}$ | (7) 3^+ $x + \frac{1}{2}, \bar{x} - \frac{1}{2}, \bar{x}$ | (8) 3^+ $\bar{x}, \bar{x} + \frac{1}{2}, x$ |
| (9) 3^- x, x, x | (10) 3^- $(-\frac{1}{3}, \frac{1}{3}, \frac{1}{3})$ $x + \frac{1}{6}, \bar{x} + \frac{1}{6}, \bar{x}$ | (11) 3^- $(\frac{1}{3}, \frac{1}{3}, -\frac{1}{3})$ $\bar{x} + \frac{1}{3}, \bar{x} + \frac{1}{6}, x$ | (12) 3^- $(\frac{1}{3}, -\frac{1}{3}, \frac{1}{3})$ $\bar{x} - \frac{1}{6}, x + \frac{1}{3}, \bar{x}$ |
| (13) $2(\frac{1}{2}, \frac{1}{2}, 0)$ $x, x - \frac{1}{4}, \frac{1}{8}$ | (14) 2 $x, \bar{x} + \frac{3}{4}, \frac{3}{8}$ | (15) 4^- $(0, 0, \frac{3}{4})$ $\frac{1}{4}, 0, z$ | (16) 4^+ $(0, 0, \frac{1}{4})$ $-\frac{1}{4}, \frac{1}{2}, z$ |
| (17) 4^- $(\frac{3}{4}, 0, 0)$ $x, \frac{1}{4}, 0$ | (18) $2(0, \frac{1}{2}, \frac{1}{2})$ $\frac{1}{8}, y + \frac{1}{4}, y$ | (19) 2 $\frac{3}{8}, y + \frac{3}{4}, \bar{y}$ | (20) 4^+ $(\frac{1}{4}, 0, 0)$ $x, -\frac{1}{4}, \frac{1}{2}$ |
| (21) 4^+ $(0, \frac{1}{4}, 0)$ $\frac{1}{2}, y, -\frac{1}{4}$ | (22) $2(\frac{1}{2}, 0, \frac{1}{2})$ $x - \frac{1}{4}, \frac{1}{8}, x$ | (23) 4^- $(0, \frac{3}{4}, 0)$ $0, y, \frac{1}{4}$ | (24) 2 $\bar{x} + \frac{3}{4}, \frac{3}{8}, x$ |
| (25) $\bar{1}$ $0, 0, 0$ | (26) a $x, y, \frac{1}{4}$ | (27) c $x, \frac{1}{4}, z$ | (28) b $\frac{1}{4}, y, z$ |
| (29) $\bar{3}^+$ $x, x, x; 0, 0, 0$ | (30) $\bar{3}^+$ $\bar{x} - \frac{1}{2}, x + 1, \bar{x}; 0, \frac{1}{2}, \frac{1}{2}$ | (31) $\bar{3}^+$ $x + \frac{1}{2}, \bar{x} + \frac{1}{2}, \bar{x}; \frac{1}{2}, \frac{1}{2}, 0$ | (32) $\bar{3}^+$ $\bar{x} + 1, \bar{x} + \frac{1}{2}, x; \frac{1}{2}, 0, \frac{1}{2}$ |
| (33) $\bar{3}^-$ $x, x, x; 0, 0, 0$ | (34) $\bar{3}^-$ $x + \frac{1}{2}, \bar{x} - \frac{1}{2}, \bar{x}; 0, 0, \frac{1}{2}$ | (35) $\bar{3}^-$ $\bar{x}, \bar{x} + \frac{1}{2}, x; 0, \frac{1}{2}, 0$ | (36) $\bar{3}^-$ $\bar{x} + \frac{1}{2}, x, \bar{x}; \frac{1}{2}, 0, 0$ |
| (37) $d(-\frac{1}{4}, \frac{1}{4}, \frac{3}{4})$ $x + \frac{1}{2}, \bar{x}, z$ | (38) $d(\frac{1}{4}, \frac{1}{4}, \frac{1}{4})$ x, x, z | (39) $\bar{4}^-$ $0, \frac{3}{4}, z; 0, \frac{3}{4}, \frac{1}{8}$ | (40) $\bar{4}^+$ $\frac{1}{2}, -\frac{1}{4}, z; \frac{1}{2}, -\frac{1}{4}, \frac{3}{8}$ |
| (41) $\bar{4}^-$ $x, 0, \frac{3}{4}; \frac{1}{8}, 0, \frac{3}{4}$ | (42) $d(\frac{3}{4}, -\frac{1}{4}, \frac{1}{4})$ $x, y + \frac{1}{2}, \bar{y}$ | (43) $d(\frac{1}{4}, \frac{1}{4}, \frac{1}{4})$ x, y, y | (44) $\bar{4}^+$ $x, \frac{1}{2}, -\frac{1}{4}; \frac{3}{8}, \frac{1}{2}, -\frac{1}{4}$ |
| (45) $\bar{4}^+$ $-\frac{1}{4}, y, \frac{1}{2}; -\frac{1}{4}, \frac{3}{8}, \frac{1}{2}$ | (46) $d(\frac{1}{4}, \frac{3}{4}, -\frac{1}{4})$ $\bar{x} + \frac{1}{2}, y, x$ | (47) $\bar{4}^-$ $\frac{3}{4}, y, 0; \frac{3}{4}, \frac{1}{8}, 0$ | (48) $d(\frac{1}{4}, \frac{1}{4}, \frac{1}{4})$ x, y, x |

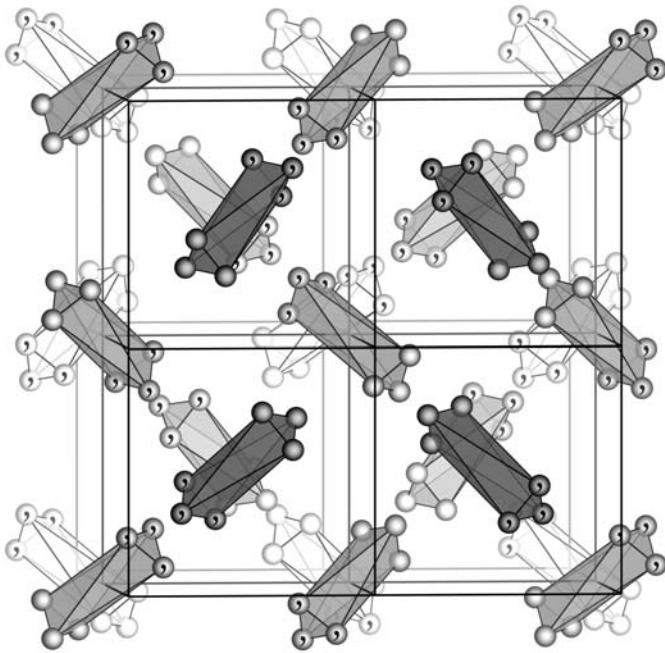
For $(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$ + set

- | | | | |
|---|--|---|--|
| (1) $i(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$ | (2) 2 $0, \frac{1}{4}, z$ | (3) 2 $\frac{1}{4}, y, 0$ | (4) 2 $x, 0, \frac{1}{4}$ |
| (5) 3^+ $(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$ x, x, x | (6) 3^+ $(\frac{1}{6}, -\frac{1}{6}, \frac{1}{6})$ $\bar{x} - \frac{1}{6}, x + \frac{1}{3}, \bar{x}$ | (7) 3^+ $(-\frac{1}{6}, \frac{1}{6}, \frac{1}{6})$ $x + \frac{1}{6}, \bar{x} + \frac{1}{6}, \bar{x}$ | (8) 3^+ $(\frac{1}{6}, \frac{1}{6}, -\frac{1}{6})$ $\bar{x} + \frac{1}{3}, \bar{x} + \frac{1}{6}, x$ |
| (9) 3^- $(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$ x, x, x | (10) 3^- $(\frac{1}{6}, -\frac{1}{6}, -\frac{1}{6})$ $x + \frac{1}{6}, \bar{x} + \frac{1}{6}, \bar{x}$ | (11) 3^- $(-\frac{1}{6}, -\frac{1}{6}, \frac{1}{6})$ $\bar{x} + \frac{1}{3}, \bar{x} + \frac{1}{6}, x$ | (12) 3^- $(-\frac{1}{6}, \frac{1}{6}, -\frac{1}{6})$ $\bar{x} - \frac{1}{6}, x + \frac{1}{3}, \bar{x}$ |
| (13) $2(\frac{1}{2}, \frac{1}{2}, 0)$ $x, x + \frac{1}{4}, \frac{3}{8}$ | (14) 2 $x, \bar{x} + \frac{1}{4}, \frac{1}{8}$ | (15) 4^- $(0, 0, \frac{1}{4})$ $\frac{3}{4}, 0, z$ | (16) 4^+ $(0, 0, \frac{3}{4})$ $\frac{1}{4}, \frac{1}{2}, z$ |
| (17) 4^- $(\frac{1}{4}, 0, 0)$ $x, \frac{3}{4}, 0$ | (18) $2(0, \frac{1}{2}, \frac{1}{2})$ $\frac{3}{8}, y - \frac{1}{4}, y$ | (19) 2 $\frac{1}{8}, y + \frac{1}{4}, \bar{y}$ | (20) 4^+ $(\frac{3}{4}, 0, 0)$ $x, \frac{1}{4}, \frac{1}{2}$ |
| (21) 4^+ $(0, \frac{3}{4}, 0)$ $\frac{1}{2}, y, \frac{1}{4}$ | (22) $2(\frac{1}{2}, 0, \frac{1}{2})$ $x + \frac{1}{4}, \frac{3}{8}, x$ | (23) 4^- $(0, \frac{1}{4}, 0)$ $0, y, \frac{3}{4}$ | (24) 2 $\bar{x} + \frac{1}{4}, \frac{1}{8}, x$ |
| (25) $\bar{1}$ $\frac{1}{4}, \frac{1}{4}, \frac{1}{4}$ | (26) b $x, y, 0$ | (27) a $x, 0, z$ | (28) c $0, y, z$ |
| (29) $\bar{3}^+$ $x, x, x; \frac{1}{4}, \frac{1}{4}, \frac{1}{4}$ | (30) $\bar{3}^+$ $\bar{x} - \frac{1}{2}, x, \bar{x}; -\frac{1}{4}, -\frac{1}{4}, \frac{1}{4}$ | (31) $\bar{3}^+$ $x - \frac{1}{2}, \bar{x} + \frac{1}{2}, \bar{x}; -\frac{1}{4}, \frac{1}{4}, -\frac{1}{4}$ | (32) $\bar{3}^+$ $\bar{x}, \bar{x} - \frac{1}{2}, x; \frac{1}{4}, -\frac{1}{4}, -\frac{1}{4}$ |
| (33) $\bar{3}^-$ $x, x, x; \frac{1}{4}, \frac{1}{4}, \frac{1}{4}$ | (34) $\bar{3}^-$ $x + \frac{1}{2}, \bar{x} - \frac{1}{2}, \bar{x}; \frac{1}{4}, -\frac{1}{4}, \frac{1}{4}$ | (35) $\bar{3}^-$ $\bar{x}, \bar{x} + \frac{1}{2}, x; -\frac{1}{4}, \frac{1}{4}, \frac{1}{4}$ | (36) $\bar{3}^-$ $\bar{x} + \frac{1}{2}, x, \bar{x}; \frac{1}{4}, \frac{1}{4}, -\frac{1}{4}$ |
| (37) $d(\frac{1}{4}, -\frac{1}{4}, \frac{1}{4})$ $x + \frac{1}{2}, \bar{x}, z$ | (38) $d(\frac{3}{4}, \frac{3}{4}, \frac{3}{4})$ x, x, z | (39) $\bar{4}^-$ $0, \frac{1}{4}, z; 0, \frac{1}{4}, \frac{3}{8}$ | (40) $\bar{4}^+$ $\frac{1}{2}, \frac{1}{4}, z; \frac{1}{2}, \frac{1}{4}, \frac{1}{8}$ |
| (41) $\bar{4}^-$ $x, 0, \frac{1}{4}; \frac{3}{8}, 0, \frac{1}{4}$ | (42) $d(\frac{1}{4}, \frac{1}{4}, -\frac{1}{4})$ $x, y + \frac{1}{2}, \bar{y}$ | (43) $d(\frac{3}{4}, \frac{3}{4}, \frac{1}{4})$ x, y, y | (44) $\bar{4}^+$ $x, \frac{1}{2}, \frac{1}{4}; \frac{1}{8}, \frac{1}{2}, \frac{1}{4}$ |
| (45) $\bar{4}^+$ $\frac{1}{4}, y, \frac{1}{2}; \frac{1}{4}, \frac{1}{8}, \frac{1}{2}$ | (46) $d(-\frac{1}{4}, \frac{1}{4}, \frac{1}{4})$ $\bar{x} + \frac{1}{2}, y, x$ | (47) $\bar{4}^-$ $\frac{1}{4}, y, 0; \frac{1}{4}, \frac{3}{8}, 0$ | (48) $d(\frac{3}{4}, \frac{3}{4}, \frac{3}{4})$ x, y, x |

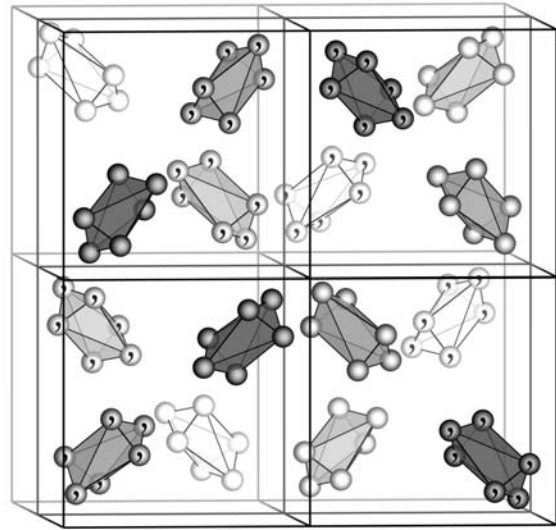
Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; $t(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$; (2); (3); (5); (13); (25)

Positions

Multiplicity, Wyckoff letter, Site symmetry	Coordinates	Reflection conditions							
	$(0,0,0) + (\frac{1}{2}, \frac{1}{2}, \frac{1}{2}) +$	h, k, l permutable General:							
96 h 1	(1) x, y, z (2) $\bar{x} + \frac{1}{2}, \bar{y}, z + \frac{1}{2}$ (3) $\bar{x}, y + \frac{1}{2}, \bar{z} + \frac{1}{2}$ (4) $x + \frac{1}{2}, \bar{y} + \frac{1}{2}, \bar{z}$ (5) z, x, y (6) $z + \frac{1}{2}, \bar{x} + \frac{1}{2}, \bar{y}$ (7) $\bar{z} + \frac{1}{2}, \bar{x}, y + \frac{1}{2}$ (8) $\bar{z}, x + \frac{1}{2}, \bar{y} + \frac{1}{2}$ (9) y, z, x (10) $\bar{y}, z + \frac{1}{2}, \bar{x} + \frac{1}{2}$ (11) $y + \frac{1}{2}, \bar{z} + \frac{1}{2}, \bar{x}$ (12) $\bar{y} + \frac{1}{2}, \bar{z}, x + \frac{1}{2}$ (13) $y + \frac{3}{4}, x + \frac{1}{4}, \bar{z} + \frac{1}{4}$ (14) $\bar{y} + \frac{3}{4}, \bar{x} + \frac{3}{4}, \bar{z} + \frac{3}{4}$ (15) $y + \frac{1}{4}, \bar{x} + \frac{1}{4}, z + \frac{3}{4}$ (16) $\bar{y} + \frac{1}{4}, x + \frac{3}{4}, z + \frac{1}{4}$ (17) $x + \frac{3}{4}, z + \frac{1}{4}, \bar{y} + \frac{1}{4}$ (18) $\bar{x} + \frac{1}{4}, z + \frac{3}{4}, y + \frac{1}{4}$ (19) $\bar{x} + \frac{3}{4}, \bar{z} + \frac{3}{4}, \bar{y} + \frac{3}{4}$ (20) $x + \frac{1}{4}, \bar{z} + \frac{1}{4}, y + \frac{3}{4}$ (21) $z + \frac{3}{4}, y + \frac{1}{4}, \bar{x} + \frac{1}{4}$ (22) $z + \frac{1}{4}, \bar{y} + \frac{1}{4}, x + \frac{3}{4}$ (23) $\bar{z} + \frac{1}{4}, y + \frac{3}{4}, x + \frac{1}{4}$ (24) $\bar{z} + \frac{3}{4}, \bar{y} + \frac{3}{4}, \bar{x} + \frac{3}{4}$ (25) $\bar{x}, \bar{y}, \bar{z}$ (26) $x + \frac{1}{2}, y, \bar{z} + \frac{1}{2}$ (27) $x, \bar{y} + \frac{1}{2}, z + \frac{1}{2}$ (28) $\bar{x} + \frac{1}{2}, y + \frac{1}{2}, z$ (29) $\bar{x}, \bar{z}, \bar{y}$ (30) $\bar{z} + \frac{1}{2}, x + \frac{1}{2}, y$ (31) $z + \frac{1}{2}, x, \bar{y} + \frac{1}{2}$ (32) $z, \bar{x} + \frac{1}{2}, y + \frac{1}{2}$ (33) $\bar{y}, \bar{z}, \bar{x}$ (34) $y, \bar{z} + \frac{1}{2}, x + \frac{1}{2}$ (35) $\bar{y} + \frac{1}{2}, z + \frac{1}{2}, x$ (36) $y + \frac{1}{2}, z, \bar{x} + \frac{1}{2}$ (37) $\bar{y} + \frac{1}{4}, \bar{x} + \frac{3}{4}, z + \frac{3}{4}$ (38) $y + \frac{1}{4}, x + \frac{1}{4}, z + \frac{1}{4}$ (39) $\bar{y} + \frac{3}{4}, x + \frac{3}{4}, \bar{z} + \frac{1}{4}$ (40) $y + \frac{3}{4}, \bar{x} + \frac{1}{4}, \bar{z} + \frac{3}{4}$ (41) $\bar{x} + \frac{1}{4}, \bar{z} + \frac{3}{4}, y + \frac{3}{4}$ (42) $x + \frac{3}{4}, \bar{z} + \frac{1}{4}, \bar{y} + \frac{3}{4}$ (43) $x + \frac{1}{4}, z + \frac{1}{4}, y + \frac{1}{4}$ (44) $\bar{x} + \frac{3}{4}, z + \frac{3}{4}, \bar{y} + \frac{1}{4}$ (45) $\bar{z} + \frac{1}{4}, \bar{y} + \frac{3}{4}, x + \frac{3}{4}$ (46) $\bar{z} + \frac{3}{4}, y + \frac{3}{4}, \bar{x} + \frac{1}{4}$ (47) $z + \frac{3}{4}, \bar{y} + \frac{1}{4}, \bar{x} + \frac{3}{4}$ (48) $z + \frac{1}{4}, y + \frac{1}{4}, x + \frac{1}{4}$	$hkl: h + k + l = 2n$ $0kl: k, l = 2n$ $hhl: 2h + l = 4n$ $h00: h = 4n$							
		Special: as above, plus							
48 g ..2	$\frac{1}{8}, y, \bar{y} + \frac{1}{4}$ $\bar{y} + \frac{1}{4}, \frac{1}{8}, y$ $y, \bar{y} + \frac{1}{4}, \frac{1}{8}$ $\frac{7}{8}, \bar{y}, y + \frac{3}{4}$ $y + \frac{3}{4}, \frac{7}{8}, \bar{y}$ $\bar{y}, y + \frac{3}{4}, \frac{7}{8}$	$\frac{3}{8}, \bar{y}, \bar{y} + \frac{3}{4}$ $\bar{y} + \frac{3}{4}, \frac{3}{8}, \bar{y}$ $\bar{y}, \bar{y} + \frac{3}{4}, \frac{3}{8}$ $\frac{5}{8}, y, y + \frac{1}{4}$ $y + \frac{1}{4}, \frac{5}{8}, y$ $y, y + \frac{1}{4}, \frac{5}{8}$	$\frac{7}{8}, y + \frac{1}{2}, y + \frac{1}{4}$ $y + \frac{1}{4}, \frac{7}{8}, y + \frac{1}{2}$ $y + \frac{1}{2}, y + \frac{1}{4}, \frac{7}{8}$ $\frac{1}{8}, \bar{y} + \frac{1}{2}, \bar{y} + \frac{3}{4}$ $\bar{y} + \frac{3}{4}, \frac{1}{8}, \bar{y} + \frac{1}{2}$ $\bar{y} + \frac{1}{2}, \bar{y} + \frac{3}{4}, \frac{1}{8}$	$\frac{5}{8}, \bar{y} + \frac{1}{2}, y + \frac{3}{4}$ $y + \frac{3}{4}, \frac{5}{8}, \bar{y} + \frac{1}{2}$ $\bar{y} + \frac{1}{2}, y + \frac{3}{4}, \frac{5}{8}$ $\frac{3}{8}, y + \frac{1}{2}, \bar{y} + \frac{1}{4}$ $\bar{y} + \frac{1}{4}, \frac{3}{8}, y + \frac{1}{2}$ $y + \frac{1}{2}, \bar{y} + \frac{1}{4}, \frac{3}{8}$	$hkl: h = 2n + 1$ or $h = 4n$				
48 f 2..	$x, 0, \frac{1}{4}$ $\frac{3}{4}, x + \frac{1}{4}, 0$ $\bar{x}, 0, \frac{3}{4}$ $\frac{1}{4}, \bar{x} + \frac{3}{4}, 0$	$\bar{x} + \frac{1}{2}, 0, \frac{3}{4}$ $\frac{3}{4}, \bar{x} + \frac{3}{4}, \frac{1}{2}$ $x + \frac{1}{2}, 0, \frac{1}{4}$ $\frac{1}{4}, x + \frac{1}{4}, \frac{1}{2}$	$\frac{1}{4}, x, 0$ $x + \frac{3}{4}, \frac{1}{2}, \frac{1}{4}$ $\frac{3}{4}, \bar{x}, 0$ $\bar{x} + \frac{1}{4}, \frac{1}{2}, \frac{3}{4}$	$\frac{3}{4}, \bar{x} + \frac{1}{2}, 0$ $\bar{x} + \frac{1}{4}, 0, \frac{1}{4}$ $\frac{1}{4}, x + \frac{1}{2}, 0$ $x + \frac{3}{4}, 0, \frac{3}{4}$	$0, \frac{1}{4}, x$ $0, \frac{1}{4}, \bar{x} + \frac{1}{4}$ $0, \frac{3}{4}, \bar{x}$ $0, \frac{3}{4}, x + \frac{3}{4}$	$0, \frac{3}{4}, \bar{x} + \frac{1}{2}$ $\frac{1}{2}, \frac{1}{4}, x + \frac{3}{4}$ $0, \frac{1}{4}, x + \frac{1}{2}$ $\frac{1}{2}, \frac{3}{4}, \bar{x} + \frac{1}{4}$	$hkl: 2h + l = 4n$		
32 e .3.	x, x, x $x + \frac{3}{4}, x + \frac{1}{4}, \bar{x} + \frac{1}{4}$ $\bar{x}, \bar{x}, \bar{x}$ $\bar{x} + \frac{1}{4}, \bar{x} + \frac{3}{4}, x + \frac{3}{4}$	$\bar{x} + \frac{1}{2}, \bar{x}, x + \frac{1}{2}$ $\bar{x} + \frac{3}{4}, \bar{x} + \frac{3}{4}, \bar{x} + \frac{3}{4}$ $x + \frac{1}{2}, x, \bar{x} + \frac{1}{2}$ $x + \frac{1}{4}, x + \frac{1}{4}, x + \frac{1}{4}$	$\bar{x}, x + \frac{1}{2}, \bar{x} + \frac{1}{2}$ $x + \frac{1}{4}, \bar{x} + \frac{1}{4}, x + \frac{3}{4}$ $x, \bar{x} + \frac{1}{2}, x + \frac{1}{2}$ $\bar{x} + \frac{3}{4}, x + \frac{3}{4}, \bar{x} + \frac{1}{4}$	$x + \frac{1}{2}, \bar{x} + \frac{1}{2}, \bar{x}$ $\bar{x} + \frac{1}{4}, x + \frac{3}{4}, x + \frac{1}{4}$ $\bar{x} + \frac{1}{2}, x + \frac{1}{2}, x$ $x + \frac{3}{4}, \bar{x} + \frac{1}{4}, \bar{x} + \frac{3}{4}$	$hkl: h = 2n + 1$ or $h + k + l = 4n$				
24 d $\bar{4}$..	$\frac{3}{8}, 0, \frac{1}{4}$ $\frac{3}{4}, \frac{5}{8}, 0$	$\frac{1}{8}, 0, \frac{3}{4}$ $\frac{3}{4}, \frac{3}{8}, \frac{1}{2}$	$\frac{1}{4}, \frac{3}{8}, 0$ $\frac{1}{8}, \frac{1}{2}, \frac{1}{4}$	$\frac{3}{4}, \frac{1}{8}, 0$ $\frac{7}{8}, 0, \frac{1}{4}$	$0, \frac{1}{4}, \frac{3}{8}$ $0, \frac{1}{4}, \frac{7}{8}$	$0, \frac{3}{4}, \frac{1}{8}$ $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}$	$hkl: h, k = 2n, h + k + l = 4n$ or $h, k = 2n + 1, l = 4n + 2$ or $h = 8n, k = 8n + 4$ and $h + k + l = 4n + 2$		
24 c 2.22	$\frac{1}{8}, 0, \frac{1}{4}$ $\frac{7}{8}, 0, \frac{3}{4}$	$\frac{3}{8}, 0, \frac{3}{4}$ $\frac{5}{8}, 0, \frac{1}{4}$	$\frac{1}{4}, \frac{1}{8}, 0$ $\frac{3}{4}, \frac{7}{8}, 0$	$\frac{3}{4}, \frac{3}{8}, 0$ $\frac{1}{4}, \frac{5}{8}, 0$	$0, \frac{1}{4}, \frac{1}{8}$ $0, \frac{3}{4}, \frac{7}{8}$	$0, \frac{3}{4}, \frac{3}{8}$ $0, \frac{1}{4}, \frac{5}{8}$			
16 b .32	$\frac{1}{8}, \frac{1}{8}, \frac{1}{8}$	$\frac{3}{8}, \frac{7}{8}, \frac{5}{8}$	$\frac{7}{8}, \frac{5}{8}, \frac{3}{8}$	$\frac{5}{8}, \frac{3}{8}, \frac{7}{8}$	$\frac{7}{8}, \frac{7}{8}, \frac{7}{8}$	$\frac{5}{8}, \frac{1}{8}, \frac{3}{8}$	$\frac{1}{8}, \frac{3}{8}, \frac{5}{8}$	$\frac{3}{8}, \frac{5}{8}, \frac{1}{8}$	$hkl: h, k = 2n + 1, l = 4n + 2$ or $h, k, l = 4n$
16 a . $\bar{3}$.	$0, 0, 0$	$\frac{1}{2}, 0, \frac{1}{2}$	$0, \frac{1}{2}, \frac{1}{2}$	$\frac{1}{2}, \frac{1}{2}, 0$	$\frac{3}{4}, \frac{1}{4}, \frac{1}{4}$	$\frac{3}{4}, \frac{3}{4}, \frac{3}{4}$	$\frac{1}{4}, \frac{1}{4}, \frac{3}{4}$	$\frac{1}{4}, \frac{3}{4}, \frac{1}{4}$	$hkl: h, k = 2n, h + k + l = 4n$



Polyhedron centre at 0, 0, 0

Polyhedron centre at $\frac{1}{8}, \frac{1}{8}, \frac{1}{8}$ **Symmetry of special projections**Along $[001]$ $p4mm$ $\mathbf{a}' = \frac{1}{2}\mathbf{a}$ $\mathbf{b}' = \frac{1}{2}\mathbf{b}$ Origin at $\frac{1}{4}, 0, z$ Along $[111]$ $p6mm$ $\mathbf{a}' = \frac{1}{3}(2\mathbf{a} - \mathbf{b} - \mathbf{c})$ Origin at x, x, x $\mathbf{b}' = \frac{1}{3}(-\mathbf{a} + 2\mathbf{b} - \mathbf{c})$ Along $[110]$ $c2mm$ $\mathbf{a}' = \frac{1}{2}(-\mathbf{a} + \mathbf{b})$ $\mathbf{b}' = \frac{1}{2}\mathbf{c}$ Origin at $x, x + \frac{1}{4}, \frac{1}{8}$