

$P4_2/m$

C_{4h}^2

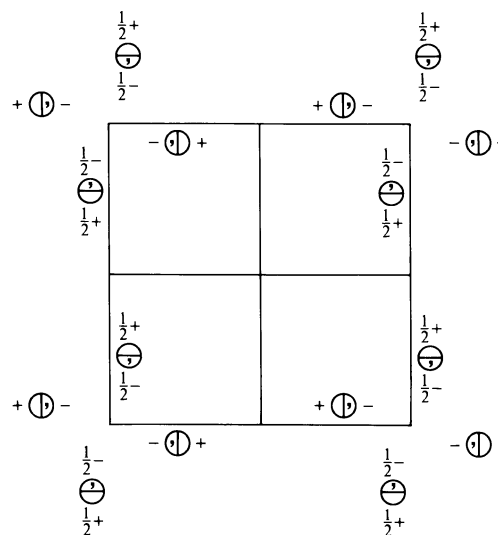
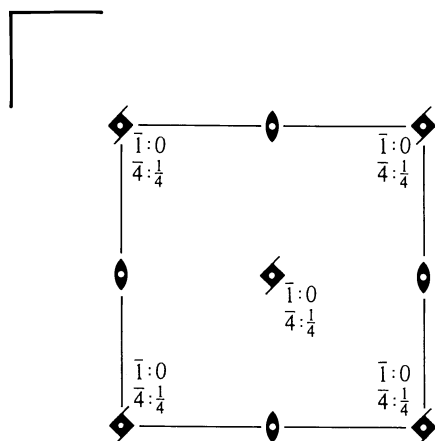
$4/m$

Tetragonal

No. 84

$P4_2/m$

Patterson symmetry $P4/m$



Origin at centre ($2/m$) on 4_2

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

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	k 1	(1) x, y, z (5) $\bar{x}, \bar{y}, \bar{z}$	(2) \bar{x}, \bar{y}, z (6) x, y, \bar{z}	(3) $\bar{y}, x, z + \frac{1}{2}$ (7) $y, \bar{x}, \bar{z} + \frac{1}{2}$	(4) $y, \bar{x}, z + \frac{1}{2}$ (8) $\bar{y}, x, \bar{z} + \frac{1}{2}$	General: $00l : l = 2n$
4	j $m..$	$x, y, 0$	$\bar{x}, \bar{y}, 0$	$\bar{y}, x, \frac{1}{2}$	$y, \bar{x}, \frac{1}{2}$	Special: as above, plus no extra conditions
4	i $2..$	$0, \frac{1}{2}, z$	$\frac{1}{2}, 0, z + \frac{1}{2}$	$0, \frac{1}{2}, \bar{z}$	$\frac{1}{2}, 0, \bar{z} + \frac{1}{2}$	$hkl : h + k + l = 2n$
4	h $2..$	$\frac{1}{2}, \frac{1}{2}, z$	$\frac{1}{2}, \frac{1}{2}, z + \frac{1}{2}$	$\frac{1}{2}, \frac{1}{2}, \bar{z}$	$\frac{1}{2}, \frac{1}{2}, \bar{z} + \frac{1}{2}$	$hkl : l = 2n$
4	g $2..$	$0, 0, z$	$0, 0, z + \frac{1}{2}$	$0, 0, \bar{z}$	$0, 0, \bar{z} + \frac{1}{2}$	$hkl : l = 2n$
2	f $\bar{4}..$	$\frac{1}{2}, \frac{1}{2}, \frac{1}{4}$	$\frac{1}{2}, \frac{1}{2}, \frac{3}{4}$			$hkl : l = 2n$
2	e $\bar{4}..$	$0, 0, \frac{1}{4}$	$0, 0, \frac{3}{4}$			$hkl : l = 2n$
2	d $2/m..$	$0, \frac{1}{2}, \frac{1}{2}$	$\frac{1}{2}, 0, 0$			$hkl : h + k + l = 2n$
2	c $2/m..$	$0, \frac{1}{2}, 0$	$\frac{1}{2}, 0, \frac{1}{2}$			$hkl : h + k + l = 2n$
2	b $2/m..$	$\frac{1}{2}, \frac{1}{2}, 0$	$\frac{1}{2}, \frac{1}{2}, \frac{1}{2}$			$hkl : l = 2n$
2	a $2/m..$	$0, 0, 0$	$0, 0, \frac{1}{2}$			$hkl : l = 2n$

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
 $[2]P4_2$ (77) 1; 2; 3; 4
 $[2]P2/m$ (10) 1; 2; 5; 6

IIa none

IIb $[2]C4_2/e$ ($\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$) ($P4_2/n$, 86)

Maximal isomorphic subgroups of lowest index

IIc $[2]C4_2/m$ ($\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$) ($P4_2/m$, 84); $[3]P4_2/m$ ($\mathbf{c}' = 3\mathbf{c}$) (84)

Minimal non-isomorphic supergroups

I $[2]P4_2/mmc$ (131); $[2]P4_2/mcm$ (132); $[2]P4_2/mbc$ (135); $[2]P4_2/mnm$ (136)

II $[2]I4/m$ (87); $[2]P4/m$ ($\mathbf{c}' = \frac{1}{2}\mathbf{c}$) (83)