

$P321$

D_3^2

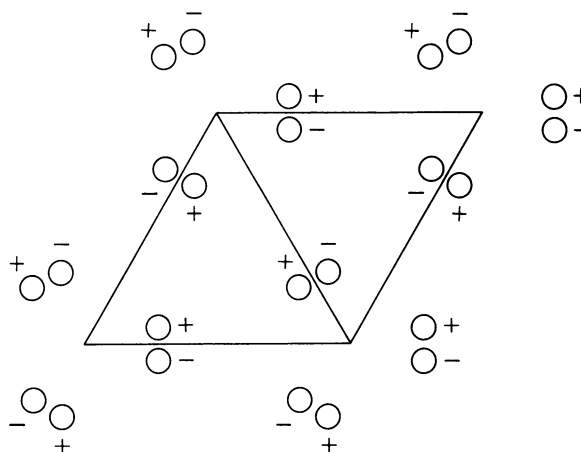
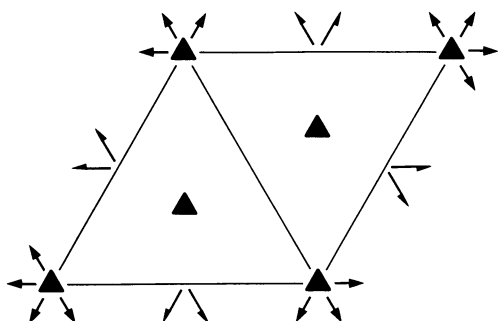
321

Trigonal

No. 150

$P321$

Patterson symmetry $P\bar{3}m1$



Origin at 321

Asymmetric unit $0 \leq x \leq \frac{2}{3}$; $0 \leq y \leq \frac{2}{3}$; $0 \leq z \leq \frac{1}{2}$; $x \leq (1+y)/2$; $y \leq \min(1-x, (1+x)/2)$

Vertices $0, 0, 0$ $\frac{1}{2}, 0, 0$ $\frac{2}{3}, \frac{1}{3}, 0$ $\frac{1}{3}, \frac{2}{3}, 0$ $0, \frac{1}{2}, 0$
 $0, 0, \frac{1}{2}$ $\frac{1}{2}, 0, \frac{1}{2}$ $\frac{2}{3}, \frac{1}{3}, \frac{1}{2}$ $\frac{1}{3}, \frac{2}{3}, \frac{1}{2}$ $0, \frac{1}{2}, \frac{1}{2}$

Symmetry operations

- (1) 1 (2) 3^+ $0, 0, z$ (3) 3^- $0, 0, z$
 (4) 2 $x, x, 0$ (5) 2 $x, 0, 0$ (6) 2 $0, y, 0$

Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2); (4)

Positions

Multiplicity, Wyckoff letter, Site symmetry		Coordinates			Reflection conditions
6	<i>g</i> 1	(1) x, y, z (4) y, x, \bar{z}	(2) $\bar{y}, x - y, z$ (5) $x - y, \bar{y}, \bar{z}$	(3) $\bar{x} + y, \bar{x}, z$ (6) $\bar{x}, \bar{x} + y, \bar{z}$	General: no conditions Special: no extra conditions
3	<i>f</i> .2.	$x, 0, \frac{1}{2}$	$0, x, \frac{1}{2}$	$\bar{x}, \bar{x}, \frac{1}{2}$	
3	<i>e</i> .2.	$x, 0, 0$	$0, x, 0$	$\bar{x}, \bar{x}, 0$	
2	<i>d</i> 3..	$\frac{1}{3}, \frac{2}{3}, z$	$\frac{2}{3}, \frac{1}{3}, \bar{z}$		
2	<i>c</i> 3..	$0, 0, z$	$0, 0, \bar{z}$		
1	<i>b</i> 32.	$0, 0, \frac{1}{2}$			
1	<i>a</i> 32.	$0, 0, 0$			

Symmetry of special projections

Along [001] $p31m$
 $\mathbf{a}' = \mathbf{a}$ $\mathbf{b}' = \mathbf{b}$
 Origin at $0, 0, z$

Along [100] $p2$
 $\mathbf{a}' = \frac{1}{2}(\mathbf{a} + 2\mathbf{b})$ $\mathbf{b}' = \mathbf{c}$
 Origin at $x, 0, 0$

Along [210] $p11m$
 $\mathbf{a}' = \frac{1}{2}\mathbf{b}$ $\mathbf{b}' = \mathbf{c}$
 Origin at $x, \frac{1}{2}x, 0$

Maximal non-isomorphic subgroups

I [2] $P311$ ($P3, 143$) 1; 2; 3
 $\left\{ \begin{array}{l} [3] P121 (C2, 5) \quad 1; 4 \\ [3] P121 (C2, 5) \quad 1; 5 \\ [3] P121 (C2, 5) \quad 1; 6 \end{array} \right.$

IIa none

IIb [3] $P3_221$ ($\mathbf{c}' = 3\mathbf{c}$) (154); [3] $P3_121$ ($\mathbf{c}' = 3\mathbf{c}$) (152); [3] $H321$ ($\mathbf{a}' = 3\mathbf{a}, \mathbf{b}' = 3\mathbf{b}$) ($P312, 149$)

Maximal isomorphic subgroups of lowest index

IIc [2] $P321$ ($\mathbf{c}' = 2\mathbf{c}$) (150); [4] $P321$ ($\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$) (150)

Minimal non-isomorphic supergroups

I [2] $P\bar{3}m1$ (164); [2] $P\bar{3}c1$ (165); [2] $P622$ (177); [2] $P6_322$ (182); [2] $P\bar{6}2m$ (189); [2] $P\bar{6}2c$ (190)

II [3] $H321$ ($P312, 149$); [3] $R32$ (obverse) (155); [3] $R32$ (reverse) (155)