

$D_{4h}^{10}$ 
 $P4_2/m2/c2/m$ 

No. 132

 $P4_2/mcm$ 
**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	$p$	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) $\bar{x}, y, \bar{z} + \frac{1}{2}$	(6) $x, \bar{y}, \bar{z} + \frac{1}{2}$	(7) $y, x, \bar{z}$	(8) $\bar{y}, \bar{x}, \bar{z}$
			(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) $x, \bar{y}, z + \frac{1}{2}$	(14) $\bar{x}, y, z + \frac{1}{2}$	(15) $\bar{y}, \bar{x}, z$	(16) $y, x, z$

**I Maximal translationengleiche subgroups**

[2] $P\bar{4}c2$ (116)	1; 2; 7; 8; 11; 12; 13; 14		0, 0, 1/4
[2] $P\bar{4}2m$ (111)	1; 2; 5; 6; 11; 12; 15; 16		0, 0, 1/4
[2] $P4_2cm$ (101)	1; 2; 3; 4; 13; 14; 15; 16		
[2] $P4_222$ (93)	1; 2; 3; 4; 5; 6; 7; 8		0, 0, 1/4
[2] $P4_2/m11$ (84, $P4_2/m$ )	1; 2; 3; 4; 9; 10; 11; 12		
[2] $P2/m12/m$ (65, $Cmmm$ )	1; 2; 7; 8; 9; 10; 15; 16	$\mathbf{a - b, a + b, c}$	
[2] $P2/m2/c1$ (49, $Pccm$ )	1; 2; 5; 6; 9; 10; 13; 14		

**II Maximal klassengleiche subgroups**

## • Enlarged unit cell

[2] $\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$			
$C4_2/ecm$ (137, $P4_2/nmc$ )	$\langle 2; 3; (5; 9) + (1, 0, 0) \rangle$	$\mathbf{a - b, a + b, c}$	1/2, 0, 0
$C4_2/ecm$ (137, $P4_2/nmc$ )	$\langle 2; 5; (3; 9) + (1, 0, 0) \rangle$	$\mathbf{a - b, a + b, c}$	0, 1/2, 0
$C4_2/mcd$ (135, $P4_2/mbc$ )	$\langle 2; 3; 9; 5 + (1, 0, 0) \rangle$	$\mathbf{a - b, a + b, c}$	
$C4_2/mcd$ (135, $P4_2/mbc$ )	$\langle 2; 5; 9; 3 + (1, 0, 0) \rangle$	$\mathbf{a - b, a + b, c}$	1/2, 1/2, 0
$C4_2/ecd$ (133, $P4_2/nbc$ )	$\langle 2; 3; 5; 9 + (1, 0, 0) \rangle$	$\mathbf{a - b, a + b, c}$	1/2, 0, 0
$C4_2/ecd$ (133, $P4_2/nbc$ )	$\langle 2; (3; 5; 9) + (1, 0, 0) \rangle$	$\mathbf{a - b, a + b, c}$	0, 1/2, 0
$C4_2/mcm$ (131, $P4_2/mmc$ )	$\langle 2; 3; 5; 9 \rangle$	$\mathbf{a - b, a + b, c}$	
$C4_2/mcm$ (131, $P4_2/mmc$ )	$\langle 2; 9; (3; 5) + (1, 0, 0) \rangle$	$\mathbf{a - b, a + b, c}$	1/2, 1/2, 0
[3] $\mathbf{c}' = 3\mathbf{c}$			
$P4_2/mcm$ (132)	$\langle 2; 9; (3; 5) + (0, 0, 1) \rangle$	$\mathbf{a, b, 3c}$	
$P4_2/mcm$ (132)	$\langle 2; 3 + (0, 0, 1); 5 + (0, 0, 3); 9 + (0, 0, 2) \rangle$	$\mathbf{a, b, 3c}$	0, 0, 1
$P4_2/mcm$ (132)	$\langle 2; 3 + (0, 0, 1); 5 + (0, 0, 5); 9 + (0, 0, 4) \rangle$	$\mathbf{a, b, 3c}$	0, 0, 2

## • Series of maximal isomorphic subgroups

[ $p$ ] $\mathbf{c}' = p\mathbf{c}$			
$P4_2/mcm$ (132)	$\langle 2; 3 + (0, 0, \frac{p}{2} - \frac{1}{2}); 5 + (0, 0, \frac{p}{2} - \frac{1}{2} + 2u); 9 + (0, 0, 2u) \rangle$ $p > 2; 0 \leq u < p$ $p$ conjugate subgroups for the prime $p$	$\mathbf{a, b, pc}$	0, 0, $u$
[ $p^2$ ] $\mathbf{a}' = p\mathbf{a}, \mathbf{b}' = p\mathbf{b}$			
$P4_2/mcm$ (132)	$\langle (2; 9) + (2u, 2v, 0); 3 + (u + v, -u + v, 0); 5 + (2u, 0, 0) \rangle$ $p > 2; 0 \leq u < p; 0 \leq v < p$ $p^2$ conjugate subgroups for the prime $p$	$\mathbf{pa, pb, c}$	$u, v, 0$

**I Minimal translationengleiche supergroups**

none

**II Minimal non-isomorphic klassengleiche supergroups**

## • Additional centring translations

 [2]  $C4_2/mcm$  (131,  $P4_2/mmc$ ); [2]  $I4/mcm$  (140)

## • Decreased unit cell

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