

$P6_122$

D_6^2

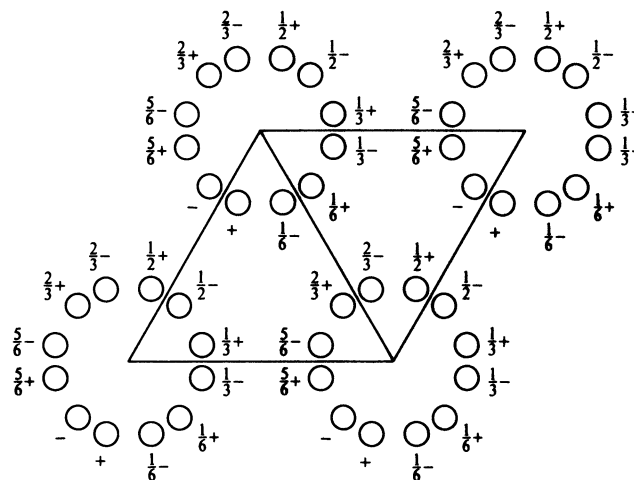
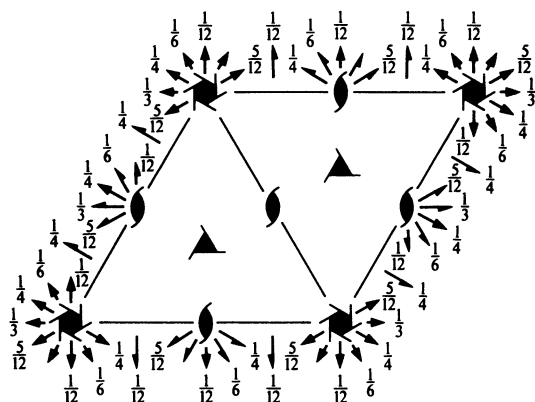
622

Hexagonal

No. 178

$P6_122$

Patterson symmetry $P6/mmm$



Origin on $2[100]$ at $6_1(2, 1, 1)1$

Asymmetric unit $0 \leq x \leq 1; 0 \leq y \leq 1; 0 \leq z \leq \frac{1}{12}$
 Vertices $0, 0, 0$ $1, 0, 0$ $1, 1, 0$ $0, 1, 0$
 $0, 0, \frac{1}{12}$ $1, 0, \frac{1}{12}$ $1, 1, \frac{1}{12}$ $0, 1, \frac{1}{12}$

Symmetry operations

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

Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2); (4); (7)

Positions

Multiplicity, Wyckoff letter, Site symmetry	Coordinates							Reflection conditions
								General:
12 <i>c</i> 1	(1) x, y, z	(2) $\bar{y}, x - y, z + \frac{1}{3}$	(3) $\bar{x} + y, \bar{x}, z + \frac{2}{3}$				(12) $x, x - y, \bar{z} + \frac{1}{6}$	$000l : l = 6n$
	(4) $\bar{x}, \bar{y}, z + \frac{1}{2}$	(5) $y, \bar{x} + y, z + \frac{5}{6}$	(6) $x - y, x, z + \frac{1}{6}$					
	(7) $y, x, \bar{z} + \frac{1}{3}$	(8) $x - y, \bar{y}, \bar{z}$	(9) $\bar{x}, \bar{x} + y, \bar{z} + \frac{2}{3}$					
	(10) $\bar{y}, \bar{x}, \bar{z} + \frac{5}{6}$	(11) $\bar{x} + y, y, \bar{z} + \frac{1}{2}$						
								Special: as above, plus
6 <i>b</i> . . 2	$x, 2x, \frac{1}{4}$	$2\bar{x}, \bar{x}, \frac{7}{12}$	$x, \bar{x}, \frac{11}{12}$	$\bar{x}, 2\bar{x}, \frac{3}{4}$	$2x, x, \frac{1}{12}$	$\bar{x}, x, \frac{5}{12}$		$hh\bar{2}hl : l = 2n$ or $l = 3n + 1$ or $l = 3n + 2$
6 <i>a</i> . 2 .	$x, 0, 0$	$0, x, \frac{1}{3}$	$\bar{x}, \bar{x}, \frac{2}{3}$	$\bar{x}, 0, \frac{1}{2}$	$0, \bar{x}, \frac{5}{6}$	$x, x, \frac{1}{6}$		$h\bar{h}0l : l = 2n$ or $l = 3n + 1$ or $l = 3n + 2$

Symmetry of special projections

Along [001] $p6mm$
 $\mathbf{a}' = \mathbf{a}$ $\mathbf{b}' = \mathbf{b}$
 Origin at 0, 0, z

Along [100] $p2gm$
 $\mathbf{a}' = \frac{1}{2}(\mathbf{a} + 2\mathbf{b})$ $\mathbf{b}' = \mathbf{c}$
 Origin at $x, 0, 0$

Along [210] $p2gm$
 $\mathbf{a}' = \frac{1}{2}\mathbf{b}$ $\mathbf{b}' = \mathbf{c}$
 Origin at $x, \frac{1}{2}x, \frac{1}{12}$

Maximal non-isomorphic subgroups

I	[2] $P6_111$ ($P6_1, 169$)	1; 2; 3; 4; 5; 6
	[2] $P3_121$ (152)	1; 2; 3; 7; 8; 9
	[2] $P3_112$ (151)	1; 2; 3; 10; 11; 12
	{ [3] $P2_122$ ($C222_1, 20$)	1; 4; 7; 10
	{ [3] $P2_122$ ($C222_1, 20$)	1; 4; 8; 11
	{ [3] $P2_122$ ($C222_1, 20$)	1; 4; 9; 12

IIa none**IIb** none**Maximal isomorphic subgroups of lowest index**

IIc [3] $H6_122$ ($\mathbf{a}' = 3\mathbf{a}, \mathbf{b}' = 3\mathbf{b}$) ($P6_122, 178$); [5] $P6_522$ ($\mathbf{c}' = 5\mathbf{c}$) (179); [7] $P6_722$ ($\mathbf{c}' = 7\mathbf{c}$) (178)

Minimal non-isomorphic supergroups**I** none

II [2] $P6_222$ ($\mathbf{c}' = \frac{1}{2}\mathbf{c}$) (180); [3] $P6_322$ ($\mathbf{c}' = \frac{1}{3}\mathbf{c}$) (182)