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 $(0,0,0)+$ $(\frac{1}{2},\frac{1}{2},0)+$	
16 *o* 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] *C*112/*e* (13, *P*112/*a*)	(1; 2; 5; 6)+	**a**,1/2(−**a**+**b**),**c**	
[2] *C*12/*m*1 (12)	(1; 3; 5; 7)+		1/4,1/4,0
[2] *C*2/*m*11 (12, *C*12/*m*1)	(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] $\mathbf{c}'=2\mathbf{c}$

Imma (74)	⟨2; 3; 5⟩	**a**,**b**,2**c**	
Imma (74)	⟨2; (3; 5)+(0,0,1)⟩	**a**,**b**,2**c**	0,0,1/2
Ibca (73)	⟨2; 5; 3+(0,0,1)⟩	**a**,**b**,2**c**	
Ibca (73)	⟨2; 3; 5+(0,0,1)⟩	**a**,**b**,2**c**	0,0,1/2
Ibmb (72, *Ibam*)	⟨3; 5; 2+(0,0,1)⟩	2**c**,**a**,**b**	1/4,1/4,1/2
Ibmb (72, *Ibam*)	⟨(2; 3; 5)+(0,0,1)⟩	2**c**,**a**,**b**	1/4,1/4,0
Imaa (72, *Ibam*)	⟨5; (2; 3)+(0,0,1)⟩	**b**,2**c**,**a**	
Imaa (72, *Ibam*)	⟨3; (2; 5)+(0,0,1)⟩	**b**,2**c**,**a**	0,0,1/2
Ccce (68)	⟨2; 5; 3+(0,0,1)⟩	**a**,**b**,2**c**	1/4,1/4,0
Ccce (68)	⟨2; 3; 5+(0,0,1)⟩	**a**,**b**,2**c**	1/4,1/4,1/2
Cmme (67)	⟨2; 3; 5⟩	**a**,**b**,2**c**	
Cmme (67)	⟨2; (3; 5)+(0,0,1)⟩	**a**,**b**,2**c**	0,0,1/2
Ccme (64, *Cmce*)	⟨3; 5; 2+(0,0,1)⟩	−**b**,**a**,2**c**	1/4,1/4,0
Ccme (64, *Cmce*)	⟨(2; 3; 5)+(0,0,1)⟩	−**b**,**a**,2**c**	1/4,1/4,1/2
Cmce (64)	⟨5; (2; 3)+(0,0,1)⟩	**a**,**b**,2**c**	
Cmce (64)	⟨3; (2; 5)+(0,0,1)⟩	**a**,**b**,2**c**	0,0,1/2

[3] $\mathbf{a}'=3\mathbf{a}$

Cmme (67)	⟨2; 3; 5⟩	3**a**,**b**,**c**	
Cmme (67)	⟨(2; 3; 5)+(2,0,0)⟩	3**a**,**b**,**c**	1,0,0
Cmme (67)	⟨(2; 3; 5)+(4,0,0)⟩	3**a**,**b**,**c**	2,0,0

[3] $\mathbf{b}'=3\mathbf{b}$

Cmme (67)	⟨5; (2; 3)+(0,1,0)⟩	**a**,3**b**,**c**	
Cmme (67)	⟨2+(0,3,0); 3+(0,1,0); 5+(0,2,0)⟩	**a**,3**b**,**c**	0,1,0
Cmme (67)	⟨2+(0,5,0); 3+(0,1,0); 5+(0,4,0)⟩	**a**,3**b**,**c**	0,2,0

[3] $\mathbf{c}'=3\mathbf{c}$

Cmme (67)	⟨2; 3; 5⟩	**a**,**b**,3**c**	
Cmme (67)	⟨2; (3; 5)+(0,0,2)⟩	**a**,**b**,3**c**	0,0,1
Cmme (67)	⟨2; (3; 5)+(0,0,4)⟩	**a**,**b**,3**c**	0,0,2

- **Series of maximal isomorphic subgroups**

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

I Minimal *translationengleiche* supergroups

[2] $P4/nbm$ (125); [2] $P4/nmm$ (129); [2] $P4_2/nnm$ (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)