

$Ccc2$

No. 37

 $Ccc2$
 C_{2v}^{13}
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

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

 8 d 1

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

[2] $C1c1$ (9)	$(1; 3)+$	
[2] $Cc11$ (9, $C1c1$)	$(1; 4)+$	$-\mathbf{b}, \mathbf{a}, \mathbf{c}$
[2] $C112$ (3, $P112$)	$(1; 2)+$	$1/2(\mathbf{a}-\mathbf{b}), 1/2(\mathbf{a}+\mathbf{b}), \mathbf{c}$

II Maximal klassengleiche subgroups

• Loss of centring translations

[2] $Pnn2$ (34)	$1; 2; (3; 4)+(\frac{1}{2},\frac{1}{2},0)$	
[2] $Pnc2$ (30)	$1; 3; (2; 4)+(\frac{1}{2},\frac{1}{2},0)$	$1/4, 1/4, 0$
[2] $Pcn2$ (30, $Pnc2$)	$1; 4; (2; 3)+(\frac{1}{2},\frac{1}{2},0)$	$-\mathbf{b}, \mathbf{a}, \mathbf{c}$
[2] $Pcc2$ (27)	$1; 2; 3; 4$	$1/4, 1/4, 0$

• Enlarged unit cell

[3] $\mathbf{a}' = 3\mathbf{a}$		
$\left\{ \begin{array}{l} Ccc2 (37) \\ Ccc2 (37) \\ Ccc2 (37) \end{array} \right.$	$\langle 2; 3 \rangle$ $\langle 3; 2+(2,0,0) \rangle$ $\langle 3; 2+(4,0,0) \rangle$	$3\mathbf{a}, \mathbf{b}, \mathbf{c}$ $3\mathbf{a}, \mathbf{b}, \mathbf{c}$ $3\mathbf{a}, \mathbf{b}, \mathbf{c}$
		$1, 0, 0$ $2, 0, 0$
[3] $\mathbf{b}' = 3\mathbf{b}$		
$\left\{ \begin{array}{l} Ccc2 (37) \\ Ccc2 (37) \\ Ccc2 (37) \end{array} \right.$	$\langle 2; 3 \rangle$ $\langle (2; 3) + (0, 2, 0) \rangle$ $\langle (2; 3) + (0, 4, 0) \rangle$	$\mathbf{a}, 3\mathbf{b}, \mathbf{c}$ $\mathbf{a}, 3\mathbf{b}, \mathbf{c}$ $\mathbf{a}, 3\mathbf{b}, \mathbf{c}$
		$0, 1, 0$ $0, 2, 0$
[3] $\mathbf{c}' = 3\mathbf{c}$		
$Ccc2 (37)$	$\langle 2; 3+(0,0,1) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$

• Series of maximal isomorphic subgroups

[p] $\mathbf{a}' = p\mathbf{a}$		
$Ccc2 (37)$	$\langle 3; 2+(2u,0,0) \rangle$ prime $p > 2; 0 \leq u < p$ p conjugate subgroups	$p\mathbf{a}, \mathbf{b}, \mathbf{c}$
		$u, 0, 0$
[p] $\mathbf{b}' = p\mathbf{b}$		
$Ccc2 (37)$	$\langle (2; 3) + (0, 2u, 0) \rangle$ prime $p > 2; 0 \leq u < p$ p conjugate subgroups	$\mathbf{a}, p\mathbf{b}, \mathbf{c}$
		$0, u, 0$
[p] $\mathbf{c}' = p\mathbf{c}$		
$Ccc2 (37)$	$\langle 2; 3+(0,0,\frac{p}{2}-\frac{1}{2}) \rangle$ prime $p > 2$ no conjugate subgroups	$\mathbf{a}, \mathbf{b}, p\mathbf{c}$

I Minimal translationengleiche supergroups

[2] $Cccm$ (66); [2] $Ccce$ (68); [2] $P4cc$ (103); [2] $P4nc$ (104); [2] $P4_2mc$ (105); [2] $P4_2bc$ (106); [2] $P\bar{4}2c$ (112); [2] $P\bar{4}2_1c$ (114); [3] $P6cc$ (184)

II Minimal non-isomorphic klassengleiche supergroups

• Additional centring translations

[2] $Fmm2$ (42)

• Decreased unit cell

[2] $\mathbf{a}' = \frac{1}{2}\mathbf{a}, \mathbf{b}' = \frac{1}{2}\mathbf{b}$ $Pcc2$ (27); [2] $\mathbf{c}' = \frac{1}{2}\mathbf{c}$ $Cmm2$ (35)