

$P4_2bc$

C_{4v}^8

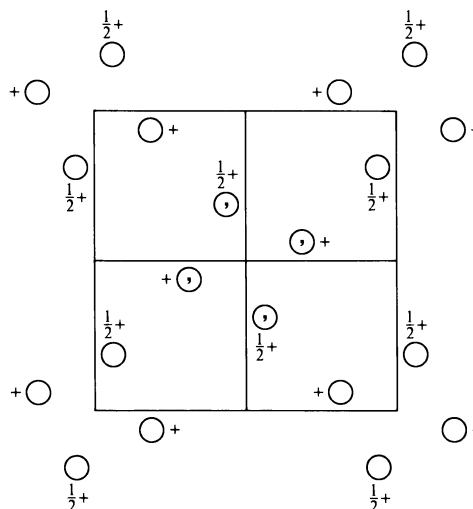
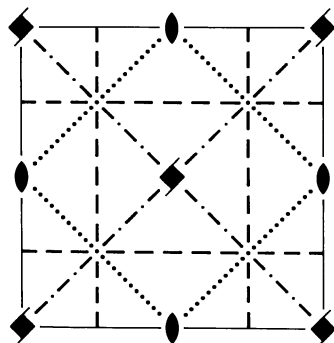
$4mm$

Tetragonal

No. 106

$P4_2bc$

Patterson symmetry $P4/mmm$



Origin on 2 on $4_2 1n$

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) a $x, \frac{1}{4}, z$ | (6) b $\frac{1}{4}, y, z$ | (7) c $x + \frac{1}{2}, \bar{x}, z$ | (8) $n(\frac{1}{2}, \frac{1}{2}, \frac{1}{2}) x, x, z$ |

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>c</i> 1	(1) x, y, z (5) $x + \frac{1}{2}, \bar{y} + \frac{1}{2}, z$	(2) \bar{x}, \bar{y}, z (6) $\bar{x} + \frac{1}{2}, y + \frac{1}{2}, z$	(3) $\bar{y}, x, z + \frac{1}{2}$ (7) $\bar{y} + \frac{1}{2}, \bar{x} + \frac{1}{2}, z + \frac{1}{2}$	(4) $y, \bar{x}, z + \frac{1}{2}$ (8) $y + \frac{1}{2}, x + \frac{1}{2}, z + \frac{1}{2}$	General: $0kl : k = 2n$ $hhl : l = 2n$ $00l : l = 2n$ $h00 : h = 2n$ Special: as above, plus $hkl : h + k, l = 2n$ $hkl : h + k, l = 2n$
4 <i>b</i> 2..	$0, \frac{1}{2}, z$	$\frac{1}{2}, 0, z + \frac{1}{2}$	$\frac{1}{2}, 0, z$	$0, \frac{1}{2}, z + \frac{1}{2}$	$hkl : h + k, l = 2n$
4 <i>a</i> 2..	$0, 0, z$	$0, 0, z + \frac{1}{2}$	$\frac{1}{2}, \frac{1}{2}, z$	$\frac{1}{2}, \frac{1}{2}, z + \frac{1}{2}$	$hkl : h + k, l = 2n$

Symmetry of special projections

Along [001] $p4gm$
 $\mathbf{a}' = \mathbf{a}$ $\mathbf{b}' = \mathbf{b}$
 Origin at $0, 0, z$

Along [100] $p1m1$
 $\mathbf{a}' = \frac{1}{2}\mathbf{b}$ $\mathbf{b}' = \mathbf{c}$
 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] $P2b1$ ($Pba2, 32$) 1; 2; 5; 6

IIa none

IIb none

Maximal isomorphic subgroups of lowest index

IIc [3] $P4_2bc$ ($\mathbf{c}' = 3\mathbf{c}$) (106); [9] $P4_2bc$ ($\mathbf{a}' = 3\mathbf{a}, \mathbf{b}' = 3\mathbf{b}$) (106)

Minimal non-isomorphic supergroups

I [2] $P4_2/nbc$ (133); [2] $P4_2/mbc$ (135)

II [2] $C4_2mc$ ($P4_2cm, 101$); [2] $I4cm$ (108); [2] $P4bm$ ($\mathbf{c}' = \frac{1}{2}\mathbf{c}$) (100)