

$P4_2 2_1 2$

D_4^2

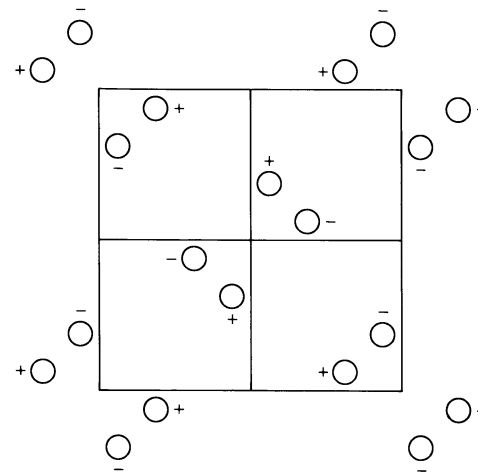
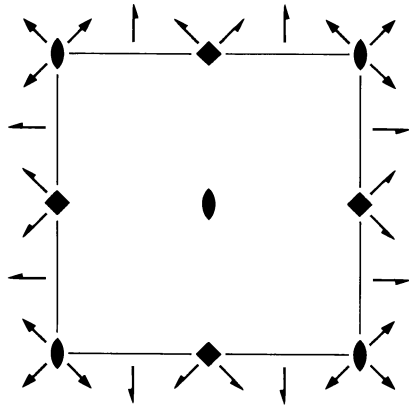
422

Tetragonal

No. 90

$P4_2 2_1 2$

Patterson symmetry $P4/mmm$



Origin at 222 at 212

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

Symmetry operations

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

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

Positions

Multiplicity, Wyckoff letter, Site symmetry	Coordinates				Reflection conditions
					General:
8 <i>g</i> 1	(1) x, y, z (5) $\bar{x} + \frac{1}{2}, y + \frac{1}{2}, \bar{z}$	(2) \bar{x}, \bar{y}, z (6) $x + \frac{1}{2}, \bar{y} + \frac{1}{2}, \bar{z}$	(3) $\bar{y} + \frac{1}{2}, x + \frac{1}{2}, z$ (7) y, x, \bar{z}	(4) $y + \frac{1}{2}, \bar{x} + \frac{1}{2}, z$ (8) $\bar{y}, \bar{x}, \bar{z}$	$h00: h = 2n$
Special: as above, plus					
4 <i>f</i> ..2	$x, x, \frac{1}{2}$	$\bar{x}, \bar{x}, \frac{1}{2}$	$\bar{x} + \frac{1}{2}, x + \frac{1}{2}, \frac{1}{2}$	$x + \frac{1}{2}, \bar{x} + \frac{1}{2}, \frac{1}{2}$	$0kl: k = 2n$
4 <i>e</i> ..2	$x, x, 0$	$\bar{x}, \bar{x}, 0$	$\bar{x} + \frac{1}{2}, x + \frac{1}{2}, 0$	$x + \frac{1}{2}, \bar{x} + \frac{1}{2}, 0$	$0kl: k = 2n$
4 <i>d</i> 2..	$0, 0, z$	$\frac{1}{2}, \frac{1}{2}, z$	$\frac{1}{2}, \frac{1}{2}, \bar{z}$	$0, 0, \bar{z}$	$hkl: h + k = 2n$
2 <i>c</i> 4..	$0, \frac{1}{2}, z$	$\frac{1}{2}, 0, \bar{z}$			$hk0: h + k = 2n$
2 <i>b</i> 2.22	$0, 0, \frac{1}{2}$	$\frac{1}{2}, \frac{1}{2}, \frac{1}{2}$			$hkl: h + k = 2n$
2 <i>a</i> 2.22	$0, 0, 0$	$\frac{1}{2}, \frac{1}{2}, 0$			$hkl: h + k = 2n$

Symmetry of special projections

Along [001] $p4gm$
 $\mathbf{a}' = \mathbf{a}$ $\mathbf{b}' = \mathbf{b}$
 Origin at $0, \frac{1}{2}, z$

Along [100] $p2mg$
 $\mathbf{a}' = \mathbf{b}$ $\mathbf{b}' = \mathbf{c}$
 Origin at $x, \frac{1}{4}, 0$

Along [110] $p2mm$
 $\mathbf{a}' = \frac{1}{2}(-\mathbf{a} + \mathbf{b})$ $\mathbf{b}' = \mathbf{c}$
 Origin at $x, x, 0$