

$P\bar{6}_3/mcm$

No. 193

 $P\bar{6}_3/m\bar{2}/c\bar{2}/m$ D_{6h}^3 **Generators selected** (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2); (4); (7); (13)**General position**

Multiplicity,
Wyckoff letter,
Site symmetry

24	l	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) $y, x, \bar{z} + \frac{1}{2}$	(8) $x - y, \bar{y}, \bar{z} + \frac{1}{2}$	(9) $\bar{x}, \bar{x} + y, \bar{z} + \frac{1}{2}$	(10) $\bar{y}, \bar{x}, \bar{z}$	(11) $\bar{x} + y, y, \bar{z}$	(12) $x, x - y, \bar{z}$
			(13) $\bar{x}, \bar{y}, \bar{z}$	(14) $y, \bar{x} + y, \bar{z}$	(15) $x - y, x, \bar{z}$	(16) $x, y, \bar{z} + \frac{1}{2}$	(17) $\bar{y}, x - y, \bar{z} + \frac{1}{2}$	(18) $\bar{x} + y, \bar{x}, \bar{z} + \frac{1}{2}$
			(19) $\bar{y}, \bar{x}, z + \frac{1}{2}$	(20) $\bar{x} + y, y, z + \frac{1}{2}$	(21) $x, x - y, z + \frac{1}{2}$	(22) y, x, z	(23) $x - y, \bar{y}, z$	(24) $\bar{x}, \bar{x} + y, z$

I Maximal translationengleiche subgroups

[2] $P\bar{6}2m$ (189)	1; 2; 3; 7; 8; 9; 16; 17; 18; 22; 23; 24	0, 0, 1/4
[2] $P\bar{6}c2$ (188)	1; 2; 3; 10; 11; 12; 16; 17; 18; 19; 20; 21	
[2] $P\bar{6}_3cm$ (185)	1; 2; 3; 4; 5; 6; 19; 20; 21; 22; 23; 24	
[2] $P\bar{6}_322$ (182)	1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12	0, 0, 1/4
[2] $P\bar{6}_3/m11$ (176, $P\bar{6}_3/m$)	1; 2; 3; 4; 5; 6; 13; 14; 15; 16; 17; 18	
[2] $P\bar{3}c1$ (165)	1; 2; 3; 7; 8; 9; 13; 14; 15; 19; 20; 21	
[2] $P\bar{3}1m$ (162)	1; 2; 3; 10; 11; 12; 13; 14; 15; 22; 23; 24	
{ [3] $Pmcm$ (63, $Cmcm$)	1; 4; 7; 10; 13; 16; 19; 22	$-\mathbf{a} + \mathbf{b}, -\mathbf{a} - \mathbf{b}, \mathbf{c}$
{ [3] $Pmcm$ (63, $Cmcm$)	1; 4; 8; 11; 13; 16; 20; 23	$-\mathbf{a} - 2\mathbf{b}, \mathbf{a}, \mathbf{c}$
{ [3] $Pmcm$ (63, $Cmcm$)	1; 4; 9; 12; 13; 16; 21; 24	$2\mathbf{a} + \mathbf{b}, \mathbf{b}, \mathbf{c}$

II Maximal klassengleiche subgroups**• Enlarged unit cell**[3] $\mathbf{c}' = 3\mathbf{c}$

{ $P\bar{6}_3/mcm$ (193)	$\langle 2; 13; (4; 7) + (0, 0, 1) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$
{ $P\bar{6}_3/mcm$ (193)	$\langle 2; 4 + (0, 0, 1); 7 + (0, 0, 3); 13 + (0, 0, 2) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$
{ $P\bar{6}_3/mcm$ (193)	$\langle 2; 4 + (0, 0, 1); 7 + (0, 0, 5); 13 + (0, 0, 4) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$

[3] $\mathbf{a}' = 3\mathbf{a}$, $\mathbf{b}' = 3\mathbf{b}$

{ $H\bar{6}_3/mcm$ (194), $P\bar{6}_3/mmc$	$\langle 2; 4; 7; 13 \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$
{ $H\bar{6}_3/mcm$ (194), $P\bar{6}_3/mmc$	$\langle (2; 7) + (1, -1, 0); (4; 13) + (2, 0, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$
{ $H\bar{6}_3/mcm$ (194), $P\bar{6}_3/mmc$	$\langle 7; 2 + (2, 1, 0); (4; 13) + (2, 2, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$

[4] $\mathbf{a}' = 2\mathbf{a}$, $\mathbf{b}' = 2\mathbf{b}$

{ $P\bar{6}_3/mcm$ (193)	$\langle 2; 4; 7; 13 \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$
{ $P\bar{6}_3/mcm$ (193)	$\langle (2; 7) + (1, -1, 0); (4; 13) + (2, 0, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$
{ $P\bar{6}_3/mcm$ (193)	$\langle 2 + (1, 2, 0); (4; 13) + (0, 2, 0); 7 + (-1, 1, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$
{ $P\bar{6}_3/mcm$ (193)	$\langle 7; 2 + (2, 1, 0); (4; 13) + (2, 2, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$

• Series of maximal isomorphic subgroups[p] $\mathbf{c}' = p\mathbf{c}$

$P\bar{6}_3/mcm$ (193)	$\langle 2; 4 + (0, 0, \frac{p}{2} - \frac{1}{2}); 7 + (0, 0, \frac{p}{2} - \frac{1}{2} + 2u); 13 + (0, 0, 2u) \rangle$	$\mathbf{a}, \mathbf{b}, p\mathbf{c}$	0, 0, u
	$p > 2; 0 \leq u < p$		
	p conjugate subgroups for the prime p		

[p^2] $\mathbf{a}' = p\mathbf{a}$, $\mathbf{b}' = p\mathbf{b}$

$P\bar{6}_3/mcm$ (193)	$\langle 2 + (u + v, -u + 2v, 0); (4; 13) + (2u, 2v, 0); 7 + (u - v, -u + v, 0) \rangle$	$p\mathbf{a}, p\mathbf{b}, \mathbf{c}$	$u, v, 0$
	$p > 1; p \neq 3; 0 \leq u < p; 0 \leq v < p$		
	p^2 conjugate subgroups for the prime p		

I Minimal translationengleiche supergroups

none

II Minimal non-isomorphic klassengleiche supergroups**• Additional centring translations**[3] $H\bar{6}_3/mcm$ (194), $P\bar{6}_3/mmc$ **• Decreased unit cell**[2] $\mathbf{c}' = \frac{1}{2}\mathbf{c}$ $P\bar{6}/mmm$ (191)