

$P4_2mc$

C_{4v}^7

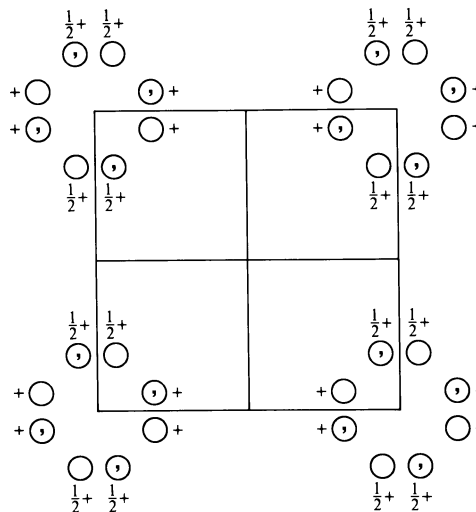
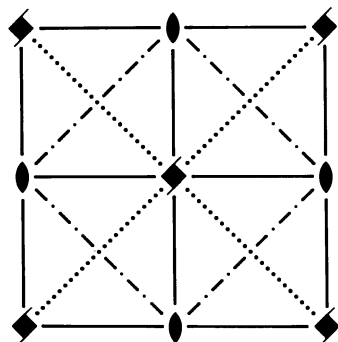
$4mm$

Tetragonal

No. 105

$P4_2mc$

Patterson symmetry $P4/mmm$



Origin on $2mm$ on 4_2mc

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) m $x,0,z$ | (6) m $0,y,z$ | (7) c x,\bar{x},z | (8) c x,x,z |

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

Symmetry of special projections

Along $[001]$ $p4mm$
 $\mathbf{a}' = \mathbf{a}$ $\mathbf{b}' = \mathbf{b}$
Origin at $0, 0, z$

Along $[100]$ $p1m1$
 $\mathbf{a}' = \mathbf{b}$ $\mathbf{b}' = \mathbf{c}$
Origin at $x, 0, 0$

Along $[110]$ $p1m1$
 $\mathbf{a}' = \frac{1}{2}(-\mathbf{a} + \mathbf{b})$ $\mathbf{b}' = \frac{1}{2}\mathbf{c}$
Origin at $x, x, 0$

Maximal non-isomorphic subgroups

I [2] $P4_211$ ($P4_2, 77$) 1; 2; 3; 4
[2] $P21c$ ($Ccc2, 37$) 1; 2; 7; 8
[2] $P2m1$ ($Pmm2, 25$) 1; 2; 5; 6

IIa none

IIb [2] $C4_2md$ ($\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$) ($P4_2nm, 102$); [2] $C4_2mc$ ($\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$) ($P4_2cm, 101$)

Maximal isomorphic subgroups of lowest index

IIc [3] $P4_2mc$ ($\mathbf{c}' = 3\mathbf{c}$) (105); [9] $P4_2mc$ ($\mathbf{a}' = 3\mathbf{a}, \mathbf{b}' = 3\mathbf{b}$) (105)

Minimal non-isomorphic supergroups

I [2] $P4_2/mmc$ (131); [2] $P4_2/nmc$ (137)

II [2] $C4_2mc$ ($P4_2cm, 101$); [2] $I4mm$ (107); [2] $P4mm$ ($\mathbf{c}' = \frac{1}{2}\mathbf{c}$) (99)