

$P4/m$

C_{4h}^1

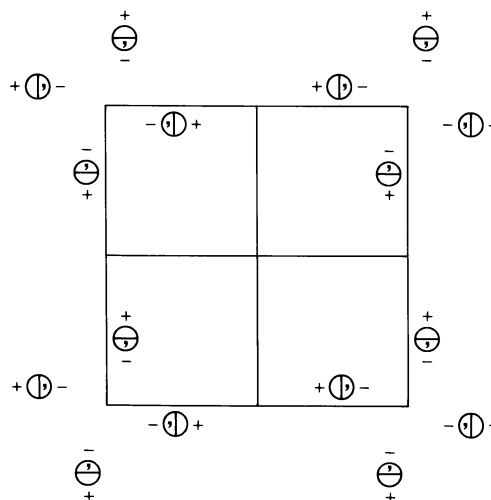
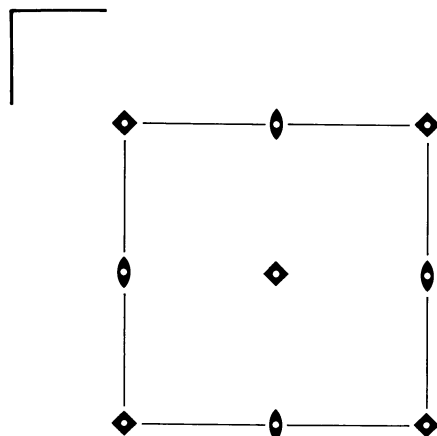
$4/m$

Tetragonal

No. 83

$P4/m$

Patterson symmetry $P4/m$



Origin at centre ($4/m$)

Asymmetric unit $0 \leq x \leq \frac{1}{2}; 0 \leq y \leq \frac{1}{2}; 0 \leq z \leq \frac{1}{2}$

Symmetry operations

- | | | | |
|-----------------------|-----------------|--------------------------------|--------------------------------|
| (1) 1 | (2) 2 $0,0,z$ | (3) 4^+ $0,0,z$ | (4) 4^- $0,0,z$ |
| (5) $\bar{1}$ $0,0,0$ | (6) m $x,y,0$ | (7) $\bar{4}^+$ $0,0,z; 0,0,0$ | (8) $\bar{4}^-$ $0,0,z; 0,0,0$ |

Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2); (3); (5)

Positions

Multiplicity, Wyckoff letter, Site symmetry	Coordinates	Reflection conditions
8 <i>l</i> 1	(1) x, y, z (5) $\bar{x}, \bar{y}, \bar{z}$ (2) \bar{x}, \bar{y}, z (6) x, y, \bar{z} (3) \bar{y}, x, z (7) y, \bar{x}, \bar{z} (4) y, \bar{x}, z (8) \bar{y}, x, \bar{z}	General: no conditions Special:
4 <i>k</i> $m..$	$x, y, \frac{1}{2}$ $\bar{x}, \bar{y}, \frac{1}{2}$ $\bar{y}, x, \frac{1}{2}$ $y, \bar{x}, \frac{1}{2}$	no extra conditions
4 <i>j</i> $m..$	$x, y, 0$ $\bar{x}, \bar{y}, 0$ $\bar{y}, x, 0$ $y, \bar{x}, 0$	no extra conditions
4 <i>i</i> $2..$	$0, \frac{1}{2}, z$ $\frac{1}{2}, 0, z$ $0, \frac{1}{2}, \bar{z}$ $\frac{1}{2}, 0, \bar{z}$	$hkl : h + k = 2n$
2 <i>h</i> $4..$	$\frac{1}{2}, \frac{1}{2}, z$ $\frac{1}{2}, \frac{1}{2}, \bar{z}$	no extra conditions
2 <i>g</i> $4..$	$0, 0, z$ $0, 0, \bar{z}$	no extra conditions
2 <i>f</i> $2/m..$	$0, \frac{1}{2}, \frac{1}{2}$ $\frac{1}{2}, 0, \frac{1}{2}$	$hkl : h + k = 2n$
2 <i>e</i> $2/m..$	$0, \frac{1}{2}, 0$ $\frac{1}{2}, 0, 0$	$hkl : h + k = 2n$
1 <i>d</i> $4/m..$	$\frac{1}{2}, \frac{1}{2}, \frac{1}{2}$	no extra conditions
1 <i>c</i> $4/m..$	$\frac{1}{2}, \frac{1}{2}, 0$	no extra conditions
1 <i>b</i> $4/m..$	$0, 0, \frac{1}{2}$	no extra conditions
1 <i>a</i> $4/m..$	$0, 0, 0$	no extra conditions

Symmetry of special projections

Along $[001] p4$
 $\mathbf{a}' = \mathbf{a}$ $\mathbf{b}' = \mathbf{b}$
Origin at $0, 0, z$

Along $[100] p2mm$
 $\mathbf{a}' = \mathbf{b}$ $\mathbf{b}' = \mathbf{c}$
Origin at $x, 0, 0$

Along $[110] p2mm$
 $\mathbf{a}' = \frac{1}{2}(-\mathbf{a} + \mathbf{b})$ $\mathbf{b}' = \mathbf{c}$
Origin at $x, x, 0$

Maximal non-isomorphic subgroups

I $[2] P\bar{4} (81)$ 1; 2; 7; 8
 $[2] P4 (75)$ 1; 2; 3; 4
 $[2] P2/m (10)$ 1; 2; 5; 6

IIa none

IIb $[2] P4_2/m (\mathbf{c}' = 2\mathbf{c}) (84)$; $[2] C4/e (\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}) (P4/n, 85)$; $[2] F4/m (\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}, \mathbf{c}' = 2\mathbf{c}) (I4/m, 87)$

Maximal isomorphic subgroups of lowest index

IIc $[2] P4/m (\mathbf{c}' = 2\mathbf{c}) (83)$; $[2] C4/m (\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}) (P4/m, 83)$

Minimal non-isomorphic supergroups

I $[2] P4/mmm (123)$; $[2] P4/mcc (124)$; $[2] P4/mbm (127)$; $[2] P4/mnc (128)$

II $[2] I4/m (87)$