

$D_{2d}^5$ 
 $P\bar{4}m2$ 

No. 115

 $P\bar{4}m2$ 
**Generators selected** (1);  $t(1,0,0)$ ;  $t(0,1,0)$ ;  $t(0,0,1)$ ; (2); (3); (5)

**General position**

 Multiplicity,  
 Wyckoff letter,  
 Site symmetry

Coordinates

8	<i>l</i>	1	(1) $x, y, z$	(2) $\bar{x}, \bar{y}, z$	(3) $y, \bar{x}, \bar{z}$	(4) $\bar{y}, x, \bar{z}$
			(5) $x, \bar{y}, z$	(6) $\bar{x}, y, z$	(7) $y, x, \bar{z}$	(8) $\bar{y}, \bar{x}, \bar{z}$

**I Maximal translationengleiche subgroups**

[2] $P\bar{4}11$ (81, $P\bar{4}$ )	1; 2; 3; 4	
[2] $P2m1$ (25, $Pmm2$ )	1; 2; 5; 6	
[2] $P212$ (21, $C222$ )	1; 2; 7; 8	<b>a - b, a + b, c</b>

**II Maximal klassengleiche subgroups**

## • Enlarged unit cell

[2] $\mathbf{c}' = 2\mathbf{c}$		
$P\bar{4}c2$ (116)	$\langle 2; 3; 5 + (0, 0, 1) \rangle$	<b>a, b, 2c</b>
$P\bar{4}c2$ (116)	$\langle 2; (3; 5) + (0, 0, 1) \rangle$	<b>a, b, 2c</b> 0, 0, 1/2
$P\bar{4}m2$ (115)	$\langle 2; 3; 5 \rangle$	<b>a, b, 2c</b>
$P\bar{4}m2$ (115)	$\langle 2; 5; 3 + (0, 0, 1) \rangle$	<b>a, b, 2c</b> 0, 0, 1/2
[2] $\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$		
$C\bar{4}m2_1$ (113, $P\bar{4}2_1m$ )	$\langle 2; 3; 5 + (0, 1, 0) \rangle$	<b>a - b, a + b, c</b>
$C\bar{4}m2_1$ (113, $P\bar{4}2_1m$ )	$\langle 2; 5; 3 + (1, 0, 0) \rangle$	<b>a - b, a + b, c</b> 1/2, 1/2, 0
$C\bar{4}m2$ (111, $P\bar{4}2m$ )	$\langle 2; 3; 5 \rangle$	<b>a - b, a + b, c</b>
$C\bar{4}m2$ (111, $P\bar{4}2m$ )	$\langle 2; (3; 5) + (1, 0, 0) \rangle$	<b>a - b, a + b, c</b> 1/2, 1/2, 0
[2] $\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}, \mathbf{c}' = 2\mathbf{c}$		
$F\bar{4}m2$ (121, $I\bar{4}2m$ )	$\langle 2; 3; 5 \rangle$	<b>a - b, a + b, 2c</b>
$F\bar{4}m2$ (121, $I\bar{4}2m$ )	$\langle 2; 5; 3 + (0, 0, 1) \rangle$	<b>a - b, a + b, 2c</b> 0, 0, 1/2
$F\bar{4}m2$ (121, $I\bar{4}2m$ )	$\langle 2; 3 + (1, 0, 0); 5 + (0, 1, 0) \rangle$	<b>a - b, a + b, 2c</b> 1/2, 1/2, 0
$F\bar{4}m2$ (121, $I\bar{4}2m$ )	$\langle 2; 3 + (1, 0, 1); 5 + (0, 1, 0) \rangle$	<b>a - b, a + b, 2c</b> 1/2, 1/2, 1/2
[3] $\mathbf{c}' = 3\mathbf{c}$		
$P\bar{4}m2$ (115)	$\langle 2; 3; 5 \rangle$	<b>a, b, 3c</b>
$P\bar{4}m2$ (115)	$\langle 2; 5; 3 + (0, 0, 2) \rangle$	<b>a, b, 3c</b> 0, 0, 1
$P\bar{4}m2$ (115)	$\langle 2; 5; 3 + (0, 0, 4) \rangle$	<b>a, b, 3c</b> 0, 0, 2

## • Series of maximal isomorphic subgroups

[ $p$ ] $\mathbf{c}' = p\mathbf{c}$		
$P\bar{4}m2$ (115)	$\langle 2; 5; 3 + (0, 0, 2u) \rangle$ $p > 2; 0 \leq u < p$ $p$ conjugate subgroups for the prime $p$	<b>a, b, pc</b> 0, 0, $u$
[ $p^2$ ] $\mathbf{a}' = p\mathbf{a}, \mathbf{b}' = p\mathbf{b}$		
$P\bar{4}m2$ (115)	$\langle 2 + (2u, 2v, 0); 3 + (u - v, u + v, 0); 5 + (0, 2v, 0) \rangle$ $p > 2; 0 \leq u < p; 0 \leq v < p$ $p^2$ conjugate subgroups for the prime $p$	<b>pa, pb, c</b> $u, v, 0$

**I Minimal translationengleiche supergroups**

 [2]  $P4/mmm$  (123); [2]  $P4/nmm$  (129); [2]  $P4_2/mmc$  (131); [2]  $P4_2/nmc$  (137)

**II Minimal non-isomorphic klassengleiche supergroups**

## • Additional centring translations

 [2]  $C\bar{4}m2$  (111,  $P\bar{4}2m$ ); [2]  $I\bar{4}m2$  (119)

## • Decreased unit cell

none