$P4/m$ No. 83 $P4/m$ C_{4h}^1

Generators selected   (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2); (3); (5)

General position

Multiplicity,
Wyckoff letter,
Site symmetry

<div align="center">Coordinates</div>

8	l	1	(1) x,y,z (2) $\bar{x},\bar{y},z$ (3) $\bar{y},x,z$ (4) $y,\bar{x},z$
			(5) $\bar{x},\bar{y},\bar{z}$ (6) $x,y,\bar{z}$ (7) $y,\bar{x},\bar{z}$ (8) $\bar{y},x,\bar{z}$

I Maximal *translationengleiche* subgroups

[2] $P\bar{4}$ (81)	1; 2; 7; 8
[2] $P4$ (75)	1; 2; 3; 4
[2] $P2/m$ (10, $P112/m$)	1; 2; 5; 6

II Maximal *klassengleiche* subgroups

• Enlarged unit cell

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

$P4_2/m$ (84)	$\langle 2;\ 5;\ 3+(0,0,1)\rangle$	$\mathbf{a},\mathbf{b},2\mathbf{c}$	
$P4_2/m$ (84)	$\langle 2;\ (3;\ 5)+(0,0,1)\rangle$	$\mathbf{a},\mathbf{b},2\mathbf{c}$	$0,0,1/2$
$P4/m$ (83)	$\langle 2;\ 3;\ 5\rangle$	$\mathbf{a},\mathbf{b},2\mathbf{c}$	
$P4/m$ (83)	$\langle 2;\ 3;\ 5+(0,0,1)\rangle$	$\mathbf{a},\mathbf{b},2\mathbf{c}$	$0,0,1/2$

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

$C4/e$ (85, $P4/n$)	$\langle 2;\ 3;\ 5+(1,0,0)\rangle$	$\mathbf{a}-\mathbf{b},\mathbf{a}+\mathbf{b},\mathbf{c}$	$1/2,0,0$
$C4/e$ (85, $P4/n$)	$\langle 2+(1,1,0);\ 3+(1,0,0);\ 5+(0,1,0)\rangle$	$\mathbf{a}-\mathbf{b},\mathbf{a}+\mathbf{b},\mathbf{c}$	$0,1/2,0$
$C4/m$ (83, $P4/m$)	$\langle 2;\ 3;\ 5\rangle$	$\mathbf{a}-\mathbf{b},\mathbf{a}+\mathbf{b},\mathbf{c}$	
$C4/m$ (83, $P4/m$)	$\langle (2;\ 5)+(1,1,0);\ 3+(1,0,0)\rangle$	$\mathbf{a}-\mathbf{b},\mathbf{a}+\mathbf{b},\mathbf{c}$	$1/2,1/2,0$

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

$F4/m$ (87, $I4/m$)	$\langle 2;\ 3;\ 5\rangle$	$\mathbf{a}-\mathbf{b},\mathbf{a}+\mathbf{b},2\mathbf{c}$	
$F4/m$ (87, $I4/m$)	$\langle 2;\ 3;\ 5+(0,0,1)\rangle$	$\mathbf{a}-\mathbf{b},\mathbf{a}+\mathbf{b},2\mathbf{c}$	$0,0,1/2$
$F4/m$ (87, $I4/m$)	$\langle (2;\ 5)+(1,1,0);\ 3+(1,0,0)\rangle$	$\mathbf{a}-\mathbf{b},\mathbf{a}+\mathbf{b},2\mathbf{c}$	$1/2,1/2,0$
$F4/m$ (87, $I4/m$)	$\langle 2+(1,1,0);\ 3+(1,0,0);\ 5+(1,1,1)\rangle$	$\mathbf{a}-\mathbf{b},\mathbf{a}+\mathbf{b},2\mathbf{c}$	$1/2,1/2,1/2$

[3] $\mathbf{c}' = 3\mathbf{c}$

$\lceil$ $P4/m$ (83)	$\langle 2;\ 3;\ 5\rangle$	$\mathbf{a},\mathbf{b},3\mathbf{c}$	
$\{$ $P4/m$ (83)	$\langle 2;\ 3;\ 5+(0,0,2)\rangle$	$\mathbf{a},\mathbf{b},3\mathbf{c}$	$0,0,1$
$\lfloor$ $P4/m$ (83)	$\langle 2;\ 3;\ 5+(0,0,4)\rangle$	$\mathbf{a},\mathbf{b},3\mathbf{c}$	$0,0,2$

• Series of maximal isomorphic subgroups

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

$P4/m$ (83)	$\langle 2;\ 3;\ 5+(0,0,2u)\rangle$	$\mathbf{a},\mathbf{b},p\mathbf{c}$	$0,0,u$
	$p > 2;\ 0 \le u < p$		
	p conjugate subgroups for the prime p		

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

$P4/m$ (83)	$\langle (2;\ 5)+(2u,2v,0);\ 3+(u+v,-u+v,0)\rangle$	$p\mathbf{a},p\mathbf{b},\mathbf{c}$	$u,v,0$
	$p > 2;\ 0 \le u < p;\ 0 \le v < p$		
	p^2 conjugate subgroups for prime $p \equiv 3 \pmod 4$		

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

$P4/m$ (83)	$\langle (2;\ 5)+(2u,0,0);\ 3+(u,-u,0)\rangle$	$q\mathbf{a}-r\mathbf{b},r\mathbf{a}+q\mathbf{b},\mathbf{c}$	$u,0,0$
	$q > 0;\ r > 0;\ p > 4;\ 0 \le u < p$		
	p conjugate subgroups for prime $p \equiv 1 \pmod 4$		

I Minimal *translationengleiche* supergroups

[2] $P4/mmm$ (123); [2] $P4/mcc$ (124); [2] $P4/mbm$ (127); [2] $P4/mnc$ (128)

II Minimal non-isomorphic *klassengleiche* supergroups

• Additional centring translations

[2] $I4/m$ (87)

• Decreased unit cell   none