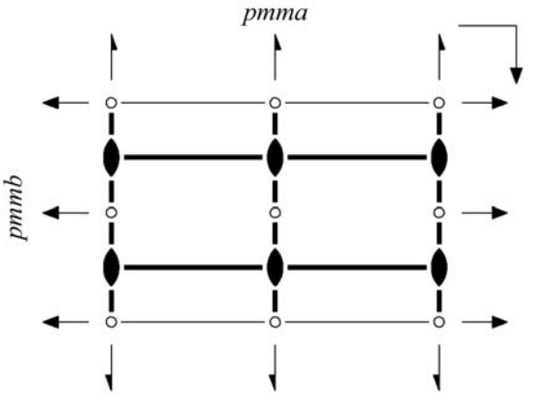
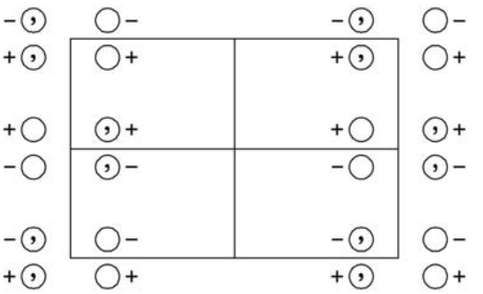
$pmma$ mmm Orthorhombic/Rectangular

No. 41 $p2_1/m2/m2/a$ Patterson symmetry $pmmm$





Origin at centre $(2/m)$ at $2_12/ma$

Asymmetric unit $0 \le x \le \frac{1}{4}; \quad 0 \le y \le \frac{1}{2}$

Symmetry operations

(1) 1
$(1|0,0,0)$

(2) $2 \quad \frac{1}{4},0,z$
$(2_z|\frac{1}{2},0,0)$

(3) $2 \quad 0,y,0$
$(2_y|0,0,0)$

(4) $2(\frac{1}{2},0,0) \quad x,0,0$
$(2_x|\frac{1}{2},0,0)$

(5) $\bar{1} \quad 0,0,0$
$(\bar{1}|0,0,0)$

(6) $a \quad x,y,0$
$(m_z|\frac{1}{2},0,0)$

(7) $m \quad x,0,z$
$(m_y|0,0,0)$

(8) $m \quad \frac{1}{4},y,z$
$(m_x|\frac{1}{2},0,0)$

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*	1	(1) x,y,z	(2) $\bar{x}+\frac{1}{2},\bar{y},z$	(3) $\bar{x},y,\bar{z}$	(4) $x+\frac{1}{2},\bar{y},\bar{z}$	hk : $h=2n$
			(5) $\bar{x},\bar{y},\bar{z}$	(6) $x+\frac{1}{2},y,\bar{z}$	(7) $x,\bar{y},z$	(8) $\bar{x}+\frac{1}{2},y,z$	$h0$: $h=2n$
							Special: no extra conditions
4	*h*	*m* . .	$\frac{1}{4},y,z$	$\frac{1}{4},\bar{y},z$	$\frac{3}{4},y,\bar{z}$	$\frac{3}{4},\bar{y},\bar{z}$	
4	*g*	. *m* .	$x,\frac{1}{2},z$	$\bar{x}+\frac{1}{2},\frac{1}{2},z$	$\bar{x},\frac{1}{2},\bar{z}$	$x+\frac{1}{2},\frac{1}{2},\bar{z}$	
4	*f*	. *m* .	$x,0,z$	$\bar{x}+\frac{1}{2},0,z$	$\bar{x},0,\bar{z}$	$x+\frac{1}{2},0,\bar{z}$	
4	*e*	. 2 .	$0,y,0$	$\frac{1}{2},\bar{y},0$	$0,\bar{y},0$	$\frac{1}{2},y,0$	
2	*d*	*m m* 2	$\frac{1}{4},\frac{1}{2},z$	$\frac{3}{4},\frac{1}{2},\bar{z}$			
2	*c*	*m m* 2	$\frac{1}{4},0,z$	$\frac{3}{4},0,\bar{z}$			
2	*b*	. 2/*m* .	$0,\frac{1}{2},0$	$\frac{1}{2},\frac{1}{2},0$			
2	*a*	. 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] $\not p2mm$
$\mathbf{a}' = \mathbf{b}$
Origin at $x,0,0$

Along [010] $\not p2mg$
$\mathbf{a}' = \mathbf{a}$
Origin at $0,y,0$

Maximal non-isotypic subgroups

I	[2] $pm2a$ (31)	1; 3; 6; 8
	[2] $p2_1ma$ ($pm2_1b$, 28)	1; 4; 6; 7
	[2] $pmm2$ (23)	1; 2; 7; 8
	[2] $p2_122$ (20)	1; 2; 3; 4
	[2] $p2_1/m11$ (15)	1; 4; 5; 8
	[2] $p12/m1$ ($p2/m11$, 14)	1; 3; 5; 7
	[2] $p112/a$ (7)	1; 2; 5; 6
IIa	none	
IIb	[2] $pmmn$ ($\mathbf{b}' = 2\mathbf{b}$) (46); [2] $pbma$ ($\mathbf{b}' = 2\mathbf{b}$) (45); [2] $pbmn$ ($\mathbf{b}' = 2\mathbf{b}$) ($pman$, 42)	

Maximal isotypic subgroups of lowest index

IIc [2] $pmma$ ($\mathbf{b}' = 2\mathbf{b}$) (41); [3] $pmma$ ($\mathbf{a}' = 3\mathbf{a}$) (41)

Minimal non-isotypic supergroups

I none

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