

$P6_322$

$D_6^6$

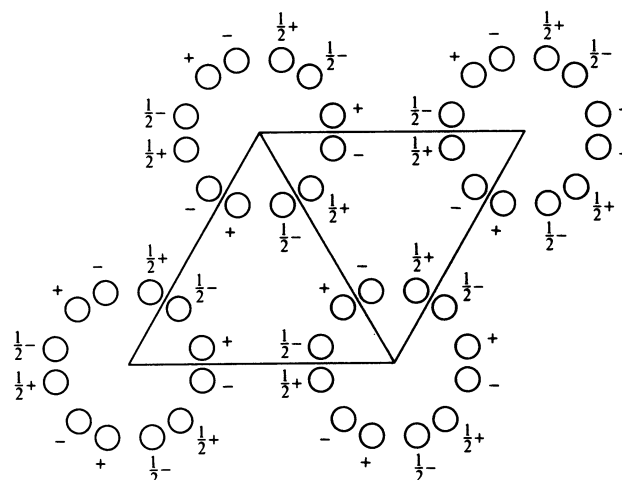
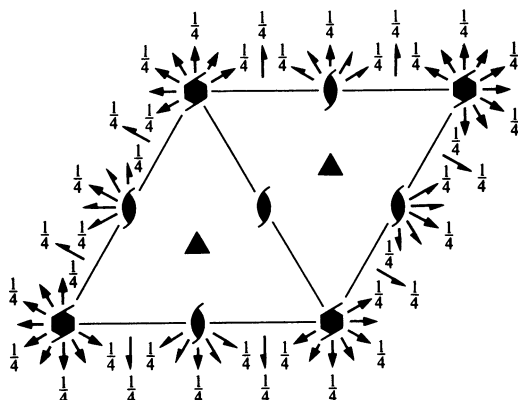
622

Hexagonal

No. 182

$P6_322$

Patterson symmetry  $P6/mmm$



Origin at  $321$  at  $6_321$

Asymmetric unit  $0 \leq x \leq \frac{2}{3}$ ;  $0 \leq y \leq \frac{2}{3}$ ;  $0 \leq z \leq \frac{1}{4}$ ;  $x \leq (1+y)/2$ ;  $y \leq \min(1-x, (1+x)/2)$

Vertices  $0, 0, 0$   $\frac{1}{2}, 0, 0$   $\frac{2}{3}, \frac{1}{3}, 0$   $\frac{1}{3}, \frac{2}{3}, 0$   $0, \frac{1}{2}, 0$   
 $0, 0, \frac{1}{4}$   $\frac{1}{2}, 0, \frac{1}{4}$   $\frac{2}{3}, \frac{1}{3}, \frac{1}{4}$   $\frac{1}{3}, \frac{2}{3}, \frac{1}{4}$   $0, \frac{1}{2}, \frac{1}{4}$

Symmetry operations

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

**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
12	<i>i</i> 1	(1) $x, y, z$ (4) $\bar{x}, \bar{y}, z + \frac{1}{2}$ (7) $y, x, \bar{z}$ (10) $\bar{y}, \bar{x}, \bar{z} + \frac{1}{2}$	(2) $\bar{y}, x - y, z$ (5) $y, \bar{x} + y, z + \frac{1}{2}$ (8) $x - y, \bar{y}, \bar{z}$ (11) $\bar{x} + y, y, \bar{z} + \frac{1}{2}$	(3) $\bar{x} + y, \bar{x}, z$ (6) $x - y, x, z + \frac{1}{2}$ (9) $\bar{x}, \bar{x} + y, \bar{z}$ (12) $x, x - y, \bar{z} + \frac{1}{2}$				General: 000 <i>l</i> : $l = 2n$  Special: as above, plus <i>hh</i> $\bar{2}hl$ : $l = 2n$ <i>h</i> $\bar{h}0l$ : $l = 2n$ <i>hkil</i> : $l = 2n$ or $h - k = 3n + 1$ or $h - k = 3n + 2$  <i>hkil</i> : $l = 2n$  <i>hkil</i> : $l = 2n$ or $h - k = 3n + 1$ or $h - k = 3n + 2$  <i>hkil</i> : $l = 2n$ or $h - k = 3n + 1$ or $h - k = 3n + 2$  <i>hkil</i> : $l = 2n$  <i>hkil</i> : $l = 2n$
6	<i>h</i> ..2	$x, 2x, \frac{1}{4}$	$2\bar{x}, \bar{x}, \frac{1}{4}$	$x, \bar{x}, \frac{1}{4}$	$\bar{x}, 2\bar{x}, \frac{3}{4}$	$2x, x, \frac{3}{4}$	$\bar{x}, x, \frac{3}{4}$	
6	<i>g</i> .2.	$x, 0, 0$	$0, x, 0$	$\bar{x}, \bar{x}, 0$	$\bar{x}, 0, \frac{1}{2}$	$0, \bar{x}, \frac{1}{2}$	$x, x, \frac{1}{2}$	
4	<i>f</i> 3..	$\frac{1}{3}, \frac{2}{3}, z$	$\frac{2}{3}, \frac{1}{3}, z + \frac{1}{2}$	$\frac{2}{3}, \frac{1}{3}, \bar{z}$	$\frac{1}{3}, \frac{2}{3}, \bar{z} + \frac{1}{2}$			
4	<i>e</i> 3..	$0, 0, z$	$0, 0, z + \frac{1}{2}$	$0, 0, \bar{z}$	$0, 0, \bar{z} + \frac{1}{2}$			
2	<i>d</i> 3.2	$\frac{1}{3}, \frac{2}{3}, \frac{3}{4}$	$\frac{2}{3}, \frac{1}{3}, \frac{1}{4}$					
2	<i>c</i> 3.2	$\frac{1}{3}, \frac{2}{3}, \frac{1}{4}$	$\frac{2}{3}, \frac{1}{3}, \frac{3}{4}$					
2	<i>b</i> 3.2	$0, 0, \frac{1}{4}$	$0, 0, \frac{3}{4}$					
2	<i>a</i> 32.	$0, 0, 0$	$0, 0, \frac{1}{2}$					

**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  $x, \frac{1}{2}x, \frac{1}{4}$