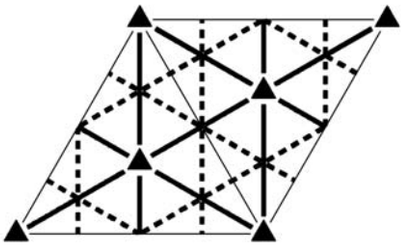
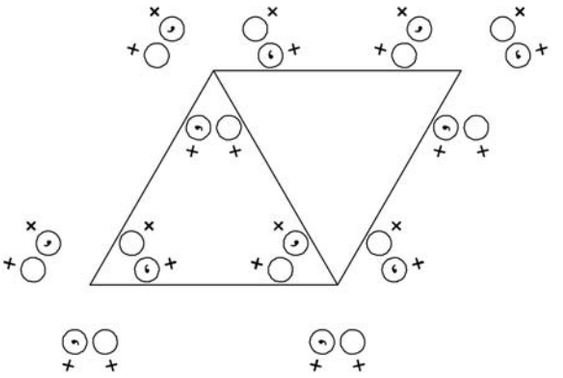
$p\,3\,m\,1$ $3\,m\,1$ Trigonal/Hexagonal

No. 69 $p\,3\,m\,1$ Patterson symmetry $p\,\bar{3}\,m\,1$





Origin on $3m1$

Asymmetric unit $0 \le x \le \frac{2}{3}$; $0 \le y \le \frac{2}{3}$; $x \le 2y$; $y \le \min(1-x, 2x)$

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

Symmetry operations

(1) 1
(2) 3^+ $0,0,z$
(3) 3^- $0,0,z$
(4) m $x,\bar{x},z$
(5) m $x,2x,z$
(6) m $2x,x,z$

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

Positions

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

Symmetry of special projections

Along [001] $p\,3\,m\,1$
$\mathbf{a}'=\mathbf{a}$ $\mathbf{b}'=\mathbf{b}$
Origin at $0,0,z$

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

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

Maximal non-isotypic subgroups

I [2] $p\,3\,1\,1$ ($p\,3$, 65) 1; 2; 3
[3] $p\,1\,m\,1$ ($c\,m\,1\,1$, 13) 1; 4
[3] $p\,1\,m\,1$ ($c\,m\,1\,1$, 13) 1; 5
[3] $p\,1\,m\,1$ ($c\,m\,1\,1$, 13) 1; 6

IIa none

IIb [3] $h\,3\,m\,1$ ($\mathbf{a}'=3\mathbf{a},\mathbf{b}'=3\mathbf{b}$) ($p\,3\,1\,m$, 70)

Maximal isotypic subgroups of lowest index

IIc [4] $p\,3\,m\,1$ ($\mathbf{a}'=2\mathbf{a},\mathbf{b}'=2\mathbf{b}$) (69)

Minimal non-isotypic supergroups

I [2] $p\,\bar{3}\,m\,1$ (72); [2] $p\,6\,m\,m$ (77); [2] $p\,\bar{6}\,m\,2$ (78)

II [2] $h\,3\,m\,1$ ($p\,3\,1\,m$, 70)