

$I\bar{4}2m$

D_{2d}^{11}

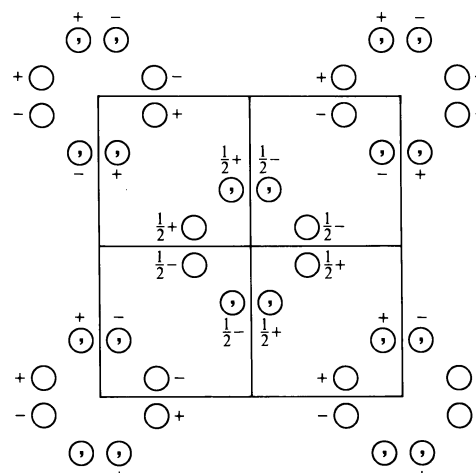
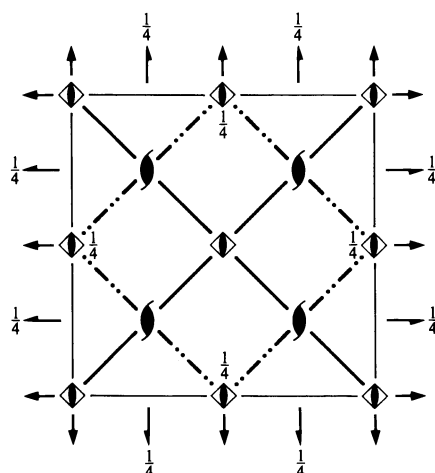
$\bar{4}2m$

Tetragonal

No. 121

$I\bar{4}2m$

Patterson symmetry $I4/mmm$



Origin at $\bar{4}2m$

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

Symmetry operations

For $(0,0,0)+$ set

- (1) 1
- (2) $2\ 0,0,z$
- (3) $\bar{4}^+ 0,0,z; 0,0,0$
- (4) $\bar{4}^- 0,0,z; 0,0,0$
- (5) $2\ 0,y,0$
- (6) $2\ x,0,0$
- (7) $m\ x,\bar{x},z$
- (8) $m\ x,x,z$

For $(\frac{1}{2},\frac{1}{2},\frac{1}{2})+$ set

- (1) $t(\frac{1}{2},\frac{1}{2},\frac{1}{2})$
- (2) $2(0,0,\frac{1}{2})\ \frac{1}{4},\frac{1}{4},z$
- (3) $\bar{4}^+ \frac{1}{2},0,z; \frac{1}{2},0,\frac{1}{4}$
- (4) $\bar{4}^- 0,\frac{1}{2},z; 0,\frac{1}{2},\frac{1}{4}$
- (5) $2(0,\frac{1}{2},0)\ \frac{1}{4},y,\frac{1}{4}$
- (6) $2(\frac{1}{2},0,0)\ x,\frac{1}{4},\frac{1}{4}$
- (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); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; $t(\frac{1}{2},\frac{1}{2},\frac{1}{2})$; (2); (3); (5)

Positions

Multiplicity, Wyckoff letter, Site symmetry	Coordinates	Reflection conditions
$(0,0,0)+$	$(\frac{1}{2},\frac{1}{2},\frac{1}{2})+$	
16 <i>j</i> 1	(1) x,y,z (2) \bar{x},\bar{y},z (3) y,\bar{x},\bar{z} (4) \bar{y},x,\bar{z} (5) \bar{x},y,\bar{z} (6) x,\bar{y},\bar{z} (7) \bar{y},\bar{x},z (8) y,x,z	General: $hkl: h+k+l=2n$ $hk0: h+k=2n$ $0kl: k+l=2n$ $hhl: l=2n$ $00l: l=2n$ $h00: h=2n$ Special: as above, plus no extra conditions
8 <i>i</i> .. <i>m</i>	x,x,z \bar{x},\bar{x},z x,\bar{x},\bar{z} \bar{x},x,\bar{z}	no extra conditions
8 <i>h</i> 2..	$0,\frac{1}{2},z$ $\frac{1}{2},0,\bar{z}$ $0,\frac{1}{2},\bar{z}$ $\frac{1}{2},0,z$	$hkl: l=2n$
8 <i>g</i> .2.	$x,0,\frac{1}{2}$ $\bar{x},0,\frac{1}{2}$ $0,\bar{x},\frac{1}{2}$ $0,x,\frac{1}{2}$	no extra conditions
8 <i>f</i> .2.	$x,0,0$ $\bar{x},0,0$ $0,\bar{x},0$ $0,x,0$	no extra conditions
4 <i>e</i> 2. <i>mm</i>	$0,0,z$ $0,0,\bar{z}$	no extra conditions
4 <i>d</i> $\bar{4}$..	$0,\frac{1}{2},\frac{1}{4}$ $0,\frac{1}{2},\frac{3}{4}$	$hkl: l=2n$
4 <i>c</i> 222.	$0,\frac{1}{2},0$ $\frac{1}{2},0,0$	$hkl: l=2n$
2 <i>b</i> $\bar{4}2m$	$0,0,\frac{1}{2}$	no extra conditions
2 <i>a</i> $\bar{4}2m$	$0,0,0$	no extra conditions

Symmetry of special projections

Along $[001]$ $p4mm$ Along $[100]$ $c2mm$ Along $[110]$ $p1m1$
 $\mathbf{a}' = \frac{1}{2}(\mathbf{a} - \mathbf{b})$ $\mathbf{b}' = \frac{1}{2}(\mathbf{a} + \mathbf{b})$ $\mathbf{a}' = \mathbf{b}$ $\mathbf{b}' = \mathbf{c}$ $\mathbf{a}' = \frac{1}{2}(-\mathbf{a} + \mathbf{b})$ $\mathbf{b}' = \frac{1}{2}\mathbf{c}$
 Origin at $0,0,z$ Origin at $x,0,0$ Origin at $x,x,0$