

$P4_2/mmc$

No. 131

 $P4_2/m2/m2/c$ D_{4h}^9 Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2); (3); (5); (9)

General position

Multiplicity,
Wyckoff letter,
Site symmetry

Coordinates

16	r	1	(1) x, y, z	(2) \bar{x}, \bar{y}, z	(3) $\bar{y}, x, z + \frac{1}{2}$	(4) $y, \bar{x}, z + \frac{1}{2}$
			(5) \bar{x}, y, \bar{z}	(6) x, \bar{y}, \bar{z}	(7) $y, x, \bar{z} + \frac{1}{2}$	(8) $\bar{y}, \bar{x}, \bar{z} + \frac{1}{2}$
			(9) $\bar{x}, \bar{y}, \bar{z}$	(10) x, y, \bar{z}	(11) $y, \bar{x}, \bar{z} + \frac{1}{2}$	(12) $\bar{y}, x, \bar{z} + \frac{1}{2}$
			(13) x, \bar{y}, z	(14) \bar{x}, y, z	(15) $\bar{y}, \bar{x}, z + \frac{1}{2}$	(16) $y, x, z + \frac{1}{2}$

I Maximal translationengleiche subgroups

[2] $P\bar{4}m2$ (115)	1; 2; 7; 8; 11; 12; 13; 14		0, 0, 1/4
[2] $P\bar{4}2c$ (112)	1; 2; 5; 6; 11; 12; 15; 16		0, 0, 1/4
[2] $P4_2mc$ (105)	1; 2; 3; 4; 13; 14; 15; 16		
[2] $P4_222$ (93)	1; 2; 3; 4; 5; 6; 7; 8		
[2] $P4_2/m11$ (84, $P4_2/m$)	1; 2; 3; 4; 9; 10; 11; 12		
[2] $P2/m12/c$ (66, $Cccm$)	1; 2; 7; 8; 9; 10; 15; 16	$\mathbf{a - b, a + b, c}$	
[2] $P2/m2/m1$ (47, $Pmmm$)	1; 2; 5; 6; 9; 10; 13; 14		

II Maximal klassengleiche subgroups

• Enlarged unit cell

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

$C4_2/emc$ (138, $P4_2/ncm$)	$\langle 2; 3; (5; 9) + (1, 0, 0) \rangle$	$\mathbf{a - b, a + b, c}$	1/2, 0, 0
$C4_2/emc$ (138, $P4_2/ncm$)	$\langle 2; 5; (3; 9) + (1, 0, 0) \rangle$	$\mathbf{a - b, a + b, c}$	0, 1/2, 0
$C4_2/mmd$ (136, $P4_2/mnm$)	$\langle 2; 5; 9; 3 + (1, 0, 0) \rangle$	$\mathbf{a - b, a + b, c}$	
$C4_2/mmd$ (136, $P4_2/mnm$)	$\langle 2; 3; 9; 5 + (1, 0, 0) \rangle$	$\mathbf{a - b, a + b, c}$	1/2, 1/2, 0
$C4_2/emd$ (134, $P4_2/nnm$)	$\langle 2; 3; 5; 9 + (1, 0, 0) \rangle$	$\mathbf{a - b, a + b, c}$	1/2, 0, 0
$C4_2/emd$ (134, $P4_2/nnm$)	$\langle 2; (3; 5; 9) + (1, 0, 0) \rangle$	$\mathbf{a - b, a + b, c}$	0, 1/2, 0
$C4_2/mmc$ (132, $P4_2/mcm$)	$\langle 2; 3; 5; 9 \rangle$	$\mathbf{a - b, a + b, c}$	
$C4_2/mmc$ (132, $P4_2/mcm$)	$\langle 2; 9; (3; 5) + (1, 0, 0) \rangle$	$\mathbf{a - b, a + b, c}$	1/2, 1/2, 0

[3] $\mathbf{c}' = 3\mathbf{c}$

$P4_2/mmc$ (131)	$\langle 2; 5; 9; 3 + (0, 0, 1) \rangle$	$\mathbf{a, b, 3c}$	
$P4_2/mmc$ (131)	$\langle 2; 3 + (0, 0, 1); (5; 9) + (0, 0, 2) \rangle$	$\mathbf{a, b, 3c}$	0, 0, 1
$P4_2/mmc$ (131)	$\langle 2; 3 + (0, 0, 1); (5; 9) + (0, 0, 4) \rangle$	$\mathbf{a, b, 3c}$	0, 0, 2

• Series of maximal isomorphic subgroups

[p] $\mathbf{c}' = p\mathbf{c}$

$P4_2/mmc$ (131)	$\langle 2; 3 + (0, 0, \frac{p}{2} - \frac{1}{2}); (5; 9) + (0, 0, 2u) \rangle$ prime $p > 2$; $0 \leq u < p$ p conjugate subgroups	$\mathbf{a, b, pc}$	0, 0, u
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[p²] $\mathbf{a}' = p\mathbf{a}, \mathbf{b}' = p\mathbf{b}$

$P4_2/mmc$ (131)	$\langle (2; 9) + (2u, 2v, 0); 3 + (u + v, -u + v, 0); 5 + (2u, 0, 0) \rangle$ prime $p > 2$; $0 \leq u < p$; $0 \leq v < p$ p^2 conjugate subgroups	$\mathbf{pa, pb, c}$	$u, v, 0$
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I Minimal translationengleiche supergroups

[3] $Pm\bar{3}n$ (223)

II Minimal non-isomorphic klassengleiche supergroups

• Additional centring translations

[2] $C4_2/mmc$ (132, $P4_2/mcm$); [2] $I4/mmm$ (139)

• Decreased unit cell

[2] $\mathbf{c}' = \frac{1}{2}\mathbf{c}$ $P4/mmm$ (123)