

$c222$

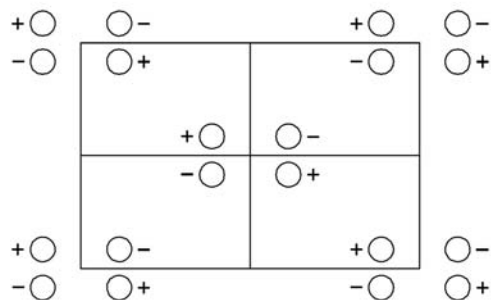
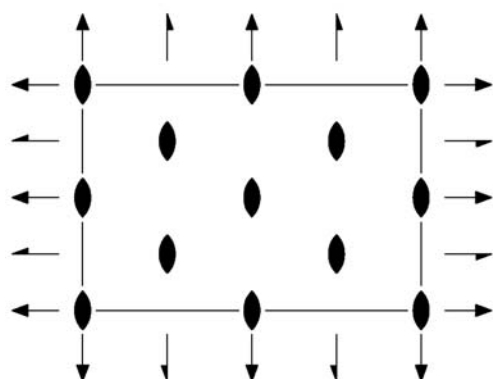
222

Orthorhombic/Rectangular

No. 22

$c222$

Patterson symmetry $cmmm$



Origin at 222

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

Symmetry operations

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

- | | | | |
|----------------------|--|--|--|
| (1) 1
(1 0, 0, 0) | (2) 2 $0, 0, z$
(2 _z 0, 0, 0) | (3) 2 $0, y, 0$
(2 _y 0, 0, 0) | (4) 2 $x, 0, 0$
(2 _x 0, 0, 0) |
|----------------------|--|--|--|

For $(\frac{1}{2}, \frac{1}{2}, 0)+$ set

- | | | | |
|---|--|--|--|
| (1) $t(\frac{1}{2}, \frac{1}{2}, 0)$
(1 $\frac{1}{2}, \frac{1}{2}, 0$) | (2) 2 $\frac{1}{4}, \frac{1}{4}, z$
(2 _z $\frac{1}{2}, \frac{1}{2}, 0$) | (3) 2 $(0, \frac{1}{2}, 0) \frac{1}{4}, y, 0$
(2 _y $\frac{1}{2}, \frac{1}{2}, 0$) | (4) 2 $(\frac{1}{2}, 0, 0) x, \frac{1}{4}, 0$
(2 _x $\frac{1}{2}, \frac{1}{2}, 0$) |
|---|--|--|--|

Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(\frac{1}{2}, \frac{1}{2}, 0)$; (2); (3)

Positions

Multiplicity, Wyckoff letter, Site symmetry	Coordinates				Reflection conditions
	$(0,0,0)+$ $(\frac{1}{2}, \frac{1}{2}, 0)+$				General:
8 <i>h</i> 1	(1) x, y, z	(2) \bar{x}, \bar{y}, z	(3) \bar{x}, y, \bar{z}	(4) x, \bar{y}, \bar{z}	$hk: h+k=2n$ $0k: k=2n$ $h0: h=2n$
4 <i>g</i> ..2	$\frac{1}{4}, \frac{1}{4}, z$	$\frac{3}{4}, \frac{1}{4}, \bar{z}$			Special: as above, plus $hk: h=2n$
4 <i>f</i> ..2	$0, \frac{1}{2}, z$	$0, \frac{1}{2}, \bar{z}$			no extra conditions
4 <i>e</i> ..2	$0, 0, z$	$0, 0, \bar{z}$			no extra conditions
4 <i>d</i> .2.	$0, y, 0$	$0, \bar{y}, 0$			no extra conditions
4 <i>c</i> 2..	$x, 0, 0$	$\bar{x}, 0, 0$			no extra conditions
2 <i>b</i> 222	$0, \frac{1}{2}, 0$				no extra conditions
2 <i>a</i> 222	$0, 0, 0$				no extra conditions

Symmetry of special projections

Along [001] $c2mm$
 $\mathbf{a}' = \mathbf{a}$ $\mathbf{b}' = \mathbf{b}$
Origin at $0, 0, z$

Along [100] $\not\approx 2mm$
 $\mathbf{a}' = \frac{1}{2}\mathbf{b}$
Origin at $x, 0, 0$

Along [010] $\not\approx 2mm$
 $\mathbf{a}' = \frac{1}{2}\mathbf{a}$
Origin at $0, y, 0$

Maximal non-isotypic subgroups

I	[2] $c121$ ($c211, 10$)	(1; 3)+
	[2] $c211$ (10)	(1; 4)+
	[2] $c112$ ($p112, 3$)	(1; 2)+
IIa	[2] $p2_12_12$ (21)	1; 2; (3; 4) + $(\frac{1}{2}, \frac{1}{2}, 0)$
	[2] $p2_122$ (20)	1; 3; (2; 4) + $(\frac{1}{2}, \frac{1}{2}, 0)$
	[2] $p22_12$ ($p2_122, 20$)	1; 4; (2; 3) + $(\frac{1}{2}, \frac{1}{2}, 0)$
	[2] $p222$ (19)	1; 2; 3; 4
IIb	none	

Maximal isotypic subgroups of lowest index

IIc [3] $c222$ ($\mathbf{a}' = 3\mathbf{a}$ or $\mathbf{b}' = 3\mathbf{b}$) (22)

Minimal non-isotypic supergroups

I	[2] $cmmm$ (47); [2] $cmme$ (48); [2] $p422$ (53); [2] $p4_12$ (54); [2] $p\bar{4}m2$ (59); [2] $p\bar{4}b2$ (60); [3] $p622$ (76)
II	[2] $p222$ ($\mathbf{a}' = \frac{1}{2}\mathbf{a}$, $\mathbf{b}' = \frac{1}{2}\mathbf{b}$) (19)