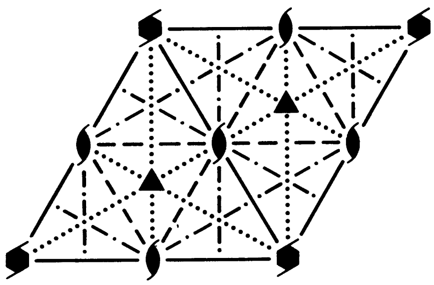
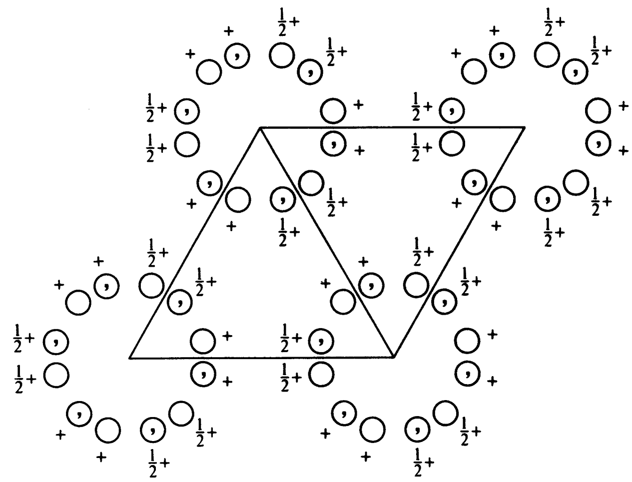
$P6_3cm$ $\quad C_{6v}^3$ $\quad 6mm$ $\quad$ Hexagonal

No. 185 $\quad P6_3cm$ $\quad$ Patterson symmetry $P6/mmm$





Origin on $31m$ on 6_3cm

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

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

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

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) c $x,\bar{x},z$	(8) c $x,2x,z$	(9) c $2x,x,z$
(10) m x,x,z	(11) m $x,0,z$	(12) m $0,y,z$

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

Positions

Multiplicity, Wyckoff letter, Site symmetry	Coordinates			Reflection conditions
				General:
12 d 1	(1) x,y,z	(2) $\bar{y},x-y,z$	(3) $\bar{x}+y,\bar{x},z$	$h\bar{h}0l$: $l=2n$
	(4) $\bar{x},\bar{y},z+\frac{1}{2}$	(5) $y,\bar{x}+y,z+\frac{1}{2}$	(6) $x-y,x,z+\frac{1}{2}$	$000l$: $l=2n$
	(7) $\bar{y},\bar{x},z+\frac{1}{2}$	(8) $\bar{x}+y,y,z+\frac{1}{2}$	(9) $x,x-y,z+\frac{1}{2}$	
	(10) y,x,z	(11) $x-y,\bar{y},z$	(12) $\bar{x},\bar{x}+y,z$	
				Special: as above, plus
6 c $..m$	$x,0,z$ $\quad 0,x,z$	$\bar{x},\bar{x},z$ $\quad \bar{x},0,z+\frac{1}{2}$	$0,\bar{x},z+\frac{1}{2}$ $\quad x,x,z+\frac{1}{2}$	no extra conditions
4 b $3..$	$\frac{1}{3},\frac{2}{3},z$ $\quad \frac{2}{3},\frac{1}{3},z+\frac{1}{2}$	$\frac{1}{3},\frac{2}{3},z+\frac{1}{2}$ $\quad \frac{2}{3},\frac{1}{3},z$		$hkil$: $l=2n$
2 a $3.m$	$0,0,z$ $\quad 0,0,z+\frac{1}{2}$			$hkil$: $l=2n$

Symmetry of special projections

Along [001] $p6mm$	Along [100] $p1m1$	Along [210] $p1g1$
$\mathbf{a}'=\mathbf{a}$ $\quad \mathbf{b}'=\mathbf{b}$	$\mathbf{a}'=\frac{1}{2}(\mathbf{a}+2\mathbf{b})$ $\quad \mathbf{b}'=\frac{1}{2}\mathbf{c}$	$\mathbf{a}'=\frac{1}{2}\mathbf{b}$ $\quad \mathbf{b}'=\mathbf{c}$
Origin at $0,0,z$	Origin at $x,0,0$	Origin at $x,\frac{1}{2}x,0$