

D_4^7 $P4_322$

No. 95

 $P4_322$ 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	d	1	(1) x, y, z	(2) $\bar{x}, \bar{y}, z + \frac{1}{2}$	(3) $\bar{y}, x, z + \frac{3}{4}$	(4) $y, \bar{x}, z + \frac{1}{4}$
			(5) \bar{x}, y, \bar{z}	(6) $x, \bar{y}, \bar{z} + \frac{1}{2}$	(7) $y, x, \bar{z} + \frac{1}{4}$	(8) $\bar{y}, \bar{x}, \bar{z} + \frac{3}{4}$

I Maximal *translationengleiche* subgroups

[2] $P4_311$ (78, $P4_3$)	1; 2; 3; 4		
[2] $P2_112$ (20, $C222_1$)	1; 2; 7; 8	$\mathbf{a} - \mathbf{b}, \mathbf{a} + \mathbf{b}, \mathbf{c}$	0, 0, 3/8
[2] $P2_121$ (17, $P222_1$)	1; 2; 5; 6		0, 0, 1/4

II Maximal *klassengleiche* subgroups

• Enlarged unit cell

[2] $\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$			
$C4_322_1$ (96, $P4_32_12$)	$\langle 2; 5; 3 + (1, 0, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + \mathbf{b}, \mathbf{c}$	0, 0, 1/4
$C4_322_1$ (96, $P4_32_12$)	$\langle 2; 3; 5 + (1, 0, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + \mathbf{b}, \mathbf{c}$	1/2, 1/2, 1/4
$C4_322$ (95, $P4_322$)	$\langle 2; 3; 5 + (0, 0, 1) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + \mathbf{b}, \mathbf{c}$	0, 0, 1/8
$C4_322$ (95, $P4_322$)	$\langle 2 + (1, 1, 0); 3 + (1, 0, 0); 5 + (1, 0, 1) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + \mathbf{b}, \mathbf{c}$	1/2, 1/2, 1/8
[3] $\mathbf{c}' = 3\mathbf{c}$			
$P4_122$ (91)	$\langle 3; 5; 2 + (0, 0, 1) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	
$P4_122$ (91)	$\langle 3; 2 + (0, 0, 1); 5 + (0, 0, 2) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	0, 0, 1
$P4_122$ (91)	$\langle 3; 2 + (0, 0, 1); 5 + (0, 0, 4) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	0, 0, 2

• Series of maximal isomorphic subgroups

[p] $\mathbf{c}' = p\mathbf{c}$			
$P4_322$ (95)	$\langle 2 + (0, 0, \frac{p}{2} - \frac{1}{2}); 3 + (0, 0, \frac{3p}{4} - \frac{3}{4}); 5 + (0, 0, 2u) \rangle$ prime $p > 4$; $0 \leq u < p$	$\mathbf{a}, \mathbf{b}, p\mathbf{c}$	0, 0, u
$P4_122$ (91)	$\langle 2 + (0, 0, \frac{p}{2} - \frac{1}{2}); 3 + (0, 0, \frac{p}{4} - \frac{3}{4}); 5 + (0, 0, 2u) \rangle$ prime $p > 2$; $0 \leq u < p$ p conjugate subgroups for $p = 4n + 1$	$\mathbf{a}, \mathbf{b}, p\mathbf{c}$	0, 0, u
[p^2] $\mathbf{a}' = p\mathbf{a}, \mathbf{b}' = p\mathbf{b}$			
$P4_322$ (95)	$\langle 2 + (2u, 2v, 0); 3 + (u + v, -u + v, 0); 5 + (2u, 0, 0) \rangle$ prime $p > 2$; $0 \leq u < p$; $0 \leq v < p$ p^2 conjugate subgroups	$p\mathbf{a}, p\mathbf{b}, \mathbf{c}$	$u, v, 0$

I Minimal *translationengleiche* supergroups

none

II Minimal non-isomorphic *klassengleiche* supergroups

• Additional centring translations

[2] $I4_122$ (98)

• Decreased unit cell

[2] $\mathbf{c}' = \frac{1}{2}\mathbf{c}$ $P4_222$ (93)