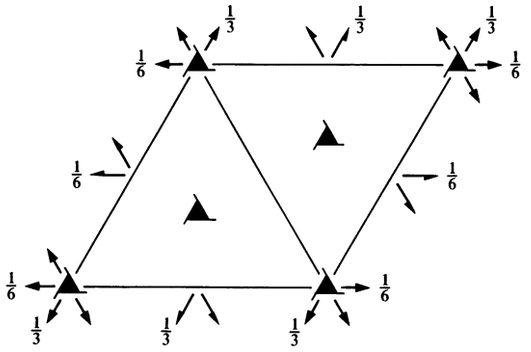
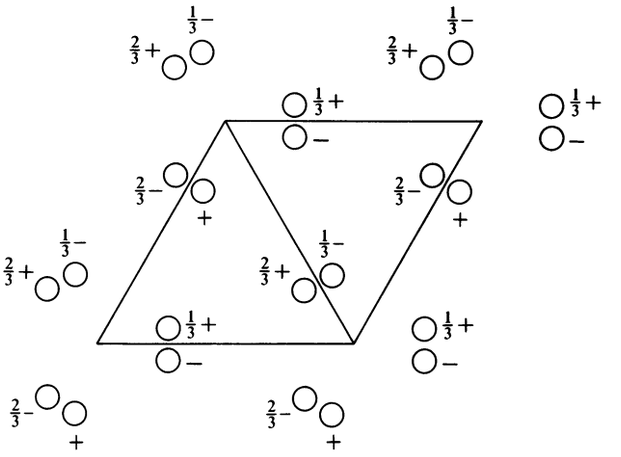
$P3_121$ D_3^4 321 Trigonal

No. 152 $P3_121$ Patterson symmetry $P\bar{3}m1$





Origin on $2[1\,1\,0]$ at $3_1\,(1,1,2)\,1$

Asymmetric unit $0 \le x \le 1;\quad 0 \le y \le 1;\quad 0 \le z \le \frac{1}{6}$

Vertices $0,0,0\quad 1,0,0\quad 1,1,0\quad 0,1,0$

$0,0,\frac{1}{6}\quad 1,0,\frac{1}{6}\quad 1,1,\frac{1}{6}\quad 0,1,\frac{1}{6}$

Symmetry operations

(1) 1
(2) $3^+(0,0,\frac{1}{3})\quad 0,0,z$
(3) $3^-(0,0,\frac{2}{3})\quad 0,0,z$
(4) 2 $\quad x,x,0$
(5) 2 $\quad x,0,\frac{1}{3}$
(6) 2 $\quad 0,y,\frac{1}{6}$

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

Positions

Multiplicity, Wyckoff letter, Site symmetry		Coordinates			Reflection conditions
					General:
6 c 1		(1) x,y,z	(2) $\bar{y},x-y,z+\frac{1}{3}$	(3) $\bar{x}+y,\bar{x},z+\frac{2}{3}$	$000l$: $l=3n$
		(4) $y,x,\bar{z}$	(5) $x-y,\bar{y},\bar{z}+\frac{2}{3}$	(6) $\bar{x},\bar{x}+y,\bar{z}+\frac{1}{3}$	
					Special: no extra conditions
3 b . 2 .		$x,0,\frac{5}{6}$	$0,x,\frac{1}{6}$	$\bar{x},\bar{x},\frac{1}{2}$	
3 a . 2 .		$x,0,\frac{1}{3}$	$0,x,\frac{2}{3}$	$\bar{x},\bar{x},0$	

Symmetry of special projections

Along [001] $p31m$
$\mathbf{a}'=\mathbf{a}$ $\mathbf{b}'=\mathbf{b}$
Origin at $0,0,z$

Along [100] $p2$
$\mathbf{a}'=\frac{1}{2}(\mathbf{a}+2\mathbf{b})$ $\mathbf{b}'=\mathbf{c}$
Origin at $x,0,\frac{1}{3}$

Along [210] $p11m$
$\mathbf{a}'=\frac{1}{2}\mathbf{b}$ $\mathbf{b}'=\mathbf{c}$
Origin at $x,\frac{1}{2}x,\frac{1}{6}$

Maximal non-isomorphic subgroups

I [2] $P3_111$ ($P3_1$, 144) 1; 2; 3
[3] $P1211$ ($C2$, 5) 1; 4
[3] $P1211$ ($C2$, 5) 1; 5
[3] $P1211$ ($C2$, 5) 1; 6

IIa none

IIb [3] $H3_121$ ($\mathbf{a}'=3\mathbf{a},\mathbf{b}'=3\mathbf{b}$) ($P3_112$, 151)

Maximal isomorphic subgroups of lowest index

IIc [2] $P3_221$ ($\mathbf{c}'=2\mathbf{c}$) (154); [4] $P3_121$ ($\mathbf{a}'=2\mathbf{a},\mathbf{b}'=2\mathbf{b}$) (152); [7] $P3_121$ ($\mathbf{c}'=7\mathbf{c}$) (152)

Minimal non-isomorphic supergroups

I [2] $P6_122$ (178); [2] $P6_422$ (181)

II [3] $H3_121$ ($P3_112$, 151); [3] $R32$ (obverse) (155); [3] $R32$ (reverse) (155); [3] $P321$ ($\mathbf{c}'=\frac{1}{3}\mathbf{c}$) (150)