

$P4_2$

No. 77

 $P4_2$
 C_4^3
Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2); (3)

General position

 Multiplicity,
 Wyckoff letter,
 Site symmetry

Coordinates

 4 d 1 (1) x, y, z (2) \bar{x}, \bar{y}, z (3) $\bar{y}, x, z + \frac{1}{2}$ (4) $y, \bar{x}, z + \frac{1}{2}$
I Maximal translationengleiche subgroups

 [2] $P2$ (3, $P112$) 1; 2

II Maximal klassengleiche subgroups

• Enlarged unit cell

[2] $c' = 2c$			
$P4_3$ (78)	$\langle (2; 3) + (0, 0, 1) \rangle$	a, b, 2c	
$P4_1$ (76)	$\langle 3; 2 + (0, 0, 1) \rangle$	a, b, 2c	
[2] $a' = 2a, b' = 2b$			
$C4_2$ (77, $P4_2$)	$\langle 2; 3 \rangle$	a - b, a + b, c	
$C4_2$ (77, $P4_2$)	$\langle 2 + (1, 1, 0); 3 + (1, 0, 0) \rangle$	a - b, a + b, c	1/2, 1/2, 0
[2] $a' = 2a, b' = 2b, c' = 2c$			
$F4_1$ (80, $I4_1$)	$\langle 3; 2 + (0, 0, 1) \rangle$	a - b, a + b, 2c	0, 1/2, 0
$F4_1$ (80, $I4_1$)	$\langle (2; 3) + (0, 0, 1) \rangle$	a - b, a + b, 2c	1/2, 0, 0
[3] $c' = 3c$			
$P4_2$ (77)	$\langle 2; 3 + (0, 0, 1) \rangle$	a, b, 3c	

• Series of maximal isomorphic subgroups

[p] $c' = pc$			
$P4_2$ (77)	$\langle 2; 3 + (0, 0, \frac{p}{2} - \frac{1}{2}) \rangle$	a, b, pc	
	$p > 2$		
	no conjugate subgroups		
[p^2] $a' = pa, b' = pb$			
$P4_2$ (77)	$\langle 2 + (2u, 2v, 0); 3 + (u + v, -u + v, 0) \rangle$	pa, pb, c	$u, v, 0$
	$p > 2; 0 \leq u < p; 0 \leq v < p$		
	p^2 conjugate subgroups for prime $p \equiv 3 \pmod{4}$		
[$p = q^2 + r^2$] $a' = qa - rb, b' = ra + qb$			
$P4_2$ (77)	$\langle 2 + (2u, 0, 0); 3 + (u, -u, 0) \rangle$	qa - rb, ra + qb, c	$u, 0, 0$
	$q > 0; r > 0; p > 4; 0 \leq u < p$		
	p conjugate subgroups for prime $p \equiv 1 \pmod{4}$		

I Minimal translationengleiche supergroups

 [2] $P4_2/m$ (84); [2] $P4_2/n$ (86); [2] $P4_222$ (93); [2] $P4_22_12$ (94); [2] $P4_2cm$ (101); [2] $P4_2nm$ (102); [2] $P4_2mc$ (105); [2] $P4_2bc$ (106)

II Minimal non-isomorphic klassengleiche supergroups

• Additional centring translations

 [2] $I4$ (79)

• Decreased unit cell

 [2] $c' = \frac{1}{2}c$ $P4$ (75)