

# Ima2

No. 46

# Ima2

$C_{2v}^{22}$

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

**General position**

Multiplicity,  
Wyckoff letter,  
Site symmetry

**Coordinates**

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

8 c 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] $I1a1$ (9, $C1c1$ )	$\langle 1; 3 \rangle +$	$-\mathbf{a} - \mathbf{c}, \mathbf{b}, \mathbf{a}$	
[2] $Im11$ (8, $C1m1$ )	$\langle 1; 4 \rangle +$	$-\mathbf{b} - \mathbf{c}, \mathbf{a}, \mathbf{c}$	$1/4, 0, 0$
[2] $I112$ (5, $A112$ )	$\langle 1; 2 \rangle +$	$\mathbf{b}, -\mathbf{a} - \mathbf{b}, \mathbf{c}$	

**II Maximal klassengleiche subgroups**

• **Loss of centring translations**

[2] $Pna2_1$ (33)	$1; 3; \langle 2; 4 \rangle + (\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$		$1/4, 1/4, 0$
[2] $Pnc2$ (30)	$1; 2; \langle 3; 4 \rangle + (\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$		
[2] $Pma2$ (28)	$1; 2; 3; 4$		
[2] $Pmc2_1$ (26)	$1; 4; \langle 2; 3 \rangle + (\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$		$1/4, 1/4, 0$

• **Enlarged unit cell**

[3] $\mathbf{a}' = 3\mathbf{a}$			
$\left\{ \begin{array}{l} Ima2 \text{ (46)} \\ Ima2 \text{ (46)} \\ Ima2 \text{ (46)} \end{array} \right.$	$\langle 2; 3 + (1,0,0) \rangle$ $\langle 2 + (2,0,0); 3 + (1,0,0) \rangle$ $\langle 2 + (4,0,0); 3 + (1,0,0) \rangle$	$3\mathbf{a}, \mathbf{b}, \mathbf{c}$ $3\mathbf{a}, \mathbf{b}, \mathbf{c}$ $3\mathbf{a}, \mathbf{b}, \mathbf{c}$	$1, 0, 0$ $2, 0, 0$
[3] $\mathbf{b}' = 3\mathbf{b}$			
$\left\{ \begin{array}{l} Ima2 \text{ (46)} \\ Ima2 \text{ (46)} \\ Ima2 \text{ (46)} \end{array} \right.$	$\langle 2; 3 \rangle$ $\langle (2; 3) + (0, 2, 0) \rangle$ $\langle (2; 3) + (0, 4, 0) \rangle$	$\mathbf{a}, 3\mathbf{b}, \mathbf{c}$ $\mathbf{a}, 3\mathbf{b}, \mathbf{c}$ $\mathbf{a}, 3\mathbf{b}, \mathbf{c}$	$0, 1, 0$ $0, 2, 0$
[3] $\mathbf{c}' = 3\mathbf{c}$			
$Ima2$ (46)	$\langle 2; 3 \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	

• **Series of maximal isomorphic subgroups**

[p] $\mathbf{a}' = p\mathbf{a}$			
$Ima2$ (46)	$\langle 2 + (2u, 0, 0); 3 + (\frac{p}{2} - \frac{1}{2}, 0, 0) \rangle$ $p > 2; 0 \leq u < p$ $p$ conjugate subgroups for the prime $p$	$p\mathbf{a}, \mathbf{b}, \mathbf{c}$	$u, 0, 0$
[p] $\mathbf{b}' = p\mathbf{b}$			
$Ima2$ (46)	$\langle (2; 3) + (0, 2u, 0) \rangle$ $p > 2; 0 \leq u < p$ $p$ conjugate subgroups for the prime $p$	$\mathbf{a}, p\mathbf{b}, \mathbf{c}$	$0, u, 0$
[p] $\mathbf{c}' = p\mathbf{c}$			
$Ima2$ (46)	$\langle 2; 3 \rangle$ $p > 2$ no conjugate subgroups	$\mathbf{a}, \mathbf{b}, p\mathbf{c}$	

**I Minimal translationengleiche supergroups**

[2]  $Ibam$  (72); [2]  $Imma$  (74)

**II Minimal non-isomorphic klassengleiche supergroups**

• **Additional centring translations**

none

• **Decreased unit cell**

[2]  $\mathbf{c}' = \frac{1}{2}\mathbf{c}$   $Cmm2$  (35); [2]  $\mathbf{a}' = \frac{1}{2}\mathbf{a}$   $Amm2$  (38); [2]  $\mathbf{b}' = \frac{1}{2}\mathbf{b}$   $Bme2$  (39,  $Aem2$ )