

$P3$

No. 143

 $P3$
 C_3^1
Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2)

General position

 Multiplicity,
 Wyckoff letter,
 Site symmetry

Coordinates

 3 d 1

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

 [3] $P1$ (1) 1

II Maximal klassengleiche subgroups

• Enlarged unit cell

[2] $c' = 2c$			
$P3$ (143)	$\langle 2 \rangle$	$\mathbf{a}, \mathbf{b}, 2\mathbf{c}$	
[3] $c' = 3c$			
$P3_2$ (145)	$\langle 2 + (0, 0, 2) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	
$P3_1$ (144)	$\langle 2 + (0, 0, 1) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	
$P3$ (143)	$\langle 2 \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	
[3] $\mathbf{a}' = 3\mathbf{a}, \mathbf{b}' = 3\mathbf{b}$			
$H3$ (143, $P3$)	$\langle 2 \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	
$H3$ (143, $P3$)	$\langle 2 + (1, 0, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	$2/3, 1/3, 0$
$H3$ (143, $P3$)	$\langle 2 + (1, 1, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$	$1/3, 2/3, 0$
[3] $\mathbf{a}' = \mathbf{a} - \mathbf{b}, \mathbf{b}' = \mathbf{a} + 2\mathbf{b}, \mathbf{c}' = 3\mathbf{c}$			
$R3$ (146)	$\langle 2 \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, 3\mathbf{c}$	
$R3$ (146)	$\langle 2 + (1, 0, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, 3\mathbf{c}$	$2/3, 1/3, 0$
$R3$ (146)	$\langle 2 + (1, 1, 0) \rangle$	$\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, 3\mathbf{c}$	$1/3, 2/3, 0$
[3] $\mathbf{a}' = 2\mathbf{a} + \mathbf{b}, \mathbf{b}' = -\mathbf{a} + \mathbf{b}, \mathbf{c}' = 3\mathbf{c}$			
$R3$ (146)	$\langle 2 \rangle$	$2\mathbf{a} + \mathbf{b}, -\mathbf{a} + \mathbf{b}, 3\mathbf{c}$	
$R3$ (146)	$\langle 2 + (1, 0, 0) \rangle$	$2\mathbf{a} + \mathbf{b}, -\mathbf{a} + \mathbf{b}, 3\mathbf{c}$	$2/3, 1/3, 0$
$R3$ (146)	$\langle 2 + (1, 1, 0) \rangle$	$2\mathbf{a} + \mathbf{b}, -\mathbf{a} + \mathbf{b}, 3\mathbf{c}$	$1/3, 2/3, 0$
[4] $\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$			
$P3$ (143)	$\langle 2 \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	
$P3$ (143)	$\langle 2 + (1, -1, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	$1, 0, 0$
$P3$ (143)	$\langle 2 + (1, 2, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	$0, 1, 0$
$P3$ (143)	$\langle 2 + (2, 1, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	$1, 1, 0$

• Series of maximal isomorphic subgroups

[p] $c' = pc$			
$P3$ (143)	$\langle 2 \rangle$	$\mathbf{a}, \mathbf{b}, pc$	
	$p > 1$		
	no conjugate subgroups		
[p^2] $\mathbf{a}' = p\mathbf{a}, \mathbf{b}' = p\mathbf{b}$			
$P3$ (143)	$\langle 2 + (u + v, -u + 2v, 0) \rangle$	$p\mathbf{a}, p\mathbf{b}, \mathbf{c}$	$u, v, 0$
	$p > 1; 0 \leq u < p; 0 \leq v < p$		
	p^2 conjugate subgroups for prime $p \equiv 2 \pmod{3}$		
[$p = q^2 + r^2 + qr$] $\mathbf{a}' = q\mathbf{a} - r\mathbf{b}, \mathbf{b}' = r\mathbf{a} + (q + r)\mathbf{b}$			
$P3$ (143)	$\langle 2 + (u, -u, 0) \rangle$	$q\mathbf{a} - r\mathbf{b}, r\mathbf{a} + (q + r)\mathbf{b}, \mathbf{c}$	$u, 0, 0$
	$q > 0; r > 0; p > 6; p \equiv 1 \pmod{3}; 0 \leq u < p$		
	p conjugate subgroups for each pair of q and r		

I Minimal translationengleiche supergroups

 [2] $P\bar{3}$ (147); [2] $P312$ (149); [2] $P321$ (150); [2] $P3m1$ (156); [2] $P31m$ (157); [2] $P3c1$ (158); [2] $P31c$ (159); [2] $P6$ (168);
 [2] $P6_3$ (173); [2] $P\bar{6}$ (174)

II Minimal non-isomorphic klassengleiche supergroups

• Additional centring translations

 [3] $R_{\text{obv}}3$ (146, $R3$); [3] $R_{\text{rev}}3$ (146, $R3$)

• Decreased unit cell

none