C_6^5 $P6_4$ No. 172 $P6_4$

Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2); (4)

General position

Multiplicity, Wyckoff letter, Site symmetry		Coordinates		
6	c	1	(1) x,y,z	(2) $\bar{y},x-y,z+\frac{1}{3}$	(3) $\bar{x}+y,\bar{x},z+\frac{2}{3}$
			(4) $\bar{x},\bar{y},z$	(5) $y,\bar{x}+y,z+\frac{1}{3}$	(6) $x-y,x,z+\frac{2}{3}$

I Maximal *translationengleiche* subgroups

[2] $P3_1$ (144) 1; 2; 3
[3] $P2$ (3, $P112$) 1; 4

II Maximal *klassengleiche* subgroups

- **Enlarged unit cell**

[2] $\mathbf{c}' = 2\mathbf{c}$

$P6_2$ (171)	$\langle 4;\ 2+(0,0,1)\rangle$	$\mathbf{a},\mathbf{b},2\mathbf{c}$	
$P6_5$ (170)	$\langle (2;\ 4)+(0,0,1)\rangle$	$\mathbf{a},\mathbf{b},2\mathbf{c}$	

[3] $\mathbf{a}' = 3\mathbf{a},\ \mathbf{b}' = 3\mathbf{b}$

$H6_4$ (172, $P6_4$)	$\langle 2;\ 4\rangle$	$\mathbf{a}-\mathbf{b},\mathbf{a}+2\mathbf{b},\mathbf{c}$	
$H6_4$ (172, $P6_4$)	$\langle 2+(1,-1,0);\ 4+(2,0,0)\rangle$	$\mathbf{a}-\mathbf{b},\mathbf{a}+2\mathbf{b},\mathbf{c}$	$1,0,0$
$H6_4$ (172, $P6_4$)	$\langle 2+(2,-2,0);\ 4+(4,0,0)\rangle$	$\mathbf{a}-\mathbf{b},\mathbf{a}+2\mathbf{b},\mathbf{c}$	$2,0,0$

[4] $\mathbf{a}' = 2\mathbf{a},\ \mathbf{b}' = 2\mathbf{b}$

$P6_4$ (172)	$\langle 2;\ 4\rangle$	$2\mathbf{a},2\mathbf{b},\mathbf{c}$	
$P6_4$ (172)	$\langle 2+(1,-1,0);\ 4+(2,0,0)\rangle$	$2\mathbf{a},2\mathbf{b},\mathbf{c}$	$1,0,0$
$P6_4$ (172)	$\langle 2+(1,2,0);\ 4+(0,2,0)\rangle$	$2\mathbf{a},2\mathbf{b},\mathbf{c}$	$0,1,0$
$P6_4$ (172)	$\langle 2+(2,1,0);\ 4+(2,2,0)\rangle$	$2\mathbf{a},2\mathbf{b},\mathbf{c}$	$1,1,0$

- **Series of maximal isomorphic subgroups**

[p] $\mathbf{c}' = p\mathbf{c}$

$P6_4$ (172)	$\langle 4;\ 2+(0,0,\frac{p}{3}-\frac{1}{3})\rangle$ $p>6;\ p\equiv 1\ (\mathrm{mod}\ 3)$ no conjugate subgroups	$\mathbf{a},\mathbf{b},p\mathbf{c}$	
$P6_2$ (171)	$\langle 4;\ 2+(0,0,\frac{2p}{3}-\frac{1}{3})\rangle$ $p>1;\ p\equiv 2\ (\mathrm{mod}\ 3)$ no conjugate subgroups	$\mathbf{a},\mathbf{b},p\mathbf{c}$	

[p^2] $\mathbf{a}' = p\mathbf{a},\ \mathbf{b}' = p\mathbf{b}$

$P6_4$ (172)	$\langle 2+(u+v,-u+2v,0);\ 4+(2u,2v,0)\rangle$ $p>1;\ 0\le u<p;\ 0\le v<p$ p^2 conjugate subgroups for prime $p\equiv 2\ (\mathrm{mod}\ 3)$	$p\mathbf{a},p\mathbf{b},\mathbf{c}$	$u,v,0$

[$p=q^2+r^2+qr$] $\mathbf{a}' = q\mathbf{a}-r\mathbf{b},\ \mathbf{b}' = r\mathbf{a}+(q+r)\mathbf{b}$

$P6_4$ (172)	$\langle 2+(u,-u,0);\ 4+(2u,0,0)\rangle$ $q>0;\ r>0;\ p>2;\ 0\le u<p$ 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] $P6_422$ (181)

II Minimal non-isomorphic *klassengleiche* supergroups

- **Additional centring translations** none

- **Decreased unit cell**

[3] $\mathbf{c}' = \frac{1}{3}\mathbf{c}$ $P6$ (168)