

*pm*aa

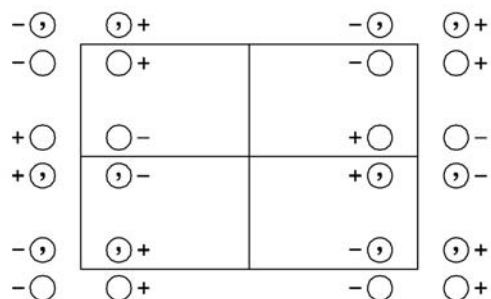
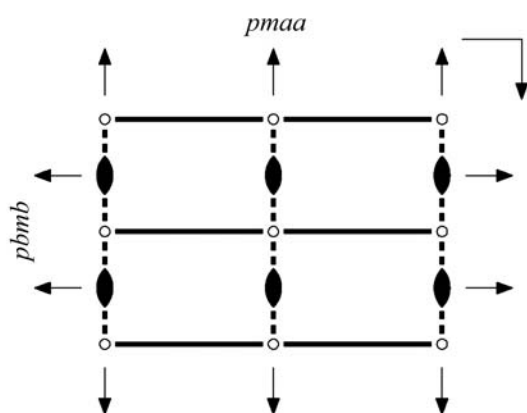
*m*mm

Orthorhombic/Rectangular

No. 38

*p*2/*m*2/*a*2/*a*

Patterson symmetry *p*mmm



Origin at centre (*2/m*) at *2/maa*

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

Symmetry operations

- | | | | |
|--|---|---|--|
| (1) 1
(1 0,0,0) | (2) 2 <i>x</i> ,0,0
(2 _{<i>x</i>} 0,0,0) | (3) 2 $\frac{1}{4}$,0, <i>z</i>
(2 _{<i>z</i>} \frac{1}{2},0,0) | (4) 2 $\frac{1}{4}$, <i>y</i> ,0
(2 _{<i>y</i>} \frac{1}{2},0,0) |
| (5) $\bar{1}$ 0,0,0
($\bar{1}$ 0,0,0) | (6) <i>m</i> 0, <i>y</i> , <i>z</i>
(<i>m</i> _{<i>x</i>} 0,0,0) | (7) <i>a</i> <i>x</i> , <i>y</i> ,0
(<i>m</i> _{<i>z</i>} \frac{1}{2},0,0) | (8) <i>a</i> <i>x</i> ,0, <i>z</i>
(<i>m</i> _{<i>y</i>} \frac{1}{2},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
							General:
8	<i>k</i>	1	(1) x, y, z (5) $\bar{x}, \bar{y}, \bar{z}$	(2) x, \bar{y}, \bar{z} (6) \bar{x}, y, z	(3) $\bar{x} + \frac{1}{2}, \bar{y}, z$ (7) $x + \frac{1}{2}, y, \bar{z}$	(4) $\bar{x} + \frac{1}{2}, y, \bar{z}$ (8) $x + \frac{1}{2}, \bar{y}, z$	$hk: h = 2n$ $h0: h = 2n$
							Special: no extra conditions
4	<i>j</i>	$m..$	$0, y, z$	$0, \bar{y}, \bar{z}$	$\frac{1}{2}, \bar{y}, z$	$\frac{1}{2}, y, \bar{z}$	
4	<i>i</i>	$2..$	$x, \frac{1}{2}, 0$	$\bar{x} + \frac{1}{2}, \frac{1}{2}, 0$	$\bar{x}, \frac{1}{2}, 0$	$x + \frac{1}{2}, \frac{1}{2}, 0$	
4	<i>h</i>	$2..$	$x, 0, 0$	$\bar{x} + \frac{1}{2}, 0, 0$	$\bar{x}, 0, 0$	$x + \frac{1}{2}, 0, 0$	
4	<i>g</i>	$..2$	$\frac{1}{4}, \frac{1}{2}, z$	$\frac{1}{4}, \frac{1}{2}, \bar{z}$	$\frac{3}{4}, \frac{1}{2}, \bar{z}$	$\frac{3}{4}, \frac{1}{2}, z$	
4	<i>f</i>	$..2$	$\frac{1}{4}, 0, z$	$\frac{1}{4}, 0, \bar{z}$	$\frac{3}{4}, 0, \bar{z}$	$\frac{3}{4}, 0, z$	
4	<i>e</i>	$.2.$	$\frac{1}{4}, y, 0$	$\frac{1}{4}, \bar{y}, 0$	$\frac{3}{4}, \bar{y}, 0$	$\frac{3}{4}, y, 0$	
2	<i>d</i>	222	$\frac{1}{4}, \frac{1}{2}, 0$	$\frac{3}{4}, \frac{1}{2}, 0$			
2	<i>c</i>	222	$\frac{1}{4}, 0, 0$	$\frac{3}{4}, 0, 0$			
2	<i>b</i>	$2/m..$	$0, \frac{1}{2}, 0$	$\frac{1}{2}, \frac{1}{2}, 0$			
2	<i>a</i>	$2/m..$	$0, 0, 0$	$\frac{1}{2}, 0, 0$			

Symmetry of special projections

Along $[001]$ $p2mm$
 $\mathbf{a}' = \frac{1}{2}\mathbf{a}$ $\mathbf{b}' = \mathbf{b}$
 Origin at $0, 0, z$

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

Along $[010]$ $\neq 2mm$
 $\mathbf{a}' = \frac{1}{2}\mathbf{a}$
 Origin at $0, y, 0$

Maximal non-isotypic subgroups

I [2] $pm2a$ (31) 1; 4; 6; 7
 [2] $p2aa$ ($pb2b$, 30) 1; 2; 7; 8
 [2] $pma2$ (24) 1; 3; 6; 8
 [2] $p222$ (19) 1; 2; 3; 4
 [2] $p12/a1$ ($p2/b11$, 16) 1; 4; 5; 8
 [2] $p2/m11$ (14) 1; 2; 5; 6
 [2] $p112/a$ (7) 1; 3; 5; 7

IIa none

IIb [2] $pbaa$ ($\mathbf{b}' = 2\mathbf{b}$) (43); [2] $pman$ ($\mathbf{b}' = 2\mathbf{b}$) (42); [2] $pban$ ($\mathbf{b}' = 2\mathbf{b}$) (39)

Maximal isotypic subgroups of lowest index

IIc [2] $pmaa$ ($\mathbf{b}' = 2\mathbf{b}$) (38); [3] $pmaa$ ($\mathbf{a}' = 3\mathbf{a}$) (38)

Minimal non-isotypic supergroups

I none

II [2] $cmme$ (48); [2] $pmmm$ ($\mathbf{b}' = \frac{1}{2}\mathbf{b}$) (37)