

C_s^3
 $C1m1$

No. 8

 Cm

 UNIQUE AXIS b , CELL CHOICE 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)

General position

 Multiplicity,
 Wyckoff letter,
 Site symmetry

Coordinates

 4 b 1

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

 (1) x,y,z (2) x,\bar{y},z
I Maximal translationengleiche subgroups

 [2] $C1 (1, P1)$ $1+$ $1/2(\mathbf{a}-\mathbf{b}), 1/2(\mathbf{a}+\mathbf{b}), \mathbf{c}$
II Maximal klassengleiche subgroups

 • **Loss of centring translations**

 [2] $P1a1 (7, P1c1)$ $1; 2+(\frac{1}{2},\frac{1}{2},0)$ $-\mathbf{a}-\mathbf{c}, \mathbf{b}, \mathbf{a}$ $0, 1/4, 0$
 [2] $P1m1 (6)$ $1; 2$

 • **Enlarged unit cell**

 [2] $\mathbf{c}' = 2\mathbf{c}$
 $C1c1 (9)$ $\langle 2+(0,0,1) \rangle$ $\mathbf{a}, \mathbf{b}, 2\mathbf{c}$
 $I1c1 (9, C1c1)$ $\langle 2+(0,0,1) \rangle$ $\mathbf{a}-2\mathbf{c}, \mathbf{b}, 2\mathbf{c}$
 $C1m1 (8)$ $\langle 2 \rangle$ $\mathbf{a}, \mathbf{b}, 2\mathbf{c}$
 $I1m1 (8, C1m1)$ $\langle 2 \rangle$ $\mathbf{a}-2\mathbf{c}, \mathbf{b}, 2\mathbf{c}$
 [3] $\mathbf{b}' = 3\mathbf{b}$
 $\left\{ \begin{array}{l} C1m1 (8) \\ C1m1 (8) \\ C1m1 (8) \end{array} \right.$ $\left\{ \begin{array}{l} \langle 2 \rangle \\ \langle 2+(0,2,0) \rangle \\ \langle 2+(0,4,0) \rangle \end{array} \right.$ $\left\{ \begin{array}{l} \mathbf{a}, 3\mathbf{b}, \mathbf{c} \\ \mathbf{a}, 3\mathbf{b}, \mathbf{c} \\ \mathbf{a}, 3\mathbf{b}, \mathbf{c} \end{array} \right.$ $\left\{ \begin{array}{l} \\ 0, 1, 0 \\ 0, 2, 0 \end{array} \right.$
 [3] $\mathbf{c}' = 3\mathbf{c}$
 $C1m1 (8)$ $\langle 2 \rangle$ $\mathbf{a}, \mathbf{b}, 3\mathbf{c}$
 [3] $\mathbf{a}' = \mathbf{a}-2\mathbf{c}, \mathbf{c}' = 3\mathbf{c}$
 $C1m1 (8)$ $\langle 2 \rangle$ $\mathbf{a}-2\mathbf{c}, \mathbf{b}, 3\mathbf{c}$
 [3] $\mathbf{a}' = \mathbf{a}-4\mathbf{c}, \mathbf{c}' = 3\mathbf{c}$
 $C1m1 (8)$ $\langle 2 \rangle$ $\mathbf{a}-4\mathbf{c}, \mathbf{b}, 3\mathbf{c}$
 [3] $\mathbf{a}' = 3\mathbf{a}$
 $C1m1 (8)$ $\langle 2 \rangle$ $3\mathbf{a}, \mathbf{b}, \mathbf{c}$

 • **Series of maximal isomorphic subgroups**

 [p] $\mathbf{b}' = p\mathbf{b}$
 $C1m1 (8)$ $\langle 2+(0,2u,0) \rangle$ $\mathbf{a}, p\mathbf{b}, \mathbf{c}$ $0, u, 0$
 $p > 2; 0 \leq u < p$
 p conjugate subgroups for the prime p
 [p] $\mathbf{a}' = \mathbf{a}-2q\mathbf{c}, \mathbf{c}' = p\mathbf{c}$
 $C1m1 (8)$ $\langle 2 \rangle$ $\mathbf{a}-2q\mathbf{c}, \mathbf{b}, p\mathbf{c}$
 $p > 1; 0 \leq q < p$
 no conjugate subgroups
 [p] $\mathbf{a}' = p\mathbf{a}$
 $C1m1 (8)$ $\langle 2 \rangle$ $p\mathbf{a}, \mathbf{b}, \mathbf{c}$
 $p > 2$
 no conjugate subgroups

I Minimal translationengleiche supergroups

 [2] $C12/m1 (12)$; [2] $Cmm2 (35)$; [2] $Cmc2_1 (36)$; [2] $Amm2 (38)$; [2] $Aem2 (39)$; [2] $Fmm2 (42)$; [2] $Imm2 (44)$; [2] $Ima2 (46)$;
 [3] $P3m1 (156)$; [3] $P31m (157)$; [3] $R3m (160)$
II Minimal non-isomorphic klassengleiche supergroups

 • **Additional centring translations**

none

 • **Decreased unit cell**

 [2] $\mathbf{a}' = \frac{1}{2}\mathbf{a}, \mathbf{b}' = \frac{1}{2}\mathbf{b}$ $P1m1 (6)$

UNIQUE AXIS *c*, CELL CHOICE 1

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

General position

Multiplicity,
Wyckoff letter,
Site symmetry

Coordinates

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

4 *b* 1

(1) x, y, z (2) x, y, \bar{z}

I Maximal translationengleiche subgroups

[2] *A1* (1, *P1*) 1+ **a, 1/2(b - c), 1/2(b + c)**

II Maximal klassengleiche subgroups

• **Loss of centring translations**

[2] *P11b* (7, *P11a*) $1; 2 + (0, \frac{1}{2}, \frac{1}{2})$ **b, -a - b, c** 0, 0, 1/4
 [2] *P11m* (6) 1; 2

• **Enlarged unit cell**

[2] **a' = 2a**
A11a (9) $\langle 2 + (1, 0, 0) \rangle$ **2a, b, c**
I11a (9, *A11a*) $\langle 2 + (1, 0, 0) \rangle$ **2a, -2a + b, c**
A11m (8) $\langle 2 \rangle$ **2a, b, c**
I11m (8, *A11m*) $\langle 2 \rangle$ **2a, -2a + b, c**
 [3] **c' = 3c**
 { *A11m* (8) $\langle 2 \rangle$ **a, b, 3c**
 A11m (8) $\langle 2 + (0, 0, 2) \rangle$ **a, b, 3c** 0, 0, 1
 A11m (8) $\langle 2 + (0, 0, 4) \rangle$ **a, b, 3c** 0, 0, 2
 [3] **a' = 3a**
A11m (8) $\langle 2 \rangle$ **3a, b, c**
 [3] **a' = 3a, b' = -2a + b**
A11m (8) $\langle 2 \rangle$ **3a, -2a + b, c**
 [3] **a' = 3a, b' = -4a + b**
A11m (8) $\langle 2 \rangle$ **3a, -4a + b, c**
 [3] **b' = 3b**
A11m (8) $\langle 2 \rangle$ **a, 3b, c**

• **Series of maximal isomorphic subgroups**

[*p*] **c' = pc**
A11m (8) $\langle 2 + (0, 0, 2u) \rangle$ **a, b, pc** 0, 0, *u*
 $p > 2; 0 \leq u < p$
 p conjugate subgroups for the prime p
 [*p*] **a' = pa, b' = -2qa + b**
A11m (8) $\langle 2 \rangle$ **pa, -2qa + b, c**
 $p > 1; 0 \leq q < p$
 no conjugate subgroups
 [*p*] **b' = pb**
A11m (8) $\langle 2 \rangle$ **a, pb, c**
 $p > 2$
 no conjugate subgroups

I Minimal translationengleiche supergroups

[2] *A112/m* (12); [2] *Cmm2* (35); [2] *Cmc2₁* (36); [2] *Amm2* (38); [2] *Aem2* (39); [2] *Fmm2* (42); [2] *Imm2* (44); [2] *Ima2* (46);
 [3] *P3m1* (156); [3] *P31m* (157); [3] *R3m* (160)

II Minimal non-isomorphic klassengleiche supergroups

• **Additional centring translations** none

• **Decreased unit cell**

[2] **b' = 1/2b, c' = 1/2c** *P11m* (6)