

$p\bar{4}2m$

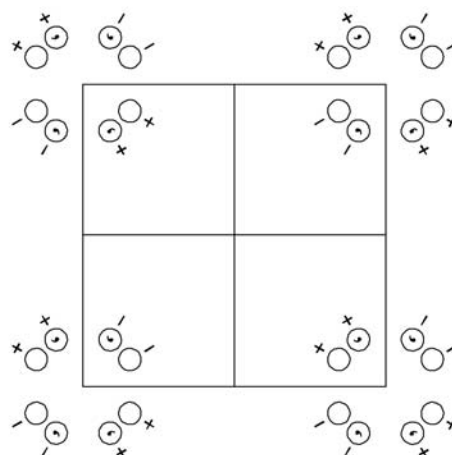
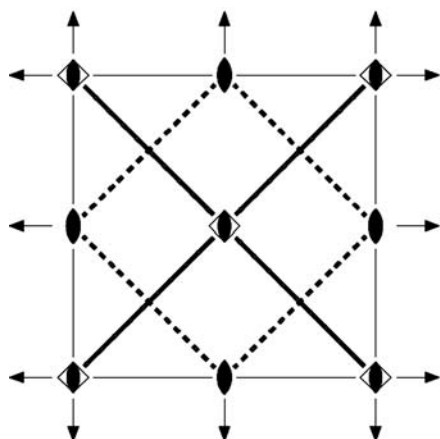
$\bar{4}2m$

Tetragonal/Square

No. 57

$p\bar{4}2m$

Patterson symmetry  $p4/mmm$



Origin at  $\bar{4}2m$

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

Symmetry operations

- |  |  |   |   |
|--|--|---|---|
| (1) 1<br>(1 0,0,0)                     | (2) 2 0,0,z<br>(2 <sub>z</sub>  0,0,0) | (3) $\bar{4}^+$ 0,0,z; 0,0,0<br>( $\bar{4}_z^+$  0,0,0) | (4) $\bar{4}^-$ 0,0,z; 0,0,0<br>( $\bar{4}_z^-$  0,0,0) |
| (5) 2 0,y,0<br>(2 <sub>y</sub>  0,0,0) | (6) 2 x,0,0<br>(2 <sub>x</sub>  0,0,0) | (7) $m$ x, $\bar{x}$ ,z<br>( $m_{xy}$  0,0,0)           | (8) $m$ x,x,z<br>( $m_{\bar{xy}}$  0,0,0)               |

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

**Positions**

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

**Symmetry of special projections**

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

Along  $[100]$   $\neq 2mm$   
 $\mathbf{a}' = \mathbf{b}$   
 Origin at  $x, 0, 0$

Along  $[110]$   $\neq 1m1$   
 $\mathbf{a}' = \frac{1}{2}(-\mathbf{a} + \mathbf{b})$   
 Origin at  $x, x, 0$

**Maximal non-isotypic subgroups**

**I**     $[2] p\bar{4}11 (p\bar{4}, 50)$     1; 2; 3; 4  
        $[2] p21m (cmm2, 26)$     1; 2; 7; 8  
        $[2] p221 (p222, 19)$     1; 2; 5; 6

**IIa**    none

**IIb**     $[2] c\bar{4}2d (\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}) (p\bar{4}b2, 60)$ ;  $[2] c\bar{4}2m (\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}) (p\bar{4}m2, 59)$

**Maximal isotypic subgroups of lowest index**

**IIc**     $[9] p\bar{4}2m (\mathbf{a}' = 3\mathbf{a}, \mathbf{b}' = 3\mathbf{b}) (57)$

**Minimal non-isotypic supergroups**

**I**     $[2] p4/mmm (61)$ ;  $[2] p4/nbm (62)$

**II**     $[2] c\bar{4}2m (p\bar{4}m2, 59)$