

Imma

D_{2h}^{28}

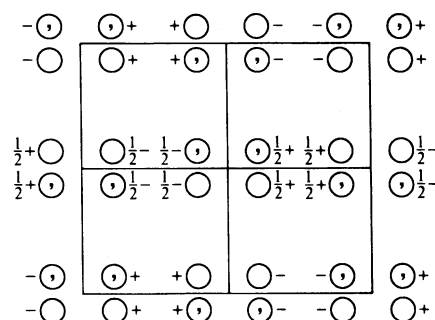
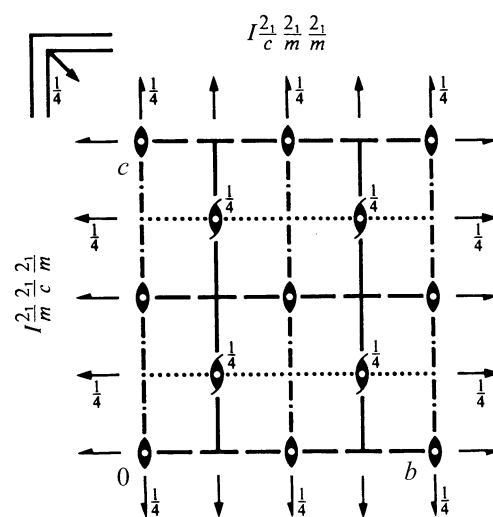
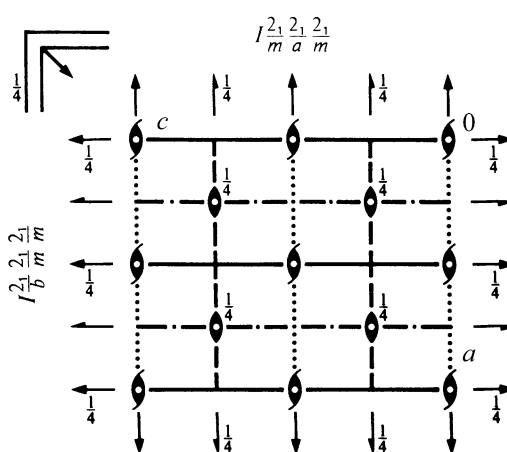
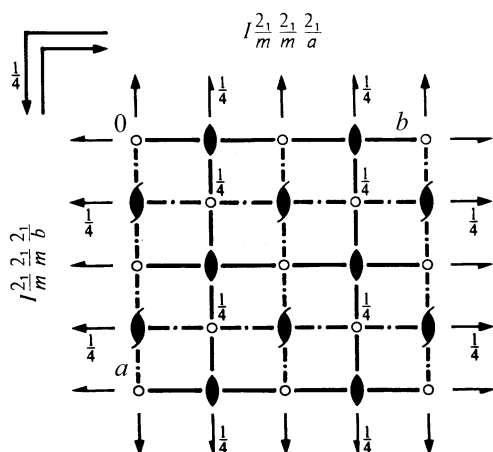
mmm

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 $0 \leq x \leq \frac{1}{4}$; $0 \leq y \leq \frac{1}{4}$; $0 \leq z \leq 1$

Symmetry operations

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

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

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

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

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

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 $0, y, 0$