

$P\bar{3}1m$

No. 162

 $P\bar{3}12/m$
 D_{3d}^1
Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2); (4); (7)

General position

 Multiplicity,
Wyckoff letter,
Site symmetry

Coordinates

| | | | | | |
|----|-----|---|---------------------------------|-------------------------------|--------------------------------|
| 12 | I | 1 | (1) x, y, z | (2) $\bar{y}, x - y, z$ | (3) $\bar{x} + y, \bar{x}, z$ |
| | | | (4) $\bar{y}, \bar{x}, \bar{z}$ | (5) $\bar{x} + y, y, \bar{z}$ | (6) $x, x - y, \bar{z}$ |
| | | | (7) $\bar{x}, \bar{y}, \bar{z}$ | (8) $y, \bar{x} + y, \bar{z}$ | (9) $x - y, x, \bar{z}$ |
| | | | (10) y, x, z | (11) $x - y, \bar{y}, z$ | (12) $\bar{x}, \bar{x} + y, z$ |

I Maximal translationengleiche subgroups

| | | |
|-------------------------------------|---------------------|---|
| [2] $P31m$ (157) | 1; 2; 3; 10; 11; 12 | |
| [2] $P312$ (149) | 1; 2; 3; 4; 5; 6 | |
| [2] $P\bar{3}11$ (147, $P\bar{3}$) | 1; 2; 3; 7; 8; 9 | |
| { [3] $P112/m$ (12, $C12/m1$) | 1; 4; 7; 10 | $-\mathbf{a} - \mathbf{b}, \mathbf{a} - \mathbf{b}, \mathbf{c}$ |
| { [3] $P112/m$ (12, $C12/m1$) | 1; 5; 7; 11 | $\mathbf{a}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$ |
| { [3] $P112/m$ (12, $C12/m1$) | 1; 6; 7; 12 | $\mathbf{b}, -2\mathbf{a} - \mathbf{b}, \mathbf{c}$ |

II Maximal klassengleiche subgroups

• Enlarged unit cell

| | | | |
|---|--|---|-------------|
| [2] $\mathbf{c}' = 2\mathbf{c}$ | | | |
| $P\bar{3}1c$ (163) | $\langle 2; 7; 4 + (0, 0, 1) \rangle$ | $\mathbf{a}, \mathbf{b}, 2\mathbf{c}$ | |
| $P\bar{3}1c$ (163) | $\langle 2; 4; 7 + (0, 0, 1) \rangle$ | $\mathbf{a}, \mathbf{b}, 2\mathbf{c}$ | $0, 0, 1/2$ |
| $P\bar{3}1m$ (162) | $\langle 2; 4; 7 \rangle$ | $\mathbf{a}, \mathbf{b}, 2\mathbf{c}$ | |
| $P\bar{3}1m$ (162) | $\langle 2; (4; 7) + (0, 0, 1) \rangle$ | $\mathbf{a}, \mathbf{b}, 2\mathbf{c}$ | $0, 0, 1/2$ |
| [3] $\mathbf{c}' = 3\mathbf{c}$ | | | |
| $P\bar{3}1m$ (162) | $\langle 2; 4; 7 \rangle$ | $\mathbf{a}, \mathbf{b}, 3\mathbf{c}$ | |
| $P\bar{3}1m$ (162) | $\langle 2; (4; 7) + (0, 0, 2) \rangle$ | $\mathbf{a}, \mathbf{b}, 3\mathbf{c}$ | $0, 0, 1$ |
| $P\bar{3}1m$ (162) | $\langle 2; (4; 7) + (0, 0, 4) \rangle$ | $\mathbf{a}, \mathbf{b}, 3\mathbf{c}$ | $0, 0, 2$ |
| [3] $\mathbf{a}' = 3\mathbf{a}, \mathbf{b}' = 3\mathbf{b}$ | | | |
| $H\bar{3}1m$ (164, $P\bar{3}m1$) | $\langle 2; 4; 7 \rangle$ | $\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$ | |
| $H\bar{3}1m$ (164, $P\bar{3}m1$) | $\langle 2 + (1, -1, 0); 4 + (1, 1, 0); 7 + (2, 0, 0) \rangle$ | $\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$ | $1, 0, 0$ |
| $H\bar{3}1m$ (164, $P\bar{3}m1$) | $\langle 2 + (2, 1, 0); (4; 7) + (2, 2, 0) \rangle$ | $\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, \mathbf{c}$ | $1, 1, 0$ |
| [3] $\mathbf{a}' = \mathbf{a} - \mathbf{b}, \mathbf{b}' = \mathbf{a} + 2\mathbf{b}, \mathbf{c}' = 3\mathbf{c}$ | | | |
| $R\bar{3}m$ (166) | $\langle 2; 4; 7 \rangle$ | $\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, 3\mathbf{c}$ | |
| $R\bar{3}m$ (166) | $\langle 2; (4; 7) + (0, 0, 2) \rangle$ | $\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, 3\mathbf{c}$ | $0, 0, 1$ |
| $R\bar{3}m$ (166) | $\langle 2; (4; 7) + (0, 0, 4) \rangle$ | $\mathbf{a} - \mathbf{b}, \mathbf{a} + 2\mathbf{b}, 3\mathbf{c}$ | $0, 0, 2$ |
| [3] $\mathbf{a}' = 2\mathbf{a} + \mathbf{b}, \mathbf{b}' = -\mathbf{a} + \mathbf{b}, \mathbf{c}' = 3\mathbf{c}$ | | | |
| $R\bar{3}m$ (166) | $\langle 2; 4; 7 \rangle$ | $2\mathbf{a} + \mathbf{b}, -\mathbf{a} + \mathbf{b}, 3\mathbf{c}$ | |
| $R\bar{3}m$ (166) | $\langle 2; (4; 7) + (0, 0, 2) \rangle$ | $2\mathbf{a} + \mathbf{b}, -\mathbf{a} + \mathbf{b}, 3\mathbf{c}$ | $0, 0, 1$ |
| $R\bar{3}m$ (166) | $\langle 2; (4; 7) + (0, 0, 4) \rangle$ | $2\mathbf{a} + \mathbf{b}, -\mathbf{a} + \mathbf{b}, 3\mathbf{c}$ | $0, 0, 2$ |
| [4] $\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$ | | | |
| $P\bar{3}1m$ (162) | $\langle 2; 4; 7 \rangle$ | $2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$ | |
| $P\bar{3}1m$ (162) | $\langle 2 + (1, -1, 0); 4 + (1, 1, 0); 7 + (2, 0, 0) \rangle$ | $2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$ | $1, 0, 0$ |
| $P\bar{3}1m$ (162) | $\langle 2 + (1, 2, 0); 4 + (1, 1, 0); 7 + (0, 2, 0) \rangle$ | $2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$ | $0, 1, 0$ |
| $P\bar{3}1m$ (162) | $\langle 2 + (2, 1, 0); (4; 7) + (2, 2, 0) \rangle$ | $2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$ | $1, 1, 0$ |

• Series of maximal isomorphic subgroups

| | | | |
|--|---|--|-----------|
| [p] $\mathbf{c}' = p\mathbf{c}$ | | | |
| $P\bar{3}1m$ (162) | $\langle 2; (4; 7) + (0, 0, 2u) \rangle$ | $\mathbf{a}, \mathbf{b}, p\mathbf{c}$ | $0, 0, u$ |
| | $p > 2; 0 \leq u < p$ | | |
| | p conjugate subgroups for the prime p | | |
| [p^2] $\mathbf{a}' = p\mathbf{a}, \mathbf{b}' = p\mathbf{b}$ | | | |
| $P\bar{3}1m$ (162) | $\langle 2 + (u + v, -u + 2v, 0); 4 + (u + v, u + v, 0); 7 + (2u, 2v, 0) \rangle$ | $p\mathbf{a}, p\mathbf{b}, \mathbf{c}$ | $u, v, 0$ |
| | $p > 1; p \neq 3; 0 \leq u < p; 0 \leq v < p$ | | |
| | p^2 conjugate subgroups for the prime p | | |

I Minimal *translationengleiche* supergroups[2] $P6/mmm$ (191); [2] $P6_3/mcm$ (193)**II Minimal non-isomorphic *klassengleiche* supergroups**• **Additional centring translations**[3] $H\bar{3}1m$ (164, $P\bar{3}m1$)• **Decreased unit cell**

none