

D_6^4
 $P6_222$

No. 180

 $P6_222$
Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2); (4); (7)

General position

 Multiplicity,
 Wyckoff letter,
 Site symmetry

Coordinates

12	k	1	(1) x, y, z	(2) $\bar{y}, x - y, z + \frac{2}{3}$	(3) $\bar{x} + y, \bar{x}, z + \frac{1}{3}$
			(4) \bar{x}, \bar{y}, z	(5) $y, \bar{x} + y, z + \frac{2}{3}$	(6) $x - y, x, z + \frac{1}{3}$
			(7) $y, x, \bar{z} + \frac{2}{3}$	(8) $x - y, \bar{y}, \bar{z}$	(9) $\bar{x}, \bar{x} + y, \bar{z} + \frac{1}{3}$
			(10) $\bar{y}, \bar{x}, \bar{z} + \frac{2}{3}$	(11) $\bar{x} + y, y, \bar{z}$	(12) $x, x - y, \bar{z} + \frac{1}{3}$

I Maximal translationengleiche subgroups

[2] $P6_211$ (171, $P6_2$)	1; 2; 3; 4; 5; 6		
[2] $P3_221$ (154)	1; 2; 3; 7; 8; 9		0, 0, 1/3
[2] $P3_212$ (153)	1; 2; 3; 10; 11; 12		0, 0, 1/6
{ [3] $P222$ (21, $C222$)	1; 4; 7; 10	$-\mathbf{a} + \mathbf{b}, -\mathbf{a} - \mathbf{b}, \mathbf{c}$	0, 0, 1/3
[3] $P222$ (21, $C222$)	1; 4; 8; 11	$-\mathbf{a} - 2\mathbf{b}, \mathbf{a}, \mathbf{c}$	
{ [3] $P222$ (21, $C222$)	1; 4; 9; 12	$2\mathbf{a} + \mathbf{b}, \mathbf{b}, \mathbf{c}$	0, 0, 2/3

II Maximal klassengleiche subgroups

• Enlarged unit cell

[2] $\mathbf{c}' = 2\mathbf{c}$			
$P6_422$ (181)	$\langle 2; 4; 7 \rangle$	$\mathbf{a}, \mathbf{b}, 2\mathbf{c}$	
$P6_422$ (181)	$\langle 2; 4; 7 + (0, 0, 1) \rangle$	$\mathbf{a}, \mathbf{b}, 2\mathbf{c}$	0, 0, 1/2
$P6_122$ (178)	$\langle 2; 7; 4 + (0, 0, 1) \rangle$	$\mathbf{a}, \mathbf{b}, 2\mathbf{c}$	
$P6_122$ (178)	$\langle 2; (4; 7) + (0, 0, 1) \rangle$	$\mathbf{a}, \mathbf{b}, 2\mathbf{c}$	0, 0, 1/2
[3] $\mathbf{a}' = 3\mathbf{a}, \mathbf{b}' = 3\mathbf{b}$			
{ $H6_222$ (180, $P6_222$)	$\langle 2; 4; 7 \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	0, 0, 1/3
$H6_222$ (180, $P6_222$)	$\langle (2; 7) + (1, -1, 0); 4 + (2, 0, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	1, 0, 1/3
$H6_222$ (180, $P6_222$)	$\langle (2; 7) + (2, -2, 0); 4 + (4, 0, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	2, 0, 1/3
[4] $\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$			
{ $P6_222$ (180)	$\langle 2; 4; 7 \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	
$P6_222$ (180)	$\langle (2; 7) + (1, -1, 0); 4 + (2, 0, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	1, 0, 0
$P6_222$ (180)	$\langle 2 + (1, 2, 0); 4 + (0, 2, 0); 7 + (-1, 1, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	0, 1, 0
$P6_222$ (180)	$\langle 7; 2 + (2, 1, 0); 4 + (2, 2, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	1, 1, 0

• Series of maximal isomorphic subgroups

[p] $\mathbf{c}' = p\mathbf{c}$			
$P6_422$ (181)	$\langle 4; 2 + (0, 0, \frac{p}{3} - \frac{2}{3}); 7 + (0, 0, \frac{p}{3} - \frac{2}{3} + 2u) \rangle$ $p > 4; 0 \leq u < p$ p conjugate subgroups for prime $p \equiv 2 \pmod{3}$	$\mathbf{a}, \mathbf{b}, p\mathbf{c}$	0, 0, u
$P6_222$ (180)	$\langle 4; 2 + (0, 0, \frac{2p}{3} - \frac{2}{3}); 7 + (0, 0, \frac{2p}{3} - \frac{2}{3} + 2u) \rangle$ $p > 6; 0 \leq u < p$ p conjugate subgroups for prime $p \equiv 1 \pmod{3}$	$\mathbf{a}, \mathbf{b}, p\mathbf{c}$	0, 0, u
[p^2] $\mathbf{a}' = p\mathbf{a}, \mathbf{b}' = p\mathbf{b}$			
$P6_222$ (180)	$\langle 2 + (u + v, -u + 2v, 0); 4 + (2u, 2v, 0); 7 + (u - v, -u + v, 0) \rangle$ $p > 1; p \neq 3; 0 \leq u < p; 0 \leq v < p$ p^2 conjugate subgroups for the prime p	$p\mathbf{a}, p\mathbf{b}, \mathbf{c}$	$u, v, 0$

I Minimal translationengleiche supergroups

none

II Minimal non-isomorphic klassengleiche supergroups

• Additional centring translations

none

• Decreased unit cell

 [3] $\mathbf{c}' = \frac{1}{3}\mathbf{c}$ $P622$ (177)