

P321

No. 150

P321
D₃²
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] $\mathbf{c}' = 3\mathbf{c}$			
P _{3,2} 21 (154)	$\langle 4; 2 + (0, 0, 2) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	
P _{3,2} 21 (154)	$\langle (2; 4) + (0, 0, 2) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	0, 0, 1
P _{3,2} 21 (154)	$\langle 2 + (0, 0, 2); 4 + (0, 0, 4) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	0, 0, 2
P _{3,1} 21 (152)	$\langle 4; 2 + (0, 0, 1) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	
P _{3,1} 21 (152)	$\langle 2 + (0, 0, 1); 4 + (0, 0, 2) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	0, 0, 1
P _{3,1} 21 (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)	$\langle 2; 4 + (0, 0, 2u) \rangle$ prime $p > 2$; $0 \leq u < p$ p conjugate subgroups	$\mathbf{a}, \mathbf{b}, p\mathbf{c}$	0, 0, u
[p ²] $\mathbf{a}' = p\mathbf{a}, \mathbf{b}' = p\mathbf{b}$			
P321 (150)	$\langle 2 + (u + v, -u + 2v, 0); 4 + (u - v, -u + v, 0) \rangle$ prime $p \neq 3$; $0 \leq u < p$; $0 \leq v < p$ p^2 conjugate subgroups	$p\mathbf{a}, p\mathbf{b}, \mathbf{c}$	$u, v, 0$

I Minimal translationengleiche supergroups

 [2] P³m1 (164); [2] P³c1 (165); [2] P622 (177); [2] P6₃22 (182); [2] P⁶2m (189); [2] P⁶2c (190)

II Minimal non-isomorphic klassengleiche supergroups

• Additional centring translations

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

• Decreased unit cell

none