C_{2v}^4 *Pma*2 No. 28 *Pma*2

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

General position

Multiplicity, Wyckoff letter, Site symmetry		Coordinates
4 *d* 1		(1) x,y,z (2) $\bar{x},\bar{y},z$ (3) $x+\frac{1}{2},\bar{y},z$ (4) $\bar{x}+\frac{1}{2},y,z$

I Maximal *translationengleiche* subgroups

[2] *P*1*a*1 (7, *P*1*c*1)	1; 3	$-\mathbf{a}-\mathbf{c},\mathbf{b},\mathbf{a}$	
[2] *Pm*11 (6, *P*1*m*1)	1; 4	$\mathbf{c},\mathbf{a},\mathbf{b}$	$1/4,0,0$
[2] *P*112 (3)	1; 2		

II Maximal *klassengleiche* subgroups

- **Enlarged unit cell**

[2] $\mathbf{b}'=2\mathbf{b}$			
*Pba*2 (32)	$\langle 2;\ 3+(0,1,0)\rangle$	$\mathbf{a},2\mathbf{b},\mathbf{c}$	
*Pba*2 (32)	$\langle 3;\ 2+(0,1,0)\rangle$	$\mathbf{a},2\mathbf{b},\mathbf{c}$	$0,1/2,0$
*Pma*2 (28)	$\langle 2;\ 3\rangle$	$\mathbf{a},2\mathbf{b},\mathbf{c}$	
*Pma*2 (28)	$\langle (2;\ 3)+(0,1,0)\rangle$	$\mathbf{a},2\mathbf{b},\mathbf{c}$	$0,1/2,0$
[2] $\mathbf{c}'=2\mathbf{c}$			
$Pmn2_1$ (31)	$\langle (2;\ 3)+(0,0,1)\rangle$	$\mathbf{a},\mathbf{b},2\mathbf{c}$	$1/4,0,0$
*Pcn*2 (30, *Pnc*2)	$\langle 2;\ 3+(0,0,1)\rangle$	$-\mathbf{b},\mathbf{a},2\mathbf{c}$	
$Pca2_1$ (29)	$\langle 3;\ 2+(0,0,1)\rangle$	$\mathbf{a},\mathbf{b},2\mathbf{c}$	
*Pma*2 (28)	$\langle 2;\ 3\rangle$	$\mathbf{a},\mathbf{b},2\mathbf{c}$	
[2] $\mathbf{b}'=2\mathbf{b},\ \mathbf{c}'=2\mathbf{c}$			
*Aea*2 (41)	$\langle 2;\ 3+(0,1,0)\rangle$	$\mathbf{a},2\mathbf{b},2\mathbf{c}$	
*Aea*2 (41)	$\langle 3;\ 2+(0,1,0)\rangle$	$\mathbf{a},2\mathbf{b},2\mathbf{c}$	$0,1/2,0$
*Ama*2 (40)	$\langle 2;\ 3\rangle$	$\mathbf{a},2\mathbf{b},2\mathbf{c}$	
*Ama*2 (40)	$\langle (2;\ 3)+(0,1,0)\rangle$	$\mathbf{a},2\mathbf{b},2\mathbf{c}$	$0,1/2,0$
[3] $\mathbf{a}'=3\mathbf{a}$			
*Pma*2 (28)	$\langle 2;\ 3+(1,0,0)\rangle$	$3\mathbf{a},\mathbf{b},\mathbf{c}$	
*Pma*2 (28)	$\langle 2+(2,0,0);\ 3+(1,0,0)\rangle$	$3\mathbf{a},\mathbf{b},\mathbf{c}$	$1,0,0$
*Pma*2 (28)	$\langle 2+(4,0,0);\ 3+(1,0,0)\rangle$	$3\mathbf{a},\mathbf{b},\mathbf{c}$	$2,0,0$
[3] $\mathbf{b}'=3\mathbf{b}$			
*Pma*2 (28)	$\langle 2;\ 3\rangle$	$\mathbf{a},3\mathbf{b},\mathbf{c}$	
*Pma*2 (28)	$\langle (2;\ 3)+(0,2,0)\rangle$	$\mathbf{a},3\mathbf{b},\mathbf{c}$	$0,1,0$
*Pma*2 (28)	$\langle (2;\ 3)+(0,4,0)\rangle$	$\mathbf{a},3\mathbf{b},\mathbf{c}$	$0,2,0$
[3] $\mathbf{c}'=3\mathbf{c}$			
*Pma*2 (28)	$\langle 2;\ 3\rangle$	$\mathbf{a},\mathbf{b},3\mathbf{c}$	

- **Series of maximal isomorphic subgroups**

[p] $\mathbf{a}'=p\mathbf{a}$			
*Pma*2 (28)	$\langle 2+(2u,0,0);\ 3+(\frac{p}{2}-\frac{1}{2},0,0)\rangle$ prime $p>2;\ 0\le u<p$ p conjugate subgroups	$p\mathbf{a},\mathbf{b},\mathbf{c}$	$u,0,0$
[p] $\mathbf{b}'=p\mathbf{b}$			
*Pma*2 (28)	$\langle (2;\ 3)+(0,2u,0)\rangle$ prime $p>2;\ 0\le u<p$ p conjugate subgroups	$\mathbf{a},p\mathbf{b},\mathbf{c}$	$0,u,0$
[p] $\mathbf{c}'=p\mathbf{c}$			
*Pma*2 (28)	$\langle 2;\ 3\rangle$ p prime no conjugate subgroups	$\mathbf{a},\mathbf{b},p\mathbf{c}$	

I Minimal *translationengleiche* supergroups

[2] *Pccm* (49); [2] *Pmma* (51); [2] *Pmna* (53); [2] *Pbcm* (57)

II Minimal non-isomorphic *klassengleiche* supergroups

- **Additional centring translations**

[2] *Cmm*2 (35); [2] *Bme*2 (39, *Aem*2); [2] *Ama*2 (40); [2] *Ima*2 (46)

- **Decreased unit cell**

[2] $\mathbf{a}'=\frac{1}{2}\mathbf{a}$ *Pmm*2 (25)

