

C_3^2
 $P3_1$

No. 144

 $P3_1$
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 a 1

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

 [3] $P1$ (1) 1

II Maximal klassengleiche subgroups

• Enlarged unit cell

 [2] $\mathbf{c}' = 2\mathbf{c}$
 $P3_2$ (145) $\langle 2 + (0, 0, 1) \rangle$
 $\mathbf{a}, \mathbf{b}, 2\mathbf{c}$

 [3] $\mathbf{a}' = 3\mathbf{a}, \mathbf{b}' = 3\mathbf{b}$
 $H3_1$ (144, $P3_1$) $\langle 2 \rangle$
 $\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$
 $H3_1$ (144, $P3_1$) $\langle 2 + (1, 0, 0) \rangle$
 $\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$
 $2/3, 1/3, 0$
 $H3_1$ (144, $P3_1$) $\langle 2 + (1, 1, 0) \rangle$
 $\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$
 $1/3, 2/3, 0$

 [4] $\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$
 $P3_1$ (144) $\langle 2 \rangle$
 $2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$
 $P3_1$ (144) $\langle 2 + (1, -1, 0) \rangle$
 $2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$
 $1, 0, 0$
 $P3_1$ (144) $\langle 2 + (1, 2, 0) \rangle$
 $2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$
 $0, 1, 0$
 $P3_1$ (144) $\langle 2 + (2, 1, 0) \rangle$
 $2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$
 $1, 1, 0$

• Series of maximal isomorphic subgroups

 [p] $\mathbf{c}' = p\mathbf{c}$
 $P3_2$ (145) $\langle 2 + (0, 0, \frac{2p}{3} - \frac{1}{3}) \rangle$
 p prime; $p = 2$ or $p = 6n - 1$
 no conjugate subgroups

 $\mathbf{a}, \mathbf{b}, p\mathbf{c}$
 $P3_1$ (144) $\langle 2 + (0, 0, \frac{p}{3} - \frac{1}{3}) \rangle$
 p prime $p = 6n + 1$
 no conjugate subgroups

 $\mathbf{a}, \mathbf{b}, p\mathbf{c}$

 [p^2] $\mathbf{a}' = p\mathbf{a}, \mathbf{b}' = p\mathbf{b}$
 $P3_1$ (144) $\langle 2 + (u + v, -u + 2v, 0) \rangle$
 p prime; $p = 2$ or $p = 6n - 1$; $0 \leq u < p$; $0 \leq v < p$
 p^2 conjugate subgroups

 $p\mathbf{a}, p\mathbf{b}, \mathbf{c}$
 $u, v, 0$

 [$p = q^2 + r^2 + qr$] $\mathbf{a}' = q\mathbf{a} - r\mathbf{b}, \mathbf{b}' = r\mathbf{a} + (q + r)\mathbf{b}$
 $P3_1$ (144) $\langle 2 + (u, -u, 0) \rangle$
 p prime $p > 6$; $q > 0$; $r > 0$; $0 \leq u < p$
 p conjugate subgroups for each pair of q and r
 $q\mathbf{a} - r\mathbf{b}, r\mathbf{a} + (q + r)\mathbf{b}, \mathbf{c}$
 $u, 0, 0$
I Minimal translationengleiche supergroups

 [2] $P3_112$ (151); [2] $P3_121$ (152); [2] $P6_1$ (169); [2] $P6_4$ (172)

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

 [3] $\mathbf{c}' = \frac{1}{3}\mathbf{c}$ $P3$ (143)