

$P321$

No. 150

 $P321$
 D_3^2
Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2); (4)

General position

 Multiplicity,
 Wyckoff letter,
 Site symmetry

Coordinates

 6 g 1

 (1) x, y, z (2) $\bar{y}, x - y, z$ (3) $\bar{x} + y, \bar{x}, z$
 (4) y, x, \bar{z} (5) $x - y, \bar{y}, \bar{z}$ (6) $\bar{x}, \bar{x} + y, \bar{z}$
I Maximal translationengleiche subgroups

[2] $P311$ (143, $P3$)	1; 2; 3	
{ [3] $P121$ (5, $C121$)	1; 4	$-\mathbf{a} + \mathbf{b}, -\mathbf{a} - \mathbf{b}, \mathbf{c}$
[3] $P121$ (5, $C121$)	1; 5	$-\mathbf{a} - 2\mathbf{b}, \mathbf{a}, \mathbf{c}$
{ [3] $P121$ (5, $C121$)	1; 6	$2\mathbf{a} + \mathbf{b}, \mathbf{b}, \mathbf{c}$

II Maximal klassengleiche subgroups

• Enlarged unit cell

[2] $\mathbf{c}' = 2\mathbf{c}$			
$P321$ (150)	$\langle 2; 4 \rangle$	$\mathbf{a}, \mathbf{b}, 2\mathbf{c}$	
$P321$ (150)	$\langle 2; 4 + (0, 0, 1) \rangle$	$\mathbf{a}, \mathbf{b}, 2\mathbf{c}$	$0, 0, 1/2$
[3] $\mathbf{c}' = 3\mathbf{c}$			
$P3_221$ (154)	$\langle 4; 2 + (0, 0, 2) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	
$P3_221$ (154)	$\langle (2; 4) + (0, 0, 2) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	$0, 0, 1$
$P3_221$ (154)	$\langle 2 + (0, 0, 2); 4 + (0, 0, 4) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	$0, 0, 2$
$P3_121$ (152)	$\langle 4; 2 + (0, 0, 1) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	
$P3_121$ (152)	$\langle 2 + (0, 0, 1); 4 + (0, 0, 2) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	$0, 0, 1$
$P3_121$ (152)	$\langle 2 + (0, 0, 1); 4 + (0, 0, 4) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	$0, 0, 2$
$P321$ (150)	$\langle 2; 4 \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	
$P321$ (150)	$\langle 2; 4 + (0, 0, 2) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	$0, 0, 1$
$P321$ (150)	$\langle 2; 4 + (0, 0, 4) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	$0, 0, 2$
[3] $\mathbf{a}' = 3\mathbf{a}, \mathbf{b}' = 3\mathbf{b}$			
$H321$ (149, $P312$)	$\langle 2; 4 \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	
[4] $\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$			
$P321$ (150)	$\langle 2; 4 \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	
$P321$ (150)	$\langle (2; 4) + (1, -1, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	$1, 0, 0$
$P321$ (150)	$\langle 2 + (1, 2, 0); 4 + (-1, 1, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	$0, 1, 0$
$P321$ (150)	$\langle 4; 2 + (2, 1, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	$1, 1, 0$

• Series of maximal isomorphic subgroups

[p] $\mathbf{c}' = p\mathbf{c}$			
$P321$ (150)	$\langle 2; 4 + (0, 0, 2u) \rangle$ $p > 2; 0 \leq u < p$ p conjugate subgroups for the prime p	$\mathbf{a}, \mathbf{b}, p\mathbf{c}$	$0, 0, u$
[p^2] $\mathbf{a}' = p\mathbf{a}, \mathbf{b}' = p\mathbf{b}$			
$P321$ (150)	$\langle 2 + (u + v, -u + 2v, 0); 4 + (u - v, -u + v, 0) \rangle$ $p > 1; p \neq 3; 0 \leq u < p; 0 \leq v < p$ p^2 conjugate subgroups for the prime p	$p\mathbf{a}, p\mathbf{b}, \mathbf{c}$	$u, v, 0$

I Minimal translationengleiche supergroups

 [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 Minimal non-isomorphic klassengleiche supergroups

• Additional centring translations

 [2] $H321$ (149, $P312$); [3] $R_{\text{obv}}32$ (155, $R32$); [3] $R_{\text{rev}}32$ (155, $R32$)

• Decreased unit cell

none