

C_{6h}^2
 $P6_3/m$

No. 176

 $P6_3/m$
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	<i>i</i>	1	(1) x, y, z	(2) $\bar{y}, x - y, z$	(3) $\bar{x} + y, \bar{x}, z$
			(4) $\bar{x}, \bar{y}, z + \frac{1}{2}$	(5) $y, \bar{x} + y, z + \frac{1}{2}$	(6) $x - y, x, z + \frac{1}{2}$
			(7) $\bar{x}, \bar{y}, \bar{z}$	(8) $y, \bar{x} + y, \bar{z}$	(9) $x - y, x, \bar{z}$
			(10) $x, y, \bar{z} + \frac{1}{2}$	(11) $\bar{y}, x - y, \bar{z} + \frac{1}{2}$	(12) $\bar{x} + y, \bar{x}, \bar{z} + \frac{1}{2}$

I Maximal translationengleiche subgroups

[2] $P\bar{6}$ (174)	1; 2; 3; 10; 11; 12	0, 0, 1/4
[2] $P6_3$ (173)	1; 2; 3; 4; 5; 6	
[2] $P\bar{3}$ (147)	1; 2; 3; 7; 8; 9	
[3] $P2_1/m$ (11, $P112_1/m$)	1; 4; 7; 10	

II Maximal klassengleiche subgroups

• Enlarged unit cell

[3] $\mathbf{c}' = 3\mathbf{c}$			
$\left\{ \begin{array}{l} P6_3/m \text{ (176)} \\ P6_3/m \text{ (176)} \\ P6_3/m \text{ (176)} \end{array} \right.$	$\langle 2; 7; 4 + (0, 0, 1) \rangle$ $\langle 2; 4 + (0, 0, 1); 7 + (0, 0, 2) \rangle$ $\langle 2; 4 + (0, 0, 1); 7 + (0, 0, 4) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$ $\mathbf{a}, \mathbf{b}, 3\mathbf{c}$ $\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	 0, 0, 1 0, 0, 2
[3] $\mathbf{a}' = 3\mathbf{a}, \mathbf{b}' = 3\mathbf{b}$			
$\left\{ \begin{array}{l} H6_3/m \text{ (176, } P6_3/m) \\ H6_3/m \text{ (176, } P6_3/m) \\ H6_3/m \text{ (176, } P6_3/m) \end{array} \right.$	$\langle 2; 4; 7 \rangle$ $\langle 2 + (1, -1, 0); (4; 7) + (2, 0, 0) \rangle$ $\langle 2 + (2, -2, 0); (4; 7) + (4, 0, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$ $\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$ $\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	 1, 0, 0 2, 0, 0
[4] $\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$			
$\left\{ \begin{array}{l} P6_3/m \text{ (176)} \\ P6_3/m \text{ (176)} \\ P6_3/m \text{ (176)} \\ P6_3/m \text{ (176)} \end{array} \right.$	$\langle 2; 4; 7 \rangle$ $\langle 2 + (1, -1, 0); (4; 7) + (2, 0, 0) \rangle$ $\langle 2 + (1, 2, 0); (4; 7) + (0, 2, 0) \rangle$ $\langle 2 + (2, 1, 0); (4; 7) + (2, 2, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$ $2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$ $2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$ $2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	 1, 0, 0 0, 1, 0 1, 1, 0

• Series of maximal isomorphic subgroups

[p] $\mathbf{c}' = p\mathbf{c}$			
$P6_3/m$ (176)	$\langle 2; 4 + (0, 0, \frac{p}{2} - \frac{1}{2}); 7 + (0, 0, 2u) \rangle$ $p > 2; 0 \leq u < p$ p conjugate subgroups for the prime p	$\mathbf{a}, \mathbf{b}, p\mathbf{c}$	0, 0, u
[p^2] $\mathbf{a}' = p\mathbf{a}, \mathbf{b}' = p\mathbf{b}$			
$P6_3/m$ (176)	$\langle 2 + (u + v, -u + 2v, 0); (4; 7) + (2u, 2v, 0) \rangle$ $p > 1; 0 \leq u < p; 0 \leq v < p$ p^2 conjugate subgroups for prime $p \equiv 2 \pmod{3}$	$p\mathbf{a}, p\mathbf{b}, \mathbf{c}$	$u, v, 0$
[$p = q^2 + r^2 + qr$] $\mathbf{a}' = q\mathbf{a} - r\mathbf{b}, \mathbf{b}' = r\mathbf{a} + (q + r)\mathbf{b}$			
$P6_3/m$ (176)	$\langle 2 + (u, -u, 0); (4; 7) + (2u, 0, 0) \rangle$ $q > 0; r > 0; p > 2; 0 \leq u < p$ p conjugate subgroups for each pair of q and r	$q\mathbf{a} - r\mathbf{b}, r\mathbf{a} + (q + r)\mathbf{b}, \mathbf{c}$	$u, 0, 0$

I Minimal translationengleiche supergroups

 [2] $P6_3/mcm$ (193); [2] $P6_3/mmc$ (194)

II Minimal non-isomorphic klassengleiche supergroups

• Additional centring translations

none

• Decreased unit cell

 [2] $\mathbf{c}' = \frac{1}{2}\mathbf{c}$ $P6/m$ (175)