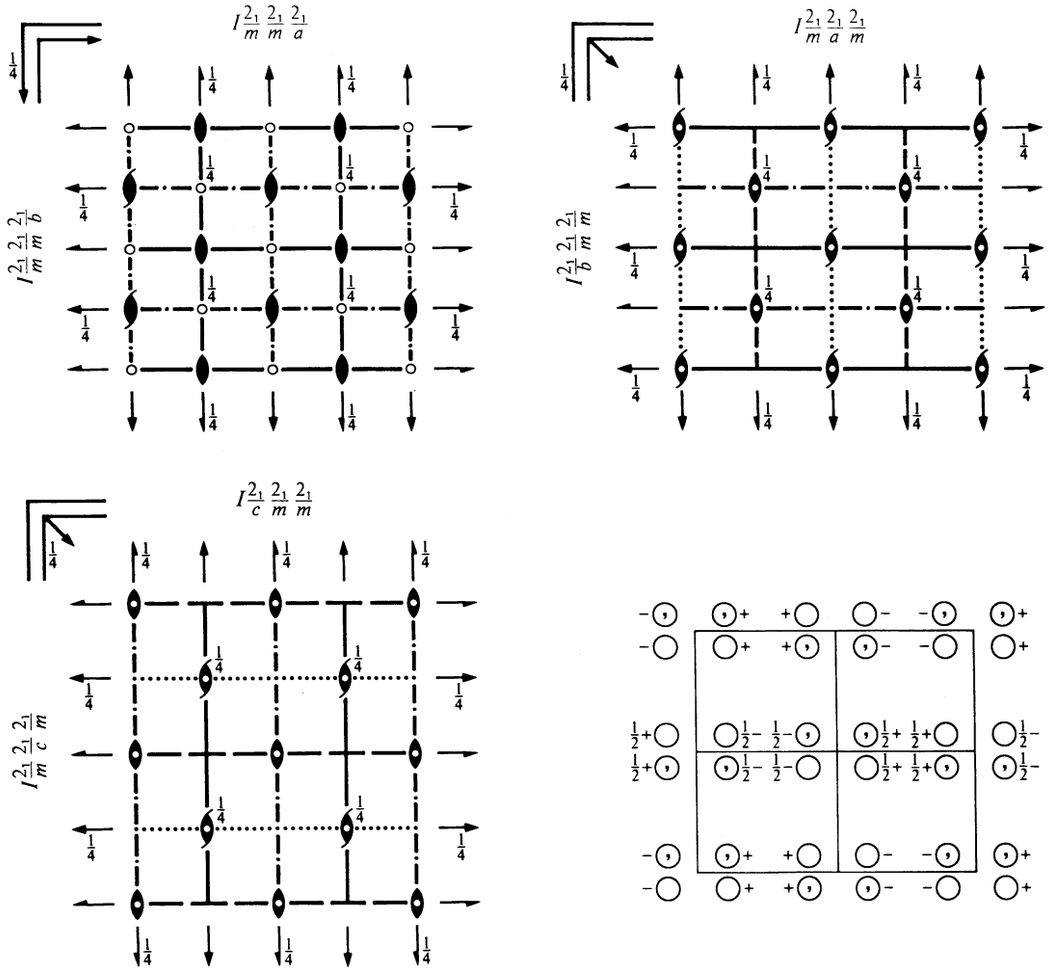
$Imma$ D_{2h}^{28} mmm Orthorhombic

No. 74 $I\ 2_1/m\ 2_1/m\ 2_1/a$ Patterson symmetry $Immm$



Origin at centre $(2/m)$ at $2/m2_1/nb$

Asymmetric unit $0 \le x \le \frac{1}{4}$; $0 \le y \le \frac{1}{4}$; $0 \le z \le 1$

Symmetry operations

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

(1) 1	(2) 2 $0,\frac{1}{4},z$	(3) $2(0,\frac{1}{2},0)$ $0,y,0$	(4) 2 $x,0,0$
(5) $\bar{1}$ $0,0,0$	(6) b $x,y,0$	(7) m $x,\frac{1}{4},z$	(8) m $0,y,z$

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

(1) $t(\frac{1}{2},\frac{1}{2},\frac{1}{2})$	(2) $2(0,0,\frac{1}{2})$ $\frac{1}{4},0,z$	(3) 2 $\frac{1}{4},y,\frac{1}{4}$	(4) $2(\frac{1}{2},0,0)$ $x,\frac{1}{4},\frac{1}{4}$
(5) $\bar{1}$ $\frac{1}{4},\frac{1}{4},\frac{1}{4}$	(6) a $x,y,\frac{1}{4}$	(7) $n(\frac{1}{2},0,\frac{1}{2})$ $x,0,z$	(8) $n(0,\frac{1}{2},\frac{1}{2})$ $\frac{1}{4},y,z$

Maximal isomorphic subgroups of lowest index

IIc [3] $Imma$ ($\mathbf{a}' = 3\mathbf{a}$ or $\mathbf{b}' = 3\mathbf{b}$) (74); [3] $Imma$ ($\mathbf{c}' = 3\mathbf{c}$) (74)

Minimal non-isomorphic supergroups

I [2] $I4_1/amd$ (141)

II [2] $Ammm$ ($\mathbf{a}' = \frac{1}{2}\mathbf{a}$) ($Cmmm$, 65); [2] $Bmmm$ ($\mathbf{b}' = \frac{1}{2}\mathbf{b}$) ($Cmmm$, 65); [2] $Cmme$ ($\mathbf{c}' = \frac{1}{2}\mathbf{c}$) (67)

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 $(0,0,0)+$ $(\frac{1}{2},\frac{1}{2},\frac{1}{2})+$				Reflection conditions
							General:
16	j	1	(1) x,y,z (5) $\bar{x},\bar{y},\bar{z}$	(2) $\bar{x},\bar{y}+\frac{1}{2},z$ (6) $x,y+\frac{1}{2},\bar{z}$	(3) $\bar{x},y+\frac{1}{2},\bar{z}$ (7) $x,\bar{y}+\frac{1}{2},z$	(4) $x,\bar{y},\bar{z}$ (8) $\bar{x},y,z$	hkl : $h+k+l=2n$ $0kl$: $k+l=2n$ $h0l$: $h+l=2n$ $hk0$: $h,k=2n$ $h00$: $h=2n$ $0k0$: $k=2n$ $00l$: $l=2n$
							Special: as above, plus
8	i	. m .	$x,\frac{1}{4},z$	$\bar{x},\frac{1}{4},z$	$\bar{x},\frac{3}{4},\bar{z}$	$x,\frac{3}{4},\bar{z}$	no extra conditions
8	h	m . .	$0,y,z$	$0,\bar{y}+\frac{1}{2},z$	$0,y+\frac{1}{2},\bar{z}$	$0,\bar{y},\bar{z}$	no extra conditions
8	g	. 2 .	$\frac{1}{4},y,\frac{1}{4}$	$\frac{3}{4},\bar{y}+\frac{1}{2},\frac{1}{4}$	$\frac{3}{4},\bar{y},\frac{3}{4}$	$\frac{1}{4},y+\frac{1}{2},\frac{3}{4}$	hkl : $h=2n$
8	f	2 . .	$x,0,0$	$\bar{x},\frac{1}{2},0$	$\bar{x},0,0$	$x,\frac{1}{2},0$	hkl : $k=2n$
4	e	$m\,m\,2$	$0,\frac{1}{4},z$	$0,\frac{3}{4},\bar{z}$			no extra conditions
4	d	. $2/m$.	$\frac{1}{4},\frac{1}{4},\frac{3}{4}$	$\frac{3}{4},\frac{1}{4},\frac{3}{4}$			hkl : $h=2n$
4	c	. $2/m$.	$\frac{1}{4},\frac{1}{4},\frac{1}{4}$	$\frac{3}{4},\frac{1}{4},\frac{1}{4}$			hkl : $h=2n$
4	b	$2/m$ . .	$0,0,\frac{1}{2}$	$0,\frac{1}{2},\frac{1}{2}$			hkl : $h=2n$
4	a	$2/m$ . .	$0,0,0$	$0,\frac{1}{2},0$			hkl : $h=2n$

Symmetry of special projections

Along [001] $p2mm$
$\mathbf{a}' = \frac{1}{2}\mathbf{a}$ $\mathbf{b}' = \frac{1}{2}\mathbf{b}$
Origin at $0,0,z$

Along [100] $c2mm$
$\mathbf{a}' = \mathbf{b}$ $\mathbf{b}' = \mathbf{c}$
Origin at $x,\frac{1}{4},\frac{1}{4}$

Along [010] $c2mm$
$\mathbf{a}' = \mathbf{c}$ $\mathbf{b}' = \mathbf{a}$
Origin at $0,y,0$

Maximal non-isomorphic subgroups

I	[2] $Im2b$ ($Ima2$, 46)	(1; 3; 6; 8)+
	[2] $I2mb$ ($Ima2$, 46)	(1; 4; 6; 7)+
	[2] $Imm2$ (44)	(1; 2; 7; 8)+
	[2] $I2_12_12_1$ (24)	(1; 2; 3; 4)+
	[2] $I112/b$ ($C2/c$, 15)	(1; 2; 5; 6)+
	[2] $I12/m1$ ($C2/m$, 12)	(1; 3; 5; 7)+
	[2] $I2/m11$ ($C2/m$, 12)	(1; 4; 5; 8)+
IIa	[2] $Pnma$ (62)	1; 3; 5; 7; (2; 4; 6; 8) + $(\frac{1}{2},\frac{1}{2},\frac{1}{2})$
	[2] $Pmnb$ ($Pnma$, 62)	1; 3; 6; 8; (2; 4; 5; 7) + $(\frac{1}{2},\frac{1}{2},\frac{1}{2})$
	[2] $Pnmb$ ($Pmna$, 53)	1; 4; 6; 7; (2; 3; 5; 8) + $(\frac{1}{2},\frac{1}{2},\frac{1}{2})$
	[2] $Pmna$ (53)	1; 4; 5; 8; (2; 3; 6; 7) + $(\frac{1}{2},\frac{1}{2},\frac{1}{2})$
	[2] $Pnna$ (52)	1; 2; 3; 4; (5; 6; 7; 8) + $(\frac{1}{2},\frac{1}{2},\frac{1}{2})$
	[2] $Pnnb$ ($Pnna$, 52)	1; 2; 5; 6; (3; 4; 7; 8) + $(\frac{1}{2},\frac{1}{2},\frac{1}{2})$
	[2] $Pmma$ (51)	1; 2; 7; 8; (3; 4; 5; 6) + $(\frac{1}{2},\frac{1}{2},\frac{1}{2})$
	[2] $Pmmb$ ($Pmma$, 51)	1; 2; 3; 4; 5; 6; 7; 8
IIb	none	

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