

$C_{2v}^{12}$ 
 $Cmc2_1$ 

No. 36

 $Cmc2_1$ 
**Generators selected** (1);  $t(1,0,0)$ ;  $t(0,1,0)$ ;  $t(0,0,1)$ ;  $t(\frac{1}{2},\frac{1}{2},0)$ ; (2); (3)

**General position**

 Multiplicity,  
Wyckoff letter,  
Site symmetry

Coordinates

 8  $b$  1

 $(0,0,0)+$   $(\frac{1}{2},\frac{1}{2},0)+$ 

 (1)  $x,y,z$  (2)  $\bar{x},\bar{y},z+\frac{1}{2}$  (3)  $x,\bar{y},z+\frac{1}{2}$  (4)  $\bar{x},y,z$ 
**I Maximal translationengleiche subgroups**

[2] $C1c1$ (9)	$\langle 1; 3 \rangle +$	
[2] $Cm11$ (8, $C1m1$ )	$\langle 1; 4 \rangle +$	$-\mathbf{b}, \mathbf{a}, \mathbf{c}$
[2] $C112_1$ (4, $P112_1$ )	$\langle 1; 2 \rangle +$	$1/2(\mathbf{a}-\mathbf{b}), 1/2(\mathbf{a}+\mathbf{b}), \mathbf{c}$

**II Maximal klassengleiche subgroups**

## • Loss of centring translations

[2] $Pbn2_1$ (33, $Pna2_1$ )	$1; 2; \langle 3; 4 \rangle + (\frac{1}{2}, \frac{1}{2}, 0)$	$-\mathbf{b}, \mathbf{a}, \mathbf{c}$	
[2] $Pmn2_1$ (31)	$1; 4; \langle 2; 3 \rangle + (\frac{1}{2}, \frac{1}{2}, 0)$		$0, 1/4, 0$
[2] $Pbc2_1$ (29, $Pca2_1$ )	$1; 3; \langle 2; 4 \rangle + (\frac{1}{2}, \frac{1}{2}, 0)$	$-\mathbf{b}, \mathbf{a}, \mathbf{c}$	$1/4, 1/4, 0$
[2] $Pmc2_1$ (26)	$1; 2; 3; 4$		

## • Enlarged unit cell

[3] $\mathbf{a}' = 3\mathbf{a}$			
$\left\{ \begin{array}{l} Cmc2_1 (36) \\ Cmc2_1 (36) \\ Cmc2_1 (36) \end{array} \right.$	$\langle 2; 3 \rangle$ $\langle 3; 2 + (2, 0, 0) \rangle$ $\langle 3; 2 + (4, 0, 0) \rangle$	$3\mathbf{a}, \mathbf{b}, \mathbf{c}$ $3\mathbf{a}, \mathbf{b}, \mathbf{c}$ $3\mathbf{a}, \mathbf{b}, \mathbf{c}$	$1, 0, 0$ $2, 0, 0$
[3] $\mathbf{b}' = 3\mathbf{b}$			
$\left\{ \begin{array}{l} Cmc2_1 (36) \\ Cmc2_1 (36) \\ Cmc2_1 (36) \end{array} \right.$	$\langle 2; 3 \rangle$ $\langle (2; 3) + (0, 2, 0) \rangle$ $\langle (2; 3) + (0, 4, 0) \rangle$	$\mathbf{a}, 3\mathbf{b}, \mathbf{c}$ $\mathbf{a}, 3\mathbf{b}, \mathbf{c}$ $\mathbf{a}, 3\mathbf{b}, \mathbf{c}$	$0, 1, 0$ $0, 2, 0$
[3] $\mathbf{c}' = 3\mathbf{c}$			
$Cmc2_1 (36)$	$\langle (2; 3) + (0, 0, 1) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	

## • Series of maximal isomorphic subgroups

[ $p$ ] $\mathbf{a}' = p\mathbf{a}$			
$Cmc2_1 (36)$	$\langle 3; 2 + (2u, 0, 0) \rangle$ $p > 2; 0 \leq u < p$ $p$ conjugate subgroups for the prime $p$	$p\mathbf{a}, \mathbf{b}, \mathbf{c}$	$u, 0, 0$
[ $p$ ] $\mathbf{b}' = p\mathbf{b}$			
$Cmc2_1 (36)$	$\langle (2; 3) + (0, 2u, 0) \rangle$ $p > 2; 0 \leq u < p$ $p$ conjugate subgroups for the prime $p$	$\mathbf{a}, p\mathbf{b}, \mathbf{c}$	$0, u, 0$
[ $p$ ] $\mathbf{c}' = p\mathbf{c}$			
$Cmc2_1 (36)$	$\langle (2; 3) + (0, 0, \frac{p}{2} - \frac{1}{2}) \rangle$ $p > 2$ no conjugate subgroups	$\mathbf{a}, \mathbf{b}, p\mathbf{c}$	

**I Minimal translationengleiche supergroups**

 [2]  $Cmcm$  (63); [2]  $Cmce$  (64); [3]  $P6_3cm$  (185); [3]  $P6_3mc$  (186)

**II Minimal non-isomorphic klassengleiche supergroups**

## • Additional centring translations

 [2]  $Fmm2$  (42)

## • Decreased unit cell

 [2]  $\mathbf{a}' = \frac{1}{2}\mathbf{a}, \mathbf{b}' = \frac{1}{2}\mathbf{b}$   $Pmc2_1$  (26); [2]  $\mathbf{c}' = \frac{1}{2}\mathbf{c}$   $Cmm2$  (35)