

D_3^3
 $P3_112$

No. 151

 $P3_112$
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	<i>c</i>	1	(1) x, y, z	(2) $\bar{y}, x - y, z + \frac{1}{3}$	(3) $\bar{x} + y, \bar{x}, z + \frac{2}{3}$
			(4) $\bar{y}, \bar{x}, \bar{z} + \frac{2}{3}$	(5) $\bar{x} + y, y, \bar{z} + \frac{1}{3}$	(6) $x, x - y, \bar{z}$

I Maximal translationengleiche subgroups

[2] $P3_111$ (144, $P3_1$)	1; 2; 3			
{	[3] $P112$ (5, $C121$)	1; 6		$\mathbf{b}, -2\mathbf{a} - \mathbf{b}, \mathbf{c}$
	[3] $P112$ (5, $C121$)	1; 4		$-\mathbf{a} - \mathbf{b}, \mathbf{a} - \mathbf{b}, \mathbf{c}$
	[3] $P112$ (5, $C121$)	1; 5		$\mathbf{a}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$
				0, 0, 1/3 0, 0, 2/3

II Maximal klassengleiche subgroups

• Enlarged unit cell

[2] $\mathbf{c}' = 2\mathbf{c}$				
	$P3_212$ (153)	$\langle 4; 2 + (0, 0, 1) \rangle$		$\mathbf{a}, \mathbf{b}, 2\mathbf{c}$
	$P3_212$ (153)	$\langle (2; 4) + (0, 0, 1) \rangle$		$\mathbf{a}, \mathbf{b}, 2\mathbf{c}$
				0, 0, 1/2
[3] $\mathbf{a}' = 3\mathbf{a}, \mathbf{b}' = 3\mathbf{b}$				
{	$H3_112$ (152, $P3_121$)	$\langle 2; 4 \rangle$		$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$
	$H3_112$ (152, $P3_121$)	$\langle 2 + (1, -1, 0); 4 + (1, 1, 0) \rangle$		$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$
	$H3_112$ (152, $P3_121$)	$\langle 2 + (2, 1, 0); 4 + (2, 2, 0) \rangle$		$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$
				1, 0, 0 1, 1, 0
{	$H3_112$ (152, $P3_121$)	$\langle 4; 2 + (1, 0, 0) \rangle$		$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$
	$H3_112$ (152, $P3_121$)	$\langle 2 + (2, 2, 0); 4 + (1, 1, 0) \rangle$		$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$
	$H3_112$ (152, $P3_121$)	$\langle 2 + (3, 4, 0); 4 + (2, 2, 0) \rangle$		$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$
				2/3, -2/3, 0 2/3, 1/3, 0 2/3, 4/3, 0
{	$H3_112$ (152, $P3_121$)	$\langle 4; 2 + (1, 1, 0) \rangle$		$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$
	$H3_112$ (152, $P3_121$)	$\langle 2 + (2, 3, 0); 4 + (1, 1, 0) \rangle$		$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$
	$H3_112$ (152, $P3_121$)	$\langle 2 + (3, 2, 0); 4 + (2, 2, 0) \rangle$		$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$
				1/3, -1/3, 0 1/3, 2/3, 0 4/3, 2/3, 0
[4] $\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$				
{	$P3_112$ (151)	$\langle 2; 4 \rangle$		$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$
	$P3_112$ (151)	$\langle 2 + (1, -1, 0); 4 + (1, 1, 0) \rangle$		$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$
	$P3_112$ (151)	$\langle 2 + (1, 2, 0); 4 + (1, 1, 0) \rangle$		$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$
	$P3_112$ (151)	$\langle 2 + (2, 1, 0); 4 + (2, 2, 0) \rangle$		$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$
				1, 0, 0 0, 1, 0 1, 1, 0

• Series of maximal isomorphic subgroups

[p] $\mathbf{c}' = p\mathbf{c}$				
	$P3_212$ (153)	$\langle 2 + (0, 0, \frac{2p}{3} - \frac{1}{3}); 4 + (0, 0, \frac{p}{3} - \frac{2}{3} + 2u) \rangle$		$\mathbf{a}, \mathbf{b}, p\mathbf{c}$
		prime $p > 4$; $0 \leq u < p$		0, 0, u
		p conjugate subgroups for $p = 6n - 1$		
	$P3_112$ (151)	$\langle 2 + (0, 0, \frac{p}{3} - \frac{1}{3}); 4 + (0, 0, \frac{2p}{3} - \frac{2}{3} + 2u) \rangle$		$\mathbf{a}, \mathbf{b}, p\mathbf{c}$
		prime $p > 6$; $0 \leq u < p$		0, 0, u
		p conjugate subgroups for $p = 6n + 1$		
[p^2] $\mathbf{a}' = p\mathbf{a}, \mathbf{b}' = p\mathbf{b}$				
	$P3_112$ (151)	$\langle 2 + (u + v, -u + 2v, 0); 4 + (u + v, u + v, 0) \rangle$		$p\mathbf{a}, p\mathbf{b}, \mathbf{c}$
		prime $p \neq 3$; $0 \leq u < p$; $0 \leq v < p$		$u, v, 0$
		p^2 conjugate subgroups		

I Minimal translationengleiche supergroups

 [2] $P6_122$ (178); [2] $P6_422$ (181)

II Minimal non-isomorphic klassengleiche supergroups

• Additional centring translations

 [3] $H3_112$ (152, $P3_121$)

• Decreased unit cell

 [3] $\mathbf{c}' = \frac{1}{3}\mathbf{c}$ $P312$ (149)