

$\bar{4}/mmm$

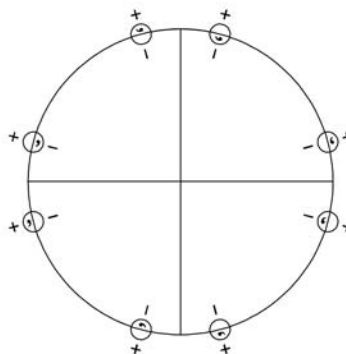
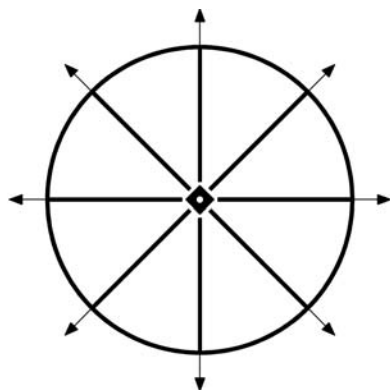
$4/mmm$

Tetragonal

No. 39

$\bar{4}/m2/m2/m$

Patterson symmetry $\bar{4}/mmm$



Origin at centre ($4/mmm$)

Asymmetric unit $0 \leq x; 0 \leq y; 0 \leq z \leq \frac{1}{2}; x \leq y$

Symmetry operations

- | | | | |
|-----------------------|------------------|---------------------------------|---------------------------------|
| (1) 1 | (2) 2 $0,0,z$ | (3) 4^+ $0,0,z$ | (4) 4^- $0,0,z$ |
| (5) 2 $0,y,0$ | (6) 2 $x,0,0$ | (7) 2 $x,x,0$ | (8) 2 $x,\bar{x},0$ |
| (9) $\bar{1}$ $0,0,0$ | (10) m $x,y,0$ | (11) $\bar{4}^+$ $0,0,z; 0,0,0$ | (12) $\bar{4}^-$ $0,0,z; 0,0,0$ |
| (13) m $x,0,z$ | (14) m $0,y,z$ | (15) m x,\bar{x},z | (16) m x,x,z |

Generators selected (1); $t(0,0,1)$; (2); (3); (5); (9)

Positions

Multiplicity, Wyckoff letter, Site symmetry		Coordinates				Reflection conditions
						General:
16	<i>l</i> 1	(1) x, y, z (5) \bar{x}, y, \bar{z} (9) $\bar{x}, \bar{y}, \bar{z}$ (13) x, \bar{y}, z	(2) \bar{x}, \bar{y}, z (6) x, \bar{y}, \bar{z} (10) x, y, \bar{z} (14) \bar{x}, y, z	(3) \bar{y}, x, z (7) y, x, \bar{z} (11) y, \bar{x}, \bar{z} (15) \bar{y}, \bar{x}, z	(4) y, \bar{x}, z (8) $\bar{y}, \bar{x}, \bar{z}$ (12) \bar{y}, x, \bar{z} (16) y, x, z	no conditions
8	<i>k</i> . <i>m</i> .	$x, 0, z$ $\bar{x}, 0, \bar{z}$	$\bar{x}, 0, z$ $x, 0, \bar{z}$	$0, x, z$ $0, x, \bar{z}$	$0, \bar{x}, z$ $0, \bar{x}, \bar{z}$	Special: no extra conditions
8	<i>j</i> . . <i>m</i>	x, x, z \bar{x}, x, \bar{z}	\bar{x}, \bar{x}, z x, \bar{x}, \bar{z}	\bar{x}, x, z x, x, \bar{z}	x, \bar{x}, z $\bar{x}, \bar{x}, \bar{z}$	
8	<i>i</i> <i>m</i> . .	$x, y, \frac{1}{2}$ $\bar{x}, y, \frac{1}{2}$	$\bar{x}, \bar{y}, \frac{1}{2}$ $x, \bar{y}, \frac{1}{2}$	$\bar{y}, x, \frac{1}{2}$ $y, x, \frac{1}{2}$	$y, \bar{x}, \frac{1}{2}$ $\bar{y}, \bar{x}, \frac{1}{2}$	
8	<i>h</i> <i>m</i> . .	$x, y, 0$ $\bar{x}, y, 0$	$\bar{x}, \bar{y}, 0$ $x, \bar{y}, 0$	$\bar{y}, x, 0$ $y, x, 0$	$y, \bar{x}, 0$ $\bar{y}, \bar{x}, 0$	
4	<i>g</i> <i>m</i> 2 <i>m</i> .	$x, 0, \frac{1}{2}$	$\bar{x}, 0, \frac{1}{2}$	$0, x, \frac{1}{2}$	$0, \bar{x}, \frac{1}{2}$	
4	<i>f</i> <i>m</i> 2 <i>m</i> .	$x, 0, 0$	$\bar{x}, 0, 0$	$0, x, 0$	$0, \bar{x}, 0$	
4	<i>e</i> <i>m</i> . 2 <i>m</i>	$x, x, \frac{1}{2}$	$\bar{x}, \bar{x}, \frac{1}{2}$	$\bar{x}, x, \frac{1}{2}$	$x, \bar{x}, \frac{1}{2}$	
4	<i>d</i> <i>m</i> . 2 <i>m</i>	$x, x, 0$	$\bar{x}, \bar{x}, 0$	$\bar{x}, x, 0$	$x, \bar{x}, 0$	
2	<i>c</i> 4 <i>m m</i>	$0, 0, z$	$0, 0, \bar{z}$			
1	<i>b</i> 4/ <i>m m m</i>	$0, 0, \frac{1}{2}$				
1	<i>a</i> 4/ <i>m m m</i>	$0, 0, 0$				

Symmetry of special projections

Along [001] 4*m m*

Origin at 0, 0, z

Along [100] $\bar{4}2m m$

$\mathbf{a}' = \mathbf{c}$

Origin at x, 0, 0

Along [110] $\bar{4}2m m$

$\mathbf{a}' = \mathbf{c}$

Origin at x, x, 0

Maximal non-isotypic non-enantiomorphic subgroups

I	$[2]\bar{4}2m$ (37)	1; 2; 5; 6; 11; 12; 15; 16
	$[2]\bar{4}m2$ ($\bar{4}2m$, 37)	1; 2; 7; 8; 11; 12; 13; 14
	$[2]\bar{4}mm$ (34)	1; 2; 3; 4; 13; 14; 15; 16
	$[2]\bar{4}22$ (30)	1; 2; 3; 4; 5; 6; 7; 8
	$[2]\bar{4}/m11$ ($\bar{4}/m$, 28)	1; 2; 3; 4; 9; 10; 11; 12
	$[2]\bar{2}/m2/m1$ ($\bar{2}mmm$, 20)	1; 2; 5; 6; 9; 10; 13; 14
	$[2]\bar{2}/m12/m$ ($\bar{2}mmm$, 20)	1; 2; 7; 8; 9; 10; 15; 16

IIa none

IIb $[2]\bar{4}_2/mmc$ ($\mathbf{c}' = 2\mathbf{c}$) (41); $[2]\bar{4}_2/mcm$ ($\mathbf{c}' = 2\mathbf{c}$) ($\bar{4}_2/mmc$, 41); $[2]\bar{4}/mcc$ ($\mathbf{c}' = 2\mathbf{c}$) (40)

Maximal isotypic subgroups and enantiomorphic subgroups of lowest index

IIc $[2]\bar{4}/mmm$ ($\mathbf{c}' = 2\mathbf{c}$) (39)

Minimal non-isotypic non-enantiomorphic supergroups

I none

II none