$p6/mmm$ $\qquad$ $6/mmm$ $\qquad\qquad$ Hexagonal/Hexagonal

No. 80 $\qquad\qquad$ $p6/mmm$ $\qquad\qquad$ Patterson symmetry $p6/mmm$
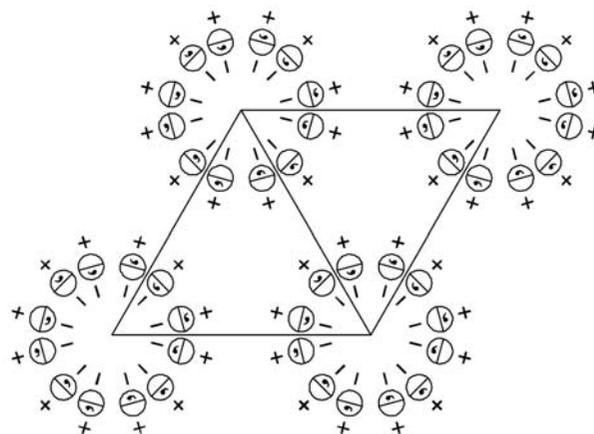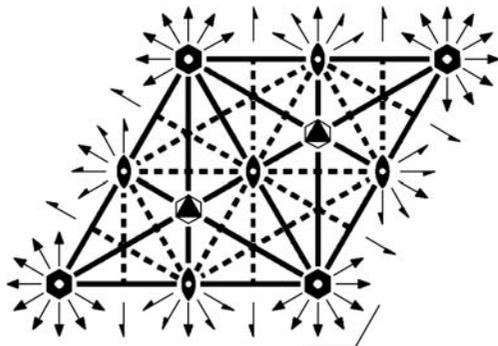
Origin at centre $(6/mmm)$

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

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

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) 2 $x,x,0$	(8) 2 $x,0,0$	(9) 2 $0,y,0$
(10) 2 $x,\bar{x},0$	(11) 2 $x,2x,0$	(12) 2 $2x,x,0$
(13) $\bar{1}$ $0,0,0$	(14) $\bar{3}^+$ $0,0,z;\ 0,0,0$	(15) $\bar{3}^-$ $0,0,z;\ 0,0,0$
(16) m $x,y,0$	(17) $\bar{6}^-$ $0,0,z;\ 0,0,0$	(18) $\bar{6}^+$ $0,0,z;\ 0,0,0$
(19) m $x,\bar{x},z$	(20) m $x,2x,z$	(21) m $2x,x,z$
(22) m x,x,z	(23) m $x,0,z$	(24) m $0,y,z$

Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; (2); (4); (7); (13)

Positions

Multiplicity, Wyckoff letter, Site symmetry	Coordinates	Reflection conditions

General:

24 l 1

(1) x,y,z (2) $\bar{y},x-y,z$ (3) $\bar{x}+y,\bar{x},z$ no conditions
(4) $\bar{x},\bar{y},z$ (5) $y,\bar{x}+y,z$ (6) $x-y,x,z$
(7) $y,x,\bar{z}$ (8) $x-y,\bar{y},\bar{z}$ (9) $\bar{x},\bar{x}+y,\bar{z}$
(10) $\bar{y},\bar{x},\bar{z}$ (11) $\bar{x}+y,y,\bar{z}$ (12) $x,x-y,\bar{z}$
(13) $\bar{x},\bar{y},\bar{z}$ (14) $y,\bar{x}+y,\bar{z}$ (15) $x-y,x,\bar{z}$
(16) $x,y,\bar{z}$ (17) $\bar{y},x-y,\bar{z}$ (18) $\bar{x}+y,\bar{x},\bar{z}$
(19) $\bar{y},\bar{x},z$ (20) $\bar{x}+y,y,z$ (21) $x,x-y,z$
(22) y,x,z (23) $x-y,\bar{y},z$ (24) $\bar{x},\bar{x}+y,z$

Special: no extra conditions

12 k m . . $x,y,0$ $\bar{y},x-y,0$ $\bar{x}+y,\bar{x},0$ $\bar{x},\bar{y},0$ $y,\bar{x}+y,0$ $x-y,x,0$
$y,x,0$ $x-y,\bar{y},0$ $\bar{x},\bar{x}+y,0$ $\bar{y},\bar{x},0$ $\bar{x}+y,y,0$ $x,x-y,0$

12 j . m . $x,2x,z$ $2\bar{x},\bar{x},z$ $x,\bar{x},z$ $\bar{x},2\bar{x},z$ $2x,x,z$ $\bar{x},x,z$
$2x,x,\bar{z}$ $\bar{x},2\bar{x},\bar{z}$ $\bar{x},x,\bar{z}$ $2\bar{x},\bar{x},\bar{z}$ $x,2x,\bar{z}$ $x,\bar{x},\bar{z}$

12 i . . m $x,0,z$ $0,x,z$ $\bar{x},\bar{x},z$ $\bar{x},0,z$ $0,\bar{x},z$ x,x,z
$0,x,\bar{z}$ $x,0,\bar{z}$ $\bar{x},\bar{x},\bar{z}$ $0,\bar{x},\bar{z}$ $\bar{x},0,\bar{z}$ $x,x,\bar{z}$

6 h $mm2$ $x,2x,0$ $2\bar{x},\bar{x},0$ $x,\bar{x},0$ $\bar{x},2\bar{x},0$ $2x,x,0$ $\bar{x},x,0$

6 g $m2m$ $x,0,0$ $0,x,0$ $\bar{x},\bar{x},0$ $\bar{x},0,0$ $0,\bar{x},0$ $x,x,0$

6 f $2mm$ $\frac{1}{2},0,z$ $0,\frac{1}{2},z$ $\frac{1}{2},\frac{1}{2},z$ $0,\frac{1}{2},\bar{z}$ $\frac{1}{2},0,\bar{z}$ $\frac{1}{2},\frac{1}{2},\bar{z}$

4 e $3m$. $\frac{1}{3},\frac{2}{3},z$ $\frac{2}{3},\frac{1}{3},z$ $\frac{2}{3},\frac{1}{3},\bar{z}$ $\frac{1}{3},\frac{2}{3},\bar{z}$

3 d mmm $\frac{1}{2},0,0$ $0,\frac{1}{2},0$ $\frac{1}{2},\frac{1}{2},0$

2 c $6mm$ $0,0,z$ $0,0,\bar{z}$

2 b $\bar{6}m2$ $\frac{1}{3},\frac{2}{3},0$ $\frac{2}{3},\frac{1}{3},0$

1 a $6/mmm$ $0,0,0$

Symmetry of special projections

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

Along [100] $p2mm$
$\mathbf{a}' = \frac{1}{2}(\mathbf{a}+2\mathbf{b})$
Origin at $x,0,0$

Along [210] $p2mm$
$\mathbf{a}' = \frac{1}{2}\mathbf{b}$
Origin at $x,\frac{1}{2}x,0$

Maximal non-isotypic subgroups

I   [2] $p\bar{6}2m$ (79)   1; 2; 3; 7; 8; 9; 16; 17; 18; 22; 23; 24
    [2] $p\bar{6}m2$ (78)   1; 2; 3; 10; 11; 12; 16; 17; 18; 19; 20; 21
    [2] $p6mm$ (77)   1; 2; 3; 4; 5; 6; 19; 20; 21; 22; 23; 24
    [2] $p622$ (76)   1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12
    [2] $p6/m11$ ($p6/m$, 75)   1; 2; 3; 4; 5; 6; 13; 14; 15; 16; 17; 18
    [2] $p\bar{3}m1$ (72)   1; 2; 3; 7; 8; 9; 13; 14; 15; 19; 20; 21
    [2] $p\bar{3}1m$ (71)   1; 2; 3; 10; 11; 12; 13; 14; 15; 22; 23; 24
    [3] $pmmm$ ($cmmm$, 47)   1; 4; 7; 10; 13; 16; 19; 22
    [3] $pmmm$ ($cmmm$, 47)   1; 4; 8; 11; 13; 16; 20; 23
    [3] $pmmm$ ($cmmm$, 47)   1; 4; 9; 12; 13; 16; 21; 24

IIa   none
IIb   none

Maximal isotypic subgroups of lowest index

IIc   [3] $h6/mmm$ ($\mathbf{a}' = 3\mathbf{a}, \mathbf{b}' = 3\mathbf{b}$) ($p6/mmm$, 80)

Minimal non-isotypic supergroups

I   none
II   none