

# *Ibam*

# No. 72

# $I2/b2/a2/m$

# $D_{2h}^{26}$

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

 16 *k* 1

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

[2] <i>Ib2m</i> (46, <i>Ima2</i> )	(1; 3; 6; 8)+	<b>c, a, b</b>	0, 0, 1/4
[2] <i>I2am</i> (46, <i>Ima2</i> )	(1; 4; 6; 7)+	<b>c, b, -a</b>	0, 0, 1/4
[2] <i>Iba2</i> (45)	(1; 2; 7; 8)+		
[2] <i>I222</i> (23)	(1; 2; 3; 4)+		0, 0, 1/4
[2] <i>I12/a1</i> (15, <i>C12/c1</i> )	(1; 3; 5; 7)+	<b>a - c, b, c</b>	
[2] <i>I2/b11</i> (15, <i>C12/c1</i> )	(1; 4; 5; 8)+	<b>-b - c, a, c</b>	
[2] <i>I112/m</i> (12, <i>A112/m</i> )	(1; 2; 5; 6)+	<b>b, -a - b, c</b>	

**II Maximal klassengleiche subgroups**

## • Loss of centring translations

[2] <i>Pcan</i> (60, <i>Pbcn</i> )	1; 3; 5; 7; (2; 4; 6; 8) + $(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$	<b>-b, a, c</b>	
[2] <i>Pbcn</i> (60)	1; 4; 5; 8; (2; 3; 6; 7) + $(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$		
[2] <i>Pbcm</i> (57)	1; 3; 6; 8; (2; 4; 5; 7) + $(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$		1/4, 1/4, 1/4
[2] <i>Pcam</i> (57, <i>Pbcm</i> )	1; 4; 6; 7; (2; 3; 5; 8) + $(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$	<b>-b, a, c</b>	1/4, 1/4, 1/4
[2] <i>Pccn</i> (56)	1; 2; 3; 4; (5; 6; 7; 8) + $(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$		1/4, 1/4, 1/4
[2] <i>Pbam</i> (55)	1; 2; 3; 4; 5; 6; 7; 8		
[2] <i>Pban</i> (50)	1; 2; 7; 8; (3; 4; 5; 6) + $(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$		1/4, 1/4, 1/4
[2] <i>Pccm</i> (49)	1; 2; 5; 6; (3; 4; 7; 8) + $(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$		

## • Enlarged unit cell

[3] <b>a' = 3a</b>			
$\left\{ \begin{array}{l} \textit{Ibam} (72) \\ \textit{Ibam} (72) \\ \textit{Ibam} (72) \end{array} \right.$	$\langle 2; 5; 3 + (1, 0, 0) \rangle$ $\langle (2; 5) + (2, 0, 0); 3 + (3, 0, 0) \rangle$ $\langle (2; 5) + (4, 0, 0); 3 + (5, 0, 0) \rangle$	<b>3a, b, c</b> <b>3a, b, c</b> <b>3a, b, c</b>	1, 0, 0 2, 0, 0
[3] <b>b' = 3b</b>			
$\left\{ \begin{array}{l} \textit{Ibam} (72) \\ \textit{Ibam} (72) \\ \textit{Ibam} (72) \end{array} \right.$	$\langle 2; 5; 3 + (0, 1, 0) \rangle$ $\langle (2; 5) + (0, 2, 0); 3 + (0, 1, 0) \rangle$ $\langle (2; 5) + (0, 4, 0); 3 + (0, 1, 0) \rangle$	<b>a, 3b, c</b> <b>a, 3b, c</b> <b>a, 3b, c</b>	0, 1, 0 0, 2, 0
[3] <b>c' = 3c</b>			
$\left\{ \begin{array}{l} \textit{Ibam} (72) \\ \textit{Ibam} (72) \\ \textit{Ibam} (72) \end{array} \right.$	$\langle 2; 3; 5 \rangle$ $\langle 2; (3; 5) + (0, 0, 2) \rangle$ $\langle 2; (3; 5) + (0, 0, 4) \rangle$	<b>a, b, 3c</b> <b>a, b, 3c</b> <b>a, b, 3c</b>	0, 0, 1 0, 0, 2

## • Series of maximal isomorphic subgroups

[ <i>p</i> ] <b>a' = pa</b>			
<i>Ibam</i> (72)	$\langle (2; 5) + (2u, 0, 0); 3 + (\frac{p}{2} - \frac{1}{2} + 2u, 0, 0) \rangle$ $p > 2; 0 \leq u < p$ <i>p</i> conjugate subgroups for the prime <i>p</i>	<b>pa, b, c</b>	<i>u</i> , 0, 0
[ <i>p</i> ] <b>b' = pb</b>			
<i>Ibam</i> (72)	$\langle (2; 5) + (0, 2u, 0); 3 + (0, \frac{p}{2} - \frac{1}{2}, 0) \rangle$ $p > 2; 0 \leq u < p$ <i>p</i> conjugate subgroups for the prime <i>p</i>	<b>a, pb, c</b>	0, <i>u</i> , 0
[ <i>p</i> ] <b>c' = pc</b>			
<i>Ibam</i> (72)	$\langle 2; (3; 5) + (0, 0, 2u) \rangle$ $p > 2; 0 \leq u < p$ <i>p</i> conjugate subgroups for the prime <i>p</i>	<b>a, b, pc</b>	0, 0, <i>u</i>

**I Minimal translationengleiche supergroups**

 [2] *I4/mcm* (140)

**II Minimal non-isomorphic klassengleiche supergroups**

## • Additional centring translations

none

## • Decreased unit cell

 [2] **c' =  $\frac{1}{2}$ c** *Cmmm* (65); [2] **a' =  $\frac{1}{2}$ a** *Aemm* (67, *Cmme*); [2] **b' =  $\frac{1}{2}$ b** *Bmem* (67, *Cmme*)