

*P*432

*O*¹

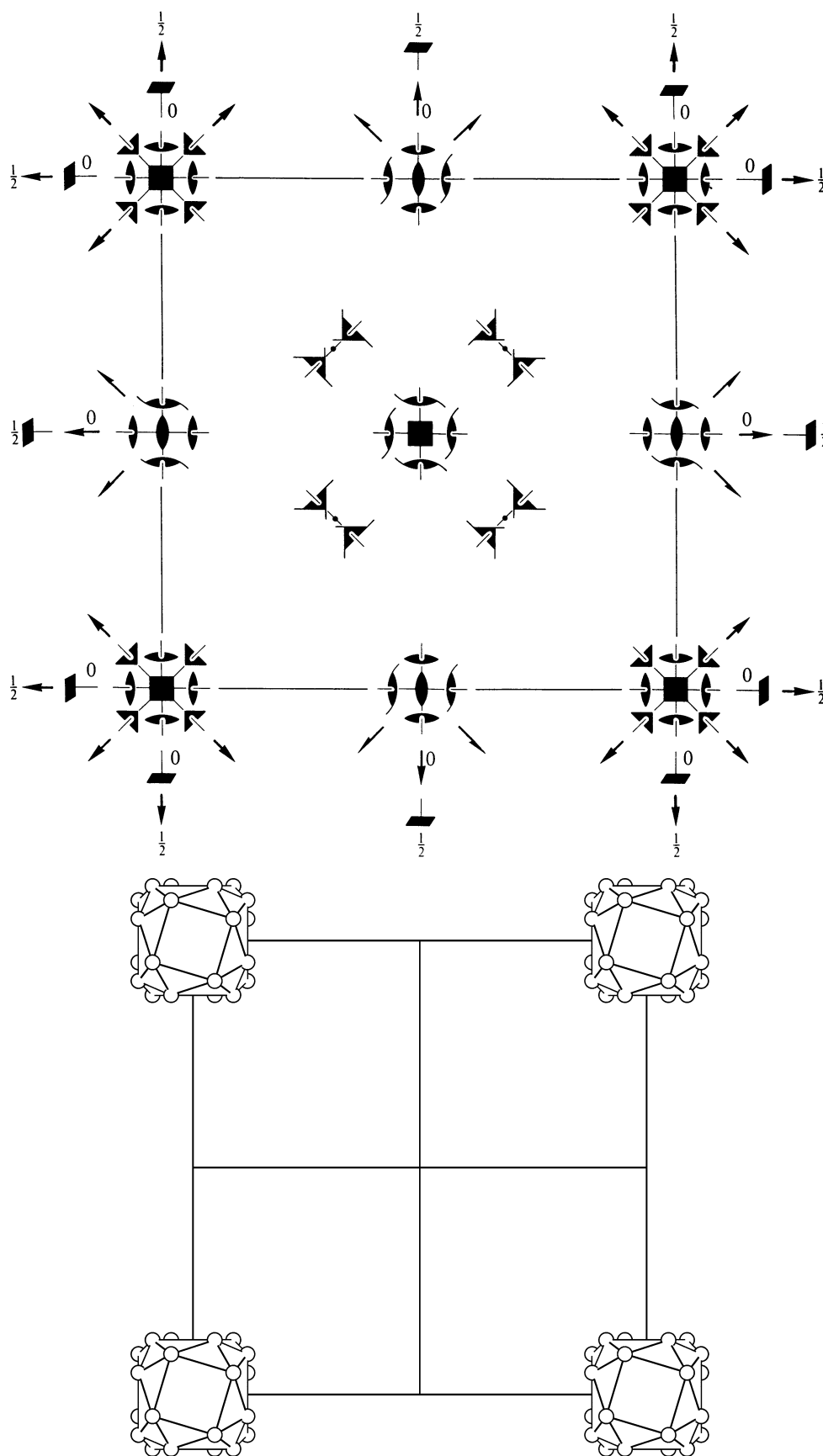
432

Cubic

No. 207

*P*432

Patterson symmetry *Pm* $\bar{3}$ *m*



Origin at 432

Asymmetric unit $0 \leq x \leq 1; 0 \leq y \leq \frac{1}{2}; 0 \leq z \leq \frac{1}{2}; y \leq \min(x, 1-x); z \leq y$

Vertices $0,0,0 \quad 1,0,0 \quad \frac{1}{2}, \frac{1}{2}, 0 \quad \frac{1}{2}, \frac{1}{2}, \frac{1}{2}$

Symmetry operations

(1) 1	(2) 2 0,0,z	(3) 2 0,y,0	(4) 2 x,0,0
(5) 3 ⁺ x,x,x	(6) 3 ⁺ \bar{x} ,x, \bar{x}	(7) 3 ⁺ x, \bar{x} , \bar{x}	(8) 3 ⁺ \bar{x} , \bar{x} ,x
(9) 3 ⁻ x,x,x	(10) 3 ⁻ x, \bar{x} , \bar{x}	(11) 3 ⁻ \bar{x} , \bar{x} ,x	(12) 3 ⁻ \bar{x} ,x, \bar{x}
(13) 2 x,x,0	(14) 2 x, \bar{x} ,0	(15) 4 ⁻ 0,0,z	(16) 4 ⁺ 0,0,z
(17) 4 ⁻ x,0,0	(18) 2 0,y,y	(19) 2 0,y, \bar{y}	(20) 4 ⁺ x,0,0
(21) 4 ⁺ 0,y,0	(22) 2 x,0,x	(23) 4 ⁻ 0,y,0	(24) 2 \bar{x} ,0,x

Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2); (3); (5); (13)

Positions

Multiplicity,
Wyckoff letter,
Site symmetry

Coordinates

Reflection conditions

24	<i>k</i>	1	(1) x,y,z	(2) \bar{x} , \bar{y} ,z	(3) \bar{x} ,y, \bar{z}	(4) x, \bar{y} , \bar{z}
			(5) z,x,y	(6) z, \bar{x} , \bar{y}	(7) \bar{z} , \bar{x} ,y	(8) \bar{z} ,x, \bar{y}
			(9) y,z,x	(10) \bar{y} ,z, \bar{x}	(11) y, \bar{z} , \bar{x}	(12) \bar{y} , \bar{z} ,x
			(13) y,x, \bar{z}	(14) \bar{y} , \bar{x} , \bar{z}	(15) y, \bar{x} ,z	(16) \bar{y} ,x,z
			(17) x,z, \bar{y}	(18) \bar{x} ,z,y	(19) \bar{x} , \bar{z} , \bar{y}	(20) x, \bar{z} ,y
			(21) z,y, \bar{x}	(22) z, \bar{y} ,x	(23) \bar{z} ,y,x	(24) \bar{z} , \bar{y} , \bar{x}

 h,k,l permutable

General:

no conditions

Special: no extra conditions

12	<i>j</i>	..2	$\frac{1}{2},y,y$ $\bar{y},\frac{1}{2},y$	$\frac{1}{2},\bar{y},y$ $\bar{y},\frac{1}{2},\bar{y}$	$\frac{1}{2},y,\bar{y}$ $y,y,\frac{1}{2}$	$\frac{1}{2},\bar{y},\bar{y}$ $\bar{y},y,\frac{1}{2}$	$y,\frac{1}{2},y$ $y,\bar{y},\frac{1}{2}$	$y,\frac{1}{2},\bar{y}$ $\bar{y},\bar{y},\frac{1}{2}$
12	<i>i</i>	..2	0,y,y $\bar{y},0,y$	0, \bar{y} ,y $\bar{y},0,\bar{y}$	0,y, \bar{y} y,y,0	0, \bar{y} , \bar{y} $\bar{y},y,0$	y,0,y y, $\bar{y},0$	y,0, \bar{y} $\bar{y},\bar{y},0$
12	<i>h</i>	2..	$x,\frac{1}{2},0$ $\frac{1}{2},x,0$	$\bar{x},\frac{1}{2},0$ $\frac{1}{2},\bar{x},0$	0,x, $\frac{1}{2}$ x,0, $\frac{1}{2}$	0, $\bar{x},\frac{1}{2}$ $\bar{x},0,\frac{1}{2}$	$\frac{1}{2},0,x$ 0, $\frac{1}{2},\bar{x}$	$\frac{1}{2},0,\bar{x}$ 0, $\frac{1}{2},x$
8	<i>g</i>	.3.	x,x,x x,x, \bar{x}	\bar{x},\bar{x},x \bar{x},\bar{x},\bar{x}	\bar{x},x,\bar{x} x, \bar{x},x	x, \bar{x},\bar{x} \bar{x},x,x		
6	<i>f</i>	4..	$x,\frac{1}{2},\frac{1}{2}$	$\bar{x},\frac{1}{2},\frac{1}{2}$	$\frac{1}{2},x,\frac{1}{2}$	$\frac{1}{2},\bar{x},\frac{1}{2}$	$\frac{1}{2},\frac{1}{2},x$	$\frac{1}{2},\frac{1}{2},\bar{x}$
6	<i>e</i>	4..	x,0,0	$\bar{x},0,0$	0,x,0	0, $\bar{x},0$	0,0,x	0,0, \bar{x}
3	<i>d</i>	42.2	$\frac{1}{2},0,0$	0, $\frac{1}{2},0$	0,0, $\frac{1}{2}$			
3	<i>c</i>	42.2	0, $\frac{1}{2},\frac{1}{2}$	$\frac{1}{2},0,\frac{1}{2}$	$\frac{1}{2},\frac{1}{2},0$			
1	<i>b</i>	432	$\frac{1}{2},\frac{1}{2},\frac{1}{2}$					
1	<i>a</i>	432	0,0,0					

Symmetry of special projections

Along [001] $p4mm$
 $\mathbf{a}' = \mathbf{a}$ $\mathbf{b}' = \mathbf{b}$
Origin at 0,0,z

Along [111] $p3m1$
 $\mathbf{a}' = \frac{1}{3}(2\mathbf{a} - \mathbf{b} - \mathbf{c})$ $\mathbf{b}' = \frac{1}{3}(-\mathbf{a} + 2\mathbf{b} - \mathbf{c})$
Origin at x,x,x

Along [110] $p2mm$
 $\mathbf{a}' = \frac{1}{2}(-\mathbf{a} + \mathbf{b})$ $\mathbf{b}' = \mathbf{c}$
Origin at x,x,0