

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

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	<i>e</i>	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)+	<b>a – b, a + b, c</b>

**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] $c' = 3c$		
$I4mm$ (107)	$\langle 2; 3; 5 \rangle$	<b>a, b, 3c</b>

## • Series of maximal isomorphic subgroups

[ <i>p</i> ] $c' = pc$		
$I4mm$ (107)	$\langle 2; 3; 5 \rangle$	<b>a, b, pc</b>
	prime $p > 2$	
	no conjugate subgroups	

[ $p^2$ ] $a' = pa, b' = pb$		
$I4mm$ (107)	$\langle 2 + (2u, 2v, 0); 3 + (u + v, -u + v, 0); 5 + (0, 2v, 0) \rangle$	<b>pa, pb, c</b>
	prime $p > 2; 0 \leq u < p; 0 \leq v < p$	u, v, 0
	$p^2$ conjugate subgroups	

**I Minimal translationengleiche supergroups**

 [2]  $I4/mmm$  (139)

**II Minimal non-isomorphic klassengleiche supergroups**

## • Additional centring translations

none

## • Decreased unit cell

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