# $C_{3i}^{1}$ No. 147 $P\bar{3}$

| | Axes | Coordinates | Wyckoff positions $1a$ | $1b$ | $2c$ | $2d$ | $3e$ | $3f$ | $6g$ |
|---|---|---|---|---|---|---|---|---|---|
| **I Maximal *translationengleiche* subgroups** | | | | | | | | | |
| [2] $P3$ (143) | | | $1a$ | $1a$ | $2\times1a$ | $1b;1c$ | $3d$ | $3d$ | $2\times3d$ |
| [3] $P\bar{1}$ (2) | | | $1a$ | $1b$ | $2i$ | $2i$ | $1c;1d;1e$ | $1f;1g;1h$ | $3\times2i$ |
| **II Maximal *klassengleiche* subgroups** | | | | | | | | | |
| **Enlarged unit cell, non-isomorphic** | | | | | | | | | |
| [3] $R\bar{3}$ (148) | $\mathbf{a}-\mathbf{b}, \mathbf{a}+2\mathbf{b}, 3\mathbf{c}$ (hexagonal axes) | $\frac{1}{3}(2x-y), \frac{1}{3}(x+y), \frac{1}{3}z;$ $\pm(0,0,\frac{1}{3})$ | $3a;6c$ | $3b;6c$ | $3\times6c$ | $18f$ | $9e;18f$ | $9d;18f$ | $3\times18f$ |
| [3] $R\bar{3}$ (148) | $2\mathbf{a}+\mathbf{b}, -\mathbf{a}+\mathbf{b}, 3\mathbf{c}$ (hexagonal axes) | $\frac{1}{3}(x+y), \frac{1}{3}(-x+2y), \frac{1}{3}z;$ $\pm(0,0,\frac{1}{3})$ | $3a;6c$ | $3b;6c$ | $3\times6c$ | $18f$ | $9e;18f$ | $9d;18f$ | $3\times18f$ |
| **Enlarged unit cell, isomorphic** | | | | | | | | | |
| [2] $P\bar{3}$ | $\mathbf{a}, \mathbf{b}, 2\mathbf{c}$ | $x, y, \frac{1}{2}z; +(0,0,\frac{1}{2})$ | $1a;1b$ | $2c$ | $2\times2c$ | $2\times2d$ | $3e;3f$ | $6g$ | $2\times6g$ |
| [2] $P\bar{3}$ | $\mathbf{a}, \mathbf{b}, 2\mathbf{c}$ | $x, y, \frac{1}{2}z+\frac{1}{4}; +(0,0,\frac{1}{2})$ | $2c$ | $1a;1b$ | $2\times2c$ | $2\times2d$ | $6g$ | $3e;3f$ | $2\times6g$ |
| [3] $P\bar{3}$ | $\mathbf{a}, \mathbf{b}, 3\mathbf{c}$ | $x, y, \frac{1}{3}z; \pm(0,0,\frac{1}{3})$ | $1a;2c$ | $1b;2c$ | $3\times2c$ | $3\times2d$ | $3e;6g$ | $3f;6g$ | $3\times6g$ |
| [$p$] $P\bar{3}$ | $\mathbf{a}, \mathbf{b}, p\mathbf{c}$ $p=$ prime $>2$; $u=1,\ldots,p-1$ | $x, y, \frac{1}{p}z; +(0,0,\frac{u}{p})$ | $1a;$ $\frac{p-1}{2}\times2c$ | $1b;$ $\frac{p-1}{2}\times2c$ | $p\times2c$ | $p\times2d$ | $3e;$ $\frac{p-1}{2}\times6g$ | $3f;$ $\frac{p-1}{2}\times6g$ | $p\times6g$ |
| [3] $P\bar{3}$ | $2\mathbf{a}+\mathbf{b}, -\mathbf{a}+\mathbf{b}, \mathbf{c}$ | $\frac{1}{3}(x+y), \frac{1}{3}(-x+2y), z;$ $\pm(\frac{1}{3},\frac{2}{3},0)$ | $1a;2d$ | $1b;2d$ | $2c;2\times2d$ | $6g$ | $3e;6g$ | $3f;6g$ | $3\times6g$ |
| [7] $P\bar{3}$ | $3\mathbf{a}+\mathbf{b}, -\mathbf{a}+2\mathbf{b}, \mathbf{c}$ | $\frac{1}{7}(2x+y), \frac{1}{7}(-x+3y), z;$ $\pm(\frac{1}{7},\frac{3}{7},0); \pm(\frac{3}{7},\frac{2}{7},0);$ $\pm(\frac{5}{7},\frac{1}{7},0)$ | $1a;6g$ | $1b;6g$ | $2c;2\times6g$ | $2d;2\times6g$ | $3e;3\times6g$ | $3f;3\times6g$ | $7\times6g$ |
| [7] $P\bar{3}$ | $3\mathbf{a}+2\mathbf{b}, -2\mathbf{a}+\mathbf{b}, \mathbf{c}$ | $\frac{1}{7}(x+2y), \frac{1}{7}(-2x+3y), z;$ $\pm(\frac{2}{7},\frac{3}{7},0); \pm(\frac{3}{7},\frac{1}{7},0);$ $\pm(\frac{1}{7},\frac{5}{7},0)$ | $1a;6g$ | $1b;6g$ | $2c;2\times6g$ | $2d;2\times6g$ | $3e;3\times6g$ | $3f;3\times6g$ | $7\times6g$ |
| [$p$] $P\bar{3}$ | $q\mathbf{a}+r\mathbf{b},$ $-r\mathbf{a}+(q-r)\mathbf{b}, \mathbf{c}$ $p=$ prime $=q^2-qr+r^2=6n+1$; $q,r=1,2,\ldots;\ q>r;\ u=1,\ldots,p-1$ | $\frac{1}{p}((q-r)x+ry),$ $\frac{1}{p}(-rx+qy), z; +(\frac{ur}{p},\frac{uq}{p},0)$ | $1a;$ $\frac{p-1}{6}\times6g$ | $1b;$ $\frac{p-1}{6}\times6g$ | $2c;$ $\frac{p-1}{3}\times6g$ | $2d;$ $\frac{p-1}{3}\times6g$ | $3e;$ $\frac{p-1}{2}\times6g$ | $3f;$ $\frac{p-1}{2}\times6g$ | $p\times6g$ |
| [4] $P\bar{3}$ | $2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$ | $\frac{1}{2}x, \frac{1}{2}y, z; +(\frac{1}{2},0,0);$ $+(0,\frac{1}{2},0); +(\frac{1}{2},\frac{1}{2},0)$ | $1a;3e$ | $1b;3f$ | $2c;6g$ | $2d;6g$ | $2\times6g$ | $2\times6g$ | $4\times6g$ |
| [$p^2$] $P\bar{3}$ | $p\mathbf{a}, p\mathbf{b}, \mathbf{c}$ $p=$ prime $=6n-1$; $u,v=1,\ldots,p-1$ | $\frac{1}{p}x, \frac{1}{p}y, z; +(\frac{u}{p},\frac{v}{p},0)$ | $1a;$ $\frac{p^2-1}{6}\times6g$ | $1b;$ $\frac{p^2-1}{6}\times6g$ | $2c;$ $\frac{p^2-1}{3}\times6g$ | $2d;$ $\frac{p^2-1}{3}\times6g$ | $3e;$ $\frac{p^2-1}{2}\times6g$ | $3f;$ $\frac{p^2-1}{2}\times6g$ | $p^2\times6g$ |

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