

*p*422

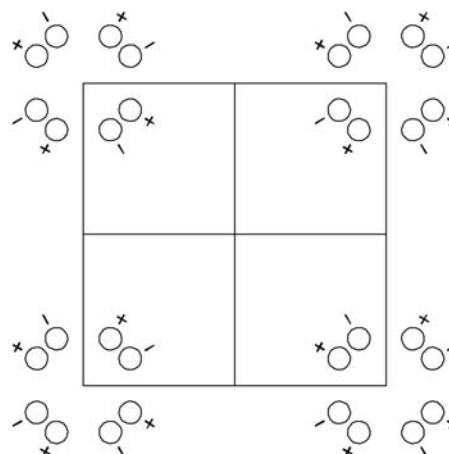
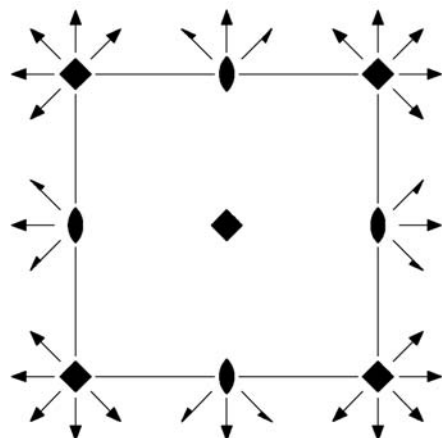
422

Tetragonal/Square

No. 53

*p*422

Patterson symmetry *p*4/*mmm*



Origin at 422

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

Symmetry operations

- | | | | |
|-------------|-------------|--------------------------|--------------------------|
| (1) 1 | (2) 2 0,0,z | (3) 4 ⁺ 0,0,z | (4) 4 ⁻ 0,0,z |
| (5) 2 0,y,0 | (6) 2 x,0,0 | (7) 2 x,x,0 | (8) 2 x, \bar{x} ,0 |

Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; (2); (3); (5)

Positions

Multiplicity, Wyckoff letter, Site symmetry	Coordinates				Reflection conditions
8 <i>j</i> 1	(1) x, y, z (5) \bar{x}, y, \bar{z}	(2) \bar{x}, \bar{y}, z (6) x, \bar{y}, \bar{z}	(3) \bar{y}, x, z (7) y, x, \bar{z}	(4) y, \bar{x}, z (8) $\bar{y}, \bar{x}, \bar{z}$	General: no conditions Special:
4 <i>i</i> .2.	$x, \frac{1}{2}, 0$	$\bar{x}, \frac{1}{2}, 0$	$\frac{1}{2}, x, 0$	$\frac{1}{2}, \bar{x}, 0$	no extra conditions
4 <i>h</i> .2.	$x, 0, 0$	$\bar{x}, 0, 0$	$0, x, 0$	$0, \bar{x}, 0$	no extra conditions
4 <i>g</i> . . 2	$x, x, 0$	$\bar{x}, \bar{x}, 0$	$\bar{x}, x, 0$	$x, \bar{x}, 0$	no extra conditions
4 <i>f</i> 2. .	$0, \frac{1}{2}, z$	$\frac{1}{2}, 0, z$	$0, \frac{1}{2}, \bar{z}$	$\frac{1}{2}, 0, \bar{z}$	$hk: h+k=2n$
2 <i>e</i> 4. .	$\frac{1}{2}, \frac{1}{2}, z$	$\frac{1}{2}, \frac{1}{2}, \bar{z}$			no extra conditions
2 <i>d</i> 4. .	$0, 0, z$	$0, 0, \bar{z}$			no extra conditions
2 <i>c</i> 222.	$\frac{1}{2}, 0, 0$	$0, \frac{1}{2}, 0$			$hk: h, k=2n$
1 <i>b</i> 422	$\frac{1}{2}, \frac{1}{2}, 0$				no extra conditions
1 <i>a</i> 422	$0, 0, 0$				no extra conditions

Symmetry of special projections

Along [001] $p4mm$
 $\mathbf{a}' = \mathbf{a}$ $\mathbf{b}' = \mathbf{b}$
 Origin at $0, 0, z$

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

Along [110] $\not\sim 2mm$
 $\mathbf{a}' = \frac{1}{2}(-\mathbf{a} + \mathbf{b})$
 Origin at $x, x, 0$

Maximal non-isotypic subgroups

I [2] $p411$ ($p4, 49$) 1; 2; 3; 4
 [2] $p212$ ($c222, 22$) 1; 2; 7; 8
 [2] $p221$ ($p222, 19$) 1; 2; 5; 6

IIa none

IIb [2] $c422$, ($\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$) ($p42_1, 2, 54$)

Maximal isotypic subgroups of lowest index

IIc [2] $c422$ ($\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$) ($p422, 53$)

Minimal non-isotypic supergroups

I [2] $p4/mmm$ (61); [2] $p4/nbm$ (62)

II none