

$P4nc$

$C_{4v}^6$

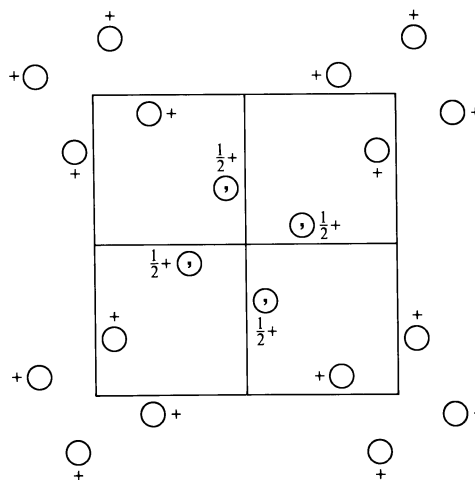
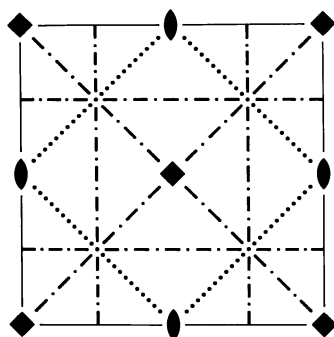
$4mm$

Tetragonal

No. 104

$P4nc$

Patterson symmetry  $P4/mmm$



Origin on  $41n$

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

**Symmetry of special projections**

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

Along [100]  $c1m1$   
 $\mathbf{a}' = \mathbf{b}$   $\mathbf{b}' = \mathbf{c}$   
 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]  $P411$  ( $P4, 75$ ) 1; 2; 3; 4  
 [2]  $P21c$  ( $Ccc2, 37$ ) 1; 2; 7; 8  
 [2]  $P2n1$  ( $Pnn2, 34$ ) 1; 2; 5; 6

**IIa** none

**IIb** none

**Maximal isomorphic subgroups of lowest index**

**IIc** [3]  $P4nc$  ( $\mathbf{c}' = 3\mathbf{c}$ ) (104); [9]  $P4nc$  ( $\mathbf{a}' = 3\mathbf{a}, \mathbf{b}' = 3\mathbf{b}$ ) (104)

**Minimal non-isomorphic supergroups**

**I** [2]  $P4/nnc$  (126); [2]  $P4/mnc$  (128)

**II** [2]  $C4cc$  ( $P4cc, 103$ ); [2]  $I4mm$  (107); [2]  $P4bm$  ( $\mathbf{c}' = \frac{1}{2}\mathbf{c}$ ) (100)