$Pmn2_1$ No. 31 $Pmn2_1$ C_{2v}^7

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	b	1	(1) x,y,z (2) $\bar{x}+\frac{1}{2},\bar{y},z+\frac{1}{2}$ (3) $x+\frac{1}{2},\bar{y},z+\frac{1}{2}$ (4) $\bar{x},y,z$

I Maximal *translationengleiche* subgroups

[2] $P1n1$ (7, $P1c1$)	1; 3	$\mathbf{c},\mathbf{b},-\mathbf{a}-\mathbf{c}$	
[2] $Pm11$ (6, $P1m1$)	1; 4	$\mathbf{c},\mathbf{a},\mathbf{b}$	
[2] $P112_1$ (4)	1; 2		$1/4,0,0$

II Maximal *klassengleiche* subgroups

- **Enlarged unit cell**

[2] $\mathbf{b}'=2\mathbf{b}$			
$Pbn2_1$ (33, $Pna2_1$)	$\langle 2;\ 3+(0,1,0)\rangle$	$-2\mathbf{b},\mathbf{a},\mathbf{c}$	$1/4,0,0$
$Pbn2_1$ (33, $Pna2_1$)	$\langle 3;\ 2+(0,1,0)\rangle$	$-2\mathbf{b},\mathbf{a},\mathbf{c}$	$1/4,1/2,0$
$Pmn2_1$ (31)	$\langle 2;\ 3\rangle$	$\mathbf{a},2\mathbf{b},\mathbf{c}$	
$Pmn2_1$ (31)	$\langle (2;\ 3)+(0,1,0)\rangle$	$\mathbf{a},2\mathbf{b},\mathbf{c}$	$0,1/2,0$
[3] $\mathbf{a}'=3\mathbf{a}$			
$Pmn2_1$ (31)	$\langle (2;\ 3)+(1,0,0)\rangle$	$3\mathbf{a},\mathbf{b},\mathbf{c}$	
$Pmn2_1$ (31)	$\langle 2+(3,0,0);\ 3+(1,0,0)\rangle$	$3\mathbf{a},\mathbf{b},\mathbf{c}$	$1,0,0$
$Pmn2_1$ (31)	$\langle 2+(5,0,0);\ 3+(1,0,0)\rangle$	$3\mathbf{a},\mathbf{b},\mathbf{c}$	$2,0,0$
[3] $\mathbf{b}'=3\mathbf{b}$			
$Pmn2_1$ (31)	$\langle 2;\ 3\rangle$	$\mathbf{a},3\mathbf{b},\mathbf{c}$	
$Pmn2_1$ (31)	$\langle (2;\ 3)+(0,2,0)\rangle$	$\mathbf{a},3\mathbf{b},\mathbf{c}$	$0,1,0$
$Pmn2_1$ (31)	$\langle (2;\ 3)+(0,4,0)\rangle$	$\mathbf{a},3\mathbf{b},\mathbf{c}$	$0,2,0$
[3] $\mathbf{c}'=3\mathbf{c}$			
$Pmn2_1$ (31)	$\langle (2;\ 3)+(0,0,1)\rangle$	$\mathbf{a},\mathbf{b},3\mathbf{c}$	

- **Series of maximal isomorphic subgroups**

[p] $\mathbf{a}'=p\mathbf{a}$			
$Pmn2_1$ (31)	$\langle 2+(\frac{p}{2}-\frac{1}{2}+2u,0,0);\ 3+(\frac{p}{2}-\frac{1}{2},0,0)\rangle$ prime $p>2$; $0\le u<p$ p conjugate subgroups	$p\mathbf{a},\mathbf{b},\mathbf{c}$	$u,0,0$
[p] $\mathbf{b}'=p\mathbf{b}$			
$Pmn2_1$ (31)	$\langle (2;\ 3)+(0,2u,0)\rangle$ prime $p>2$; $0\le u<p$ p conjugate subgroups	$\mathbf{a},p\mathbf{b},\mathbf{c}$	$0,u,0$
[p] $\mathbf{c}'=p\mathbf{c}$			
$Pmn2_1$ (31)	$\langle (2;\ 3)+(0,0,\frac{p}{2}-\frac{1}{2})\rangle$ prime $p>2$ no conjugate subgroups	$\mathbf{a},\mathbf{b},p\mathbf{c}$	

I Minimal *translationengleiche* supergroups

[2] *Pmna* (53); [2] *Pnnm* (58); [2] *Pmmn* (59); [2] *Pnma* (62)

II Minimal non-isomorphic *klassengleiche* supergroups

- **Additional centring translations**

[2] $Cmc2_1$ (36); [2] *Bmm*2 (38, *Amm*2); [2] *Ama*2 (40); [2] *Imm*2 (44)

- **Decreased unit cell**

[2] $\mathbf{a}'=\frac{1}{2}\mathbf{a}$ $Pmc2_1$ (26); [2] $\mathbf{c}'=\frac{1}{2}\mathbf{c}$ *Pma*2 (28)

