

$p6mm$

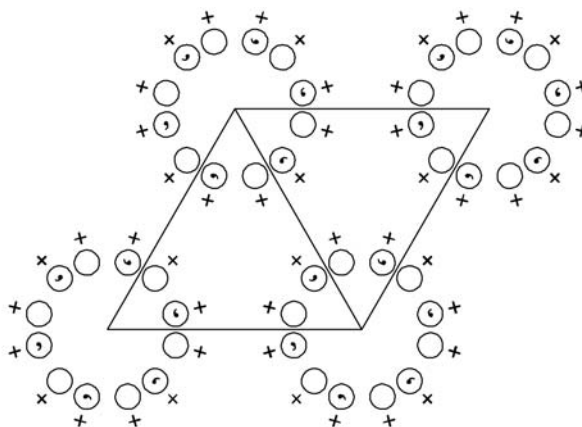
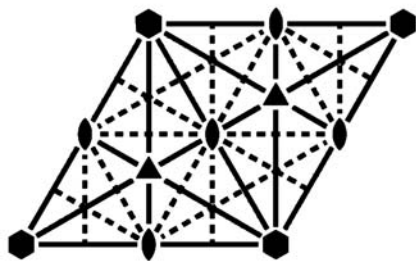
$6mm$

Hexagonal/Hexagonal

No. 77

$p6mm$

Patterson symmetry  $p6/mmm$



Origin on  $6mm$

Asymmetric unit  $0 \leq x \leq \frac{2}{3}; 0 \leq y \leq \frac{1}{3}; x \leq (1+y)/2; y \leq x/2$

Vertices  $0, 0, \frac{1}{2}, 0, \frac{2}{3}, \frac{1}{3}$

Symmetry operations

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

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

**Positions**

Multiplicity, Wyckoff letter, Site symmetry		Coordinates			Reflection conditions		
					General:		
12 $f$ 1	(1) $x, y, z$ (4) $\bar{x}, \bar{y}, z$ (7) $\bar{y}, \bar{x}, z$ (10) $y, x, z$	(2) $\bar{y}, x - y, z$ (5) $y, \bar{x} + y, z$ (8) $\bar{x} + y, y, z$ (11) $x - y, \bar{y}, z$	(3) $\bar{x} + y, \bar{x}, z$ (6) $x - y, x, z$ (9) $x, x - y, z$ (12) $\bar{x}, \bar{x} + y, z$		no conditions		
					Special: no extra conditions		
6 $e$ . $m$ .	$x, \bar{x}, z$	$x, 2x, z$	$2\bar{x}, \bar{x}, z$	$\bar{x}, x, z$	$\bar{x}, 2\bar{x}, z$	$2x, x, z$	
6 $d$ . . $m$	$x, 0, z$	$0, x, z$	$\bar{x}, \bar{x}, z$	$\bar{x}, 0, z$	$0, \bar{x}, z$	$x, x, z$	
3 $c$ $2mm$	$\frac{1}{2}, 0, z$	$0, \frac{1}{2}, z$	$\frac{1}{2}, \frac{1}{2}, z$				
2 $b$ $3m$ .	$\frac{1}{3}, \frac{2}{3}, z$	$\frac{2}{3}, \frac{1}{3}, z$					
1 $a$ $6mm$	$0, 0, z$						

**Symmetry of special projections**

Along  $[001]$   $p6mm$

$\mathbf{a}' = \mathbf{a}$      $\mathbf{b}' = \mathbf{b}$

Origin at  $0, 0, z$

Along  $[100]$   $\neq 1m1$

$\mathbf{a}' = \frac{1}{2}(\mathbf{a} + 2\mathbf{b})$

Origin at  $x, 0, 0$

Along  $[210]$   $\neq 1m1$

$\mathbf{a}' = \frac{1}{2}\mathbf{b}$

Origin at  $x, \frac{1}{2}x, 0$

**Maximal non-isotypic subgroups**

<b>I</b>	$[2] p611 (p6, 73)$	1; 2; 3; 4; 5; 6
	$[2] p31m (70)$	1; 2; 3; 10; 11; 12
	$[2] p3m1 (69)$	1; 2; 3; 7; 8; 9
	$[3] p2mm (cmm2, 26)$	1; 4; 7; 10
	$[3] p2mm (cmm2, 26)$	1; 4; 8; 11
	$[3] p2mm (cmm2, 26)$	1; 4; 9; 12

**IIa** none

**IIb** none

**Maximal isotypic subgroups of lowest index**

**IIc**  $[3] h6mm (\mathbf{a}' = 3\mathbf{a}, \mathbf{b}' = 3\mathbf{b}) (p6mm, 77)$

**Minimal non-isotypic supergroups**

**I**  $[2] p6/mmm (80)$

**II** none