

$P4_2nm$

C_{4v}^4

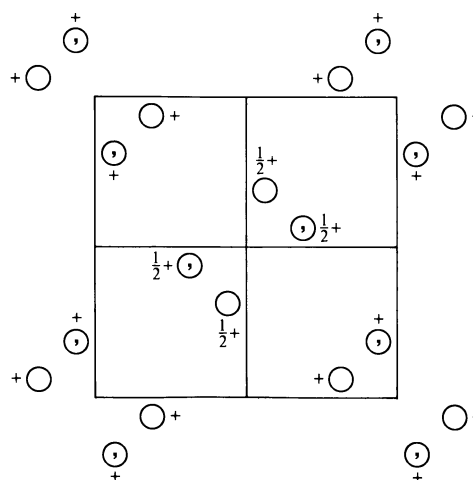
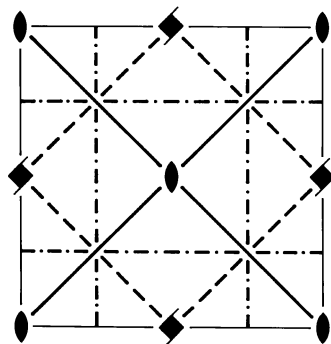
$4mm$

Tetragonal

No. 102

$P4_2nm$

Patterson symmetry $P4/mmm$



Origin on $2mm$ on $21m$

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

Symmetry operations

- (1) 1 (2) $2\ 0,0,z$ (3) $4^+(0,0,\frac{1}{2})\ 0,\frac{1}{2},z$ (4) $4^-(0,0,\frac{1}{2})\ \frac{1}{2},0,z$
 (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) $m\ x,\bar{x},z$ (8) $m\ x,x,z$

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>d</i> 1	(1) x,y,z (2) \bar{x},\bar{y},z (3) $\bar{y}+\frac{1}{2},x+\frac{1}{2},z+\frac{1}{2}$ (4) $y+\frac{1}{2},\bar{x}+\frac{1}{2},z+\frac{1}{2}$ (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},\bar{x},z (8) y,x,z	General: $Ok\bar{l}: k+l=2n$ $00l: l=2n$ $h00: h=2n$ Special: as above, plus
4 <i>c</i> $..m$	x,x,z \bar{x},\bar{x},z $\bar{x}+\frac{1}{2},x+\frac{1}{2},z+\frac{1}{2}$ $x+\frac{1}{2},\bar{x}+\frac{1}{2},z+\frac{1}{2}$	no extra conditions
4 <i>b</i> $2..$	$0,\frac{1}{2},z$ $0,\frac{1}{2},z+\frac{1}{2}$ $\frac{1}{2},0,z+\frac{1}{2}$ $\frac{1}{2},0,z$	$hkl: h+k,l=2n$
2 <i>a</i> $2.mmm$	$0,0,z$ $\frac{1}{2},\frac{1}{2},z+\frac{1}{2}$	$hkl: h+k+l=2n$

Symmetry of special projections

Along $[001]$ $p4gm$
 $\mathbf{a}' = \mathbf{a}$ $\mathbf{b}' = \mathbf{b}$
 Origin at $0,\frac{1}{2},z$

Along $[100]$ $c1m1$
 $\mathbf{a}' = \mathbf{b}$ $\mathbf{b}' = \mathbf{c}$
 Origin at $x,0,0$

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