

D_{2h}^{21} $C2/m2/m2/e$

No. 67

 $Cmme$ Former space-group symbol $Cmma$ Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; $t(\frac{1}{2},\frac{1}{2},0)$; (2); (3); (5)

General position

Multiplicity,
Wyckoff letter,
Site symmetry

Coordinates

16	<i>o</i>	1	(1) x, y, z	(2) $\bar{x}, \bar{y} + \frac{1}{2}, z$	(3) $\bar{x}, y + \frac{1}{2}, \bar{z}$	(4) x, \bar{y}, \bar{z}
			(5) $\bar{x}, \bar{y}, \bar{z}$	(6) $x, y + \frac{1}{2}, \bar{z}$	(7) $x, \bar{y} + \frac{1}{2}, z$	(8) \bar{x}, y, z

I Maximal translationengleiche subgroups

[2] $Cm2e$ (39, $Aem2$)	(1; 3; 6; 8)+	c, a, b	1/4, 0, 0
[2] $C2me$ (39, $Aem2$)	(1; 4; 6; 7)+	c, b, -a	
[2] $Cmm2$ (35)	(1; 2; 7; 8)+		0, 1/4, 0
[2] $C222$ (21)	(1; 2; 3; 4)+		1/4, 0, 0
[2] $C112/e$ (13, $P112/a$)	(1; 2; 5; 6)+	a, 1/2(-a + b), c	
[2] $C12/m1$ (12)	(1; 3; 5; 7)+		1/4, 1/4, 0
[2] $C2/m11$ (12, $C12/m1$)	(1; 4; 5; 8)+	-b, a, c	

II Maximal klassengleiche subgroups

• Loss of centring translations

[2] $Pbma$ (57, $Pbcm$)	1; 3; 5; 7; (2; 4; 6; 8) + $(\frac{1}{2}, \frac{1}{2}, 0)$	c, a, b	
[2] $Pmab$ (57, $Pbcm$)	1; 3; 6; 8; (2; 4; 5; 7) + $(\frac{1}{2}, \frac{1}{2}, 0)$	c, b, -a	1/4, 1/4, 0
[2] $Pbaa$ (54, $Pcca$)	1; 2; 3; 4; (5; 6; 7; 8) + $(\frac{1}{2}, \frac{1}{2}, 0)$	b, c, a	1/4, 1/4, 0
[2] $Pbab$ (54, $Pcca$)	1; 2; 5; 6; (3; 4; 7; 8) + $(\frac{1}{2}, \frac{1}{2}, 0)$	a, -c, b	
[2] $Pmmb$ (51, $Pmma$)	1; 2; 3; 4; 5; 6; 7; 8	-b, a, c	
[2] $Pmma$ (51)	1; 2; 7; 8; (3; 4; 5; 6) + $(\frac{1}{2}, \frac{1}{2}, 0)$		1/4, 1/4, 0
[2] $Pmaa$ (49, $Pccm$)	1; 4; 5; 8; (2; 3; 6; 7) + $(\frac{1}{2}, \frac{1}{2}, 0)$	b, c, a	
[2] $Pbmb$ (49, $Pccm$)	1; 4; 6; 7; (2; 3; 5; 8) + $(\frac{1}{2}, \frac{1}{2}, 0)$	c, a, b	1/4, 1/4, 0

• Enlarged unit cell

[2] $c' = 2c$			
$Imma$ (74)	$\langle 2; 3; 5 \rangle$	a, b, 2c	
$Imma$ (74)	$\langle 2; (3; 5) + (0, 0, 1) \rangle$	a, b, 2c	0, 0, 1/2
$Ibca$ (73)	$\langle 2; 5; 3 + (0, 0, 1) \rangle$	a, b, 2c	
$Ibca$ (73)	$\langle 2; 3; 5 + (0, 0, 1) \rangle$	a, b, 2c	0, 0, 1/2
$Ibmb$ (72, $Ibam$)	$\langle 3; 5; 2 + (0, 0, 1) \rangle$	2c, a, b	1/4, 1/4, 1/2
$Ibmb$ (72, $Ibam$)	$\langle (2; 3; 5) + (0, 0, 1) \rangle$	2c, a, b	1/4, 1/4, 0
$Imaa$ (72, $Ibam$)	$\langle 5; (2; 3) + (0, 0, 1) \rangle$	b, 2c, a	
$Imaa$ (72, $Ibam$)	$\langle 3; (2; 5) + (0, 0, 1) \rangle$	b, 2c, a	0, 0, 1/2
$Ccce$ (68)	$\langle 2; 5; 3 + (0, 0, 1) \rangle$	a, b, 2c	1/4, 1/4, 0
$Ccce$ (68)	$\langle 2; 3; 5 + (0, 0, 1) \rangle$	a, b, 2c	1/4, 1/4, 1/2
$Cmme$ (67)	$\langle 2; 3; 5 \rangle$	a, b, 2c	
$Cmme$ (67)	$\langle 2; (3; 5) + (0, 0, 1) \rangle$	a, b, 2c	0, 0, 1/2
$Ccme$ (64, $Cmce$)	$\langle 3; 5; 2 + (0, 0, 1) \rangle$	-b, a, 2c	1/4, 1/4, 0
$Ccme$ (64, $Cmce$)	$\langle (2; 3; 5) + (0, 0, 1) \rangle$	-b, a, 2c	1/4, 1/4, 1/2
$Cmce$ (64)	$\langle 5; (2; 3) + (0, 0, 1) \rangle$	a, b, 2c	
$Cmce$ (64)	$\langle 3; (2; 5) + (0, 0, 1) \rangle$	a, b, 2c	0, 0, 1/2
[3] $a' = 3a$			
$Cmme$ (67)	$\langle 2; 3; 5 \rangle$	3a, b, c	
$Cmme$ (67)	$\langle (2; 3; 5) + (2, 0, 0) \rangle$	3a, b, c	1, 0, 0
$Cmme$ (67)	$\langle (2; 3; 5) + (4, 0, 0) \rangle$	3a, b, c	2, 0, 0
[3] $b' = 3b$			
$Cmme$ (67)	$\langle 5; (2; 3) + (0, 1, 0) \rangle$	a, 3b, c	
$Cmme$ (67)	$\langle 2 + (0, 3, 0); 3 + (0, 1, 0); 5 + (0, 2, 0) \rangle$	a, 3b, c	0, 1, 0
$Cmme$ (67)	$\langle 2 + (0, 5, 0); 3 + (0, 1, 0); 5 + (0, 4, 0) \rangle$	a, 3b, c	0, 2, 0
[3] $c' = 3c$			
$Cmme$ (67)	$\langle 2; 3; 5 \rangle$	a, b, 3c	
$Cmme$ (67)	$\langle 2; (3; 5) + (0, 0, 2) \rangle$	a, b, 3c	0, 0, 1
$Cmme$ (67)	$\langle 2; (3; 5) + (0, 0, 4) \rangle$	a, b, 3c	0, 0, 2

- Series of maximal isomorphic subgroups

[p] $\mathbf{a}' = p\mathbf{a}$ Cmme (67)	$\langle (2; 3; 5) + (2u, 0, 0) \rangle$ $p > 2; 0 \leq u < p$ p conjugate subgroups for the prime p	$p\mathbf{a}, \mathbf{b}, \mathbf{c}$	$u, 0, 0$
[p] $\mathbf{b}' = p\mathbf{b}$ Cmme (67)	$\langle 2 + (0, \frac{p}{2} - \frac{1}{2} + 2u, 0); 3 + (0, \frac{p}{2} - \frac{1}{2}, 0); 5 + (0, 2u, 0) \rangle$ $p > 2; 0 \leq u < p$ p conjugate subgroups for the prime p	$\mathbf{a}, p\mathbf{b}, \mathbf{c}$	$0, u, 0$
[p] $\mathbf{c}' = p\mathbf{c}$ Cmme (67)	$\langle 2; (3; 5) + (0, 0, 2u) \rangle$ $p > 2; 0 \leq u < p$ p conjugate subgroups for the prime p	$\mathbf{a}, \mathbf{b}, p\mathbf{c}$	$0, 0, u$

I Minimal translationengleiche supergroups

[2] $P4/nbm$ (125); [2] $P4/nmm$ (129); [2] $P4_2/nmm$ (134); [2] $P4_2/ncm$ (138)

II Minimal non-isomorphic klassengleiche supergroups

- Additional centring translations

[2] $Fmmm$ (69)

- Decreased unit cell

[2] $\mathbf{a}' = \frac{1}{2}\mathbf{a}, \mathbf{b}' = \frac{1}{2}\mathbf{b}$ $Pmmm$ (47)