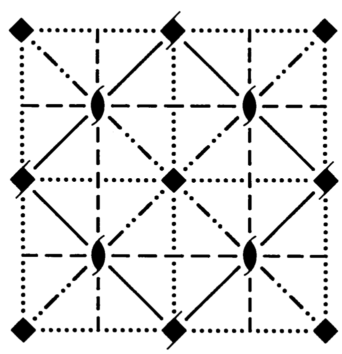
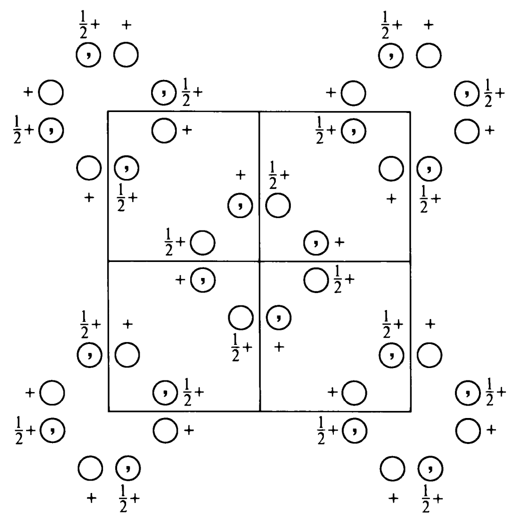
$I4cm$ C_{4v}^{10} $4mm$ Tetragonal

No. 108 $I4cm$ Patterson symmetry $I4/mmm$





Origin on $4ce$

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

Symmetry operations

For $(0,0,0)+$ set

(1) 1	(2) 2 $0,0,z$	(3) 4^+ $0,0,z$	(4) 4^- $0,0,z$
(5) c $x,0,z$	(6) c $0,y,z$	(7) c $x,\bar{x},z$	(8) c x,x,z

For $(\frac{1}{2},\frac{1}{2},\frac{1}{2})+$ set

(1) $t(\frac{1}{2},\frac{1}{2},\frac{1}{2})$	(2) $2(0,0,\frac{1}{2})$ $\frac{1}{4},\frac{1}{4},z$	(3) $4^+(0,0,\frac{1}{2})$ $0,\frac{1}{2},z$	(4) $4^-(0,0,\frac{1}{2})$ $\frac{1}{2},0,z$
(5) a $x,\frac{1}{4},z$	(6) b $\frac{1}{4},y,z$	(7) m $x+\frac{1}{2},\bar{x},z$	(8) $g(\frac{1}{2},\frac{1}{2},0)$ x,x,z

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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)

Positions

Multiplicity, Wyckoff letter, Site symmetry			Coordinates				Reflection conditions
			$(0,0,0)+$ $(\frac{1}{2},\frac{1}{2},\frac{1}{2})+$				General:
16	d	1	(1) x,y,z (5) $x,\bar{y},z+\frac{1}{2}$	(2) $\bar{x},\bar{y},z$ (6) $\bar{x},y,z+\frac{1}{2}$	(3) $\bar{y},x,z$ (7) $\bar{y},\bar{x},z+\frac{1}{2}$	(4) $y,\bar{x},z$ (8) $y,x,z+\frac{1}{2}$	hkl : $h+k+l=2n$ $hk0$: $h+k=2n$ $0kl$: $k,l=2n$ hhl : $l=2n$ $00l$: $l=2n$ $h00$: $h=2n$
							Special: as above, plus
8	c	$..m$	$x,x+\frac{1}{2},z$	$\bar{x},\bar{x}+\frac{1}{2},z$	$\bar{x}+\frac{1}{2},x,z$	$x+\frac{1}{2},\bar{x},z$	no extra conditions
4	b	$2.mm$	$\frac{1}{2},0,z$	$0,\frac{1}{2},z$			hkl : $l=2n$
4	a	$4..$	$0,0,z$	$0,0,z+\frac{1}{2}$			hkl : $l=2n$

Symmetry of special projections

Along [001] $p4mm$
$\mathbf{a}'=\frac{1}{2}(\mathbf{a}-\mathbf{b})$ $\mathbf{b}'=\frac{1}{2}(\mathbf{a}+\mathbf{b})$
Origin at $0,0,z$

Along [100] $p1m1$
$\mathbf{a}'=\frac{1}{2}\mathbf{b}$ $\mathbf{b}'=\frac{1}{2}\mathbf{c}$
Origin at $x,0,0$

Along [110] $p1m1$
$\mathbf{a}'=\frac{1}{2}(-\mathbf{a}+\mathbf{b})$ $\mathbf{b}'=\frac{1}{2}\mathbf{c}$
Origin at $x,x,0$

Maximal non-isomorphic subgroups

I [2] $I411$ ($I4$, 79) (1; 2; 3; 4)+
[2] $I2c1$ ($Iba2$, 45) (1; 2; 5; 6)+
[2] $I21m$ ($Fmm2$, 42) (1; 2; 7; 8)+

IIa [2] $P4_2bc$ (106) 1; 2; 7; 8; (3; 4; 5; 6) + $(\frac{1}{2},\frac{1}{2},\frac{1}{2})$
[2] $P4cc$ (103) 1; 2; 3; 4; 5; 6; 7; 8
[2] $P4_2cm$ (101) 1; 2; 5; 6; (3; 4; 7; 8) + $(\frac{1}{2},\frac{1}{2},\frac{1}{2})$
[2] $P4bm$ (100) 1; 2; 3; 4; (5; 6; 7; 8) + $(\frac{1}{2},\frac{1}{2},\frac{1}{2})$

IIb none

Maximal isomorphic subgroups of lowest index

IIc [3] $I4cm$ ($\mathbf{c}'=3\mathbf{c}$) (108); [9] $I4cm$ ($\mathbf{a}'=3\mathbf{a},\mathbf{b}'=3\mathbf{b}$) (108)

Minimal non-isomorphic supergroups

I [2] $I4/mcm$ (140)

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