

$P3c1$ 

No. 158

 $P3c1$ 
 $C_{3v}^3$ 
**Generators selected** (1);  $t(1,0,0)$ ;  $t(0,1,0)$ ;  $t(0,0,1)$ ; (2); (4)

**General position**

 Multiplicity,  
Wyckoff letter,  
Site symmetry

Coordinates

6	$d$	1	(1) $x, y, z$	(2) $\bar{y}, x - y, z$	(3) $\bar{x} + y, \bar{x}, z$
			(4) $\bar{y}, \bar{x}, z + \frac{1}{2}$	(5) $\bar{x} + y, y, z + \frac{1}{2}$	(6) $x, x - y, z + \frac{1}{2}$

**I Maximal translationengleiche subgroups**

[2] $P311$ (143, $P3$ )	1; 2; 3	
[3] $P1c1$ (9, $C1c1$ )	1; 4	$-\mathbf{a} + \mathbf{b}, -\mathbf{a} - \mathbf{b}, \mathbf{c}$
[3] $P1c1$ (9, $C1c1$ )	1; 5	$-\mathbf{a} - 2\mathbf{b}, \mathbf{a}, \mathbf{c}$
[3] $P1c1$ (9, $C1c1$ )	1; 6	$2\mathbf{a} + \mathbf{b}, \mathbf{b}, \mathbf{c}$

**II Maximal klassengleiche subgroups**

## • Enlarged unit cell

[3] $\mathbf{c}' = 3\mathbf{c}$			
$P3c1$ (158)	$\langle 2; 4 + (0, 0, 1) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	
[3] $\mathbf{a}' = 3\mathbf{a}, \mathbf{b}' = 3\mathbf{b}$			
$H3c1$ (159, $P31c$ )	$\langle 2; 4 \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	
$H3c1$ (159, $P31c$ )	$\langle 2 + (1, -1, 0); 4 + (1, 1, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	1, 0, 0
$H3c1$ (159, $P31c$ )	$\langle 2 + (2, 1, 0); 4 + (2, 2, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	1, 1, 0
$H3c1$ (159, $P31c$ )	$\langle 4; 2 + (1, 0, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	$2/3, -2/3, 0$
$H3c1$ (159, $P31c$ )	$\langle 2 + (2, 2, 0); 4 + (1, 1, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	$2/3, 1/3, 0$
$H3c1$ (159, $P31c$ )	$\langle 2 + (3, 4, 0); 4 + (2, 2, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	$2/3, 4/3, 0$
$H3c1$ (159, $P31c$ )	$\langle 4; 2 + (1, 1, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	$1/3, -1/3, 0$
$H3c1$ (159, $P31c$ )	$\langle 2 + (2, 3, 0); 4 + (1, 1, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	$1/3, 2/3, 0$
$H3c1$ (159, $P31c$ )	$\langle 2 + (3, 2, 0); 4 + (2, 2, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	$4/3, 2/3, 0$
[4] $\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$			
$P3c1$ (158)	$\langle 2; 4 \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	
$P3c1$ (158)	$\langle 2 + (1, -1, 0); 4 + (1, 1, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	1, 0, 0
$P3c1$ (158)	$\langle 2 + (1, 2, 0); 4 + (1, 1, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	0, 1, 0
$P3c1$ (158)	$\langle 2 + (2, 1, 0); 4 + (2, 2, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	1, 1, 0

## • Series of maximal isomorphic subgroups

[ $p$ ] $\mathbf{c}' = p\mathbf{c}$			
$P3c1$ (158)	$\langle 2; 4 + (0, 0, \frac{p}{2} - \frac{1}{2}) \rangle$	$\mathbf{a}, \mathbf{b}, p\mathbf{c}$	
	prime $p > 2$		
	no conjugate subgroups		
[ $p^2$ ] $\mathbf{a}' = p\mathbf{a}, \mathbf{b}' = p\mathbf{b}$			
$P3c1$ (158)	$\langle 2 + (u + v, -u + 2v, 0); 4 + (u + v, u + v, 0) \rangle$	$p\mathbf{a}, p\mathbf{b}, \mathbf{c}$	$u, v, 0$
	prime $p \neq 3; 0 \leq u < p; 0 \leq v < p$		
	$p^2$ conjugate subgroups		

**I Minimal translationengleiche supergroups**

 [2]  $P\bar{3}c1$  (165); [2]  $P6cc$  (184); [2]  $P6_3cm$  (185); [2]  $P\bar{6}c2$  (188)

**II Minimal non-isomorphic klassengleiche supergroups**

## • Additional centring translations

 [3]  $H3c1$  (159,  $P31c$ ); [3]  $R_{\text{obv}}3c$  (161,  $R3c$ ); [3]  $R_{\text{rev}}3c$  (161,  $R3c$ )

## • Decreased unit cell

 [2]  $\mathbf{c}' = \frac{1}{2}\mathbf{c}$   $P3m1$  (156)