

$C_{4v}^9$ 
 $I4mm$ 

No. 107

 $I4mm$ 
**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); (5)

**General position**

 Multiplicity,  
 Wyckoff letter,  
 Site symmetry

**Coordinates**

 16 *e* 1

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

 (1)  $x, y, z$  (2)  $\bar{x}, \bar{y}, z$  (3)  $\bar{y}, x, z$  (4)  $y, \bar{x}, z$   
 (5)  $x, \bar{y}, z$  (6)  $\bar{x}, y, z$  (7)  $\bar{y}, \bar{x}, z$  (8)  $y, x, z$ 
**I Maximal translationengleiche subgroups**

 [2]  $I411$  (79,  $I4$ ) (1; 2; 3; 4)+  
 [2]  $I2m1$  (44,  $Imm2$ ) (1; 2; 5; 6)+  
 [2]  $I21m$  (42,  $Fmm2$ ) (1; 2; 7; 8)+

 $\mathbf{a-b, a+b, c}$ 
**II Maximal klassengleiche subgroups**

 • **Loss of centring translations**

 [2]  $P4_2mc$  (105) 1; 2; 5; 6; (3; 4; 7; 8) +  $(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$  0, 1/2, 0  
 [2]  $P4nc$  (104) 1; 2; 3; 4; (5; 6; 7; 8) +  $(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$   
 [2]  $P4_2nm$  (102) 1; 2; 7; 8; (3; 4; 5; 6) +  $(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$   
 [2]  $P4mm$  (99) 1; 2; 3; 4; 5; 6; 7; 8

 • **Enlarged unit cell**

 [3]  $\mathbf{c}' = 3\mathbf{c}$   
 $I4mm$  (107)  $\langle 2; 3; 5 \rangle$   $\mathbf{a, b, 3c}$ 

 • **Series of maximal isomorphic subgroups**

 [p]  $\mathbf{c}' = p\mathbf{c}$   
 $I4mm$  (107)  $\langle 2; 3; 5 \rangle$   $\mathbf{a, b, pc}$   
 $p > 2$   
 no conjugate subgroups

 [ $p^2$ ]  $\mathbf{a}' = p\mathbf{a}, \mathbf{b}' = p\mathbf{b}$   
 $I4mm$  (107)  $\langle 2 + (2u, 2v, 0); 3 + (u + v, -u + v, 0); 5 + (0, 2v, 0) \rangle$   $p\mathbf{a}, p\mathbf{b}, \mathbf{c}$   $u, v, 0$   
 $p > 2; 0 \leq u < p; 0 \leq v < p$   
 $p^2$  conjugate subgroups for the prime  $p$ 
**I Minimal translationengleiche supergroups**

 [2]  $I4/mmm$  (139)

**II Minimal non-isomorphic klassengleiche supergroups**

 • **Additional centring translations** none

 • **Decreased unit cell**

 [2]  $\mathbf{c}' = \frac{1}{2}\mathbf{c}$   $C4mm$  (99,  $P4mm$ )