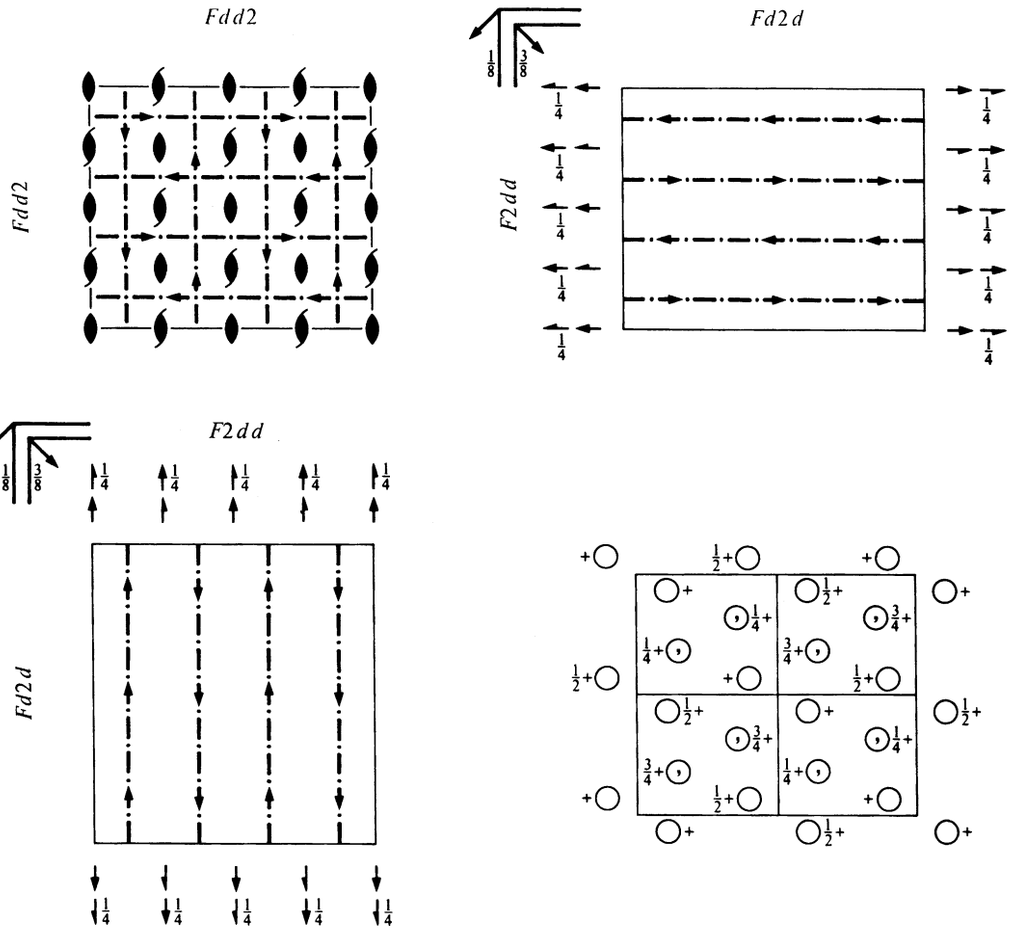
$Fdd2$ C_{2v}^{19} $mm2$ Orthorhombic

No. 43 $Fdd2$ Patterson symmetry $Fmmm$



Origin on 1 1 2

Asymmetric unit $0 \le x \le \frac{1}{4}$; $0 \le y \le \frac{1}{4}$; $0 \le z \le 1$

Symmetry operations

For $(0,0,0)+$ set

(1) 1 (2) 2 $0,0,z$ (3) $d(\frac{1}{4},0,\frac{1}{4})$ $x,\frac{1}{8},z$ (4) $d(0,\frac{1}{4},\frac{1}{4})$ $\frac{1}{8},y,z$

For $(0,\frac{1}{2},\frac{1}{2})+$ set

(1) $t(0,\frac{1}{2},\frac{1}{2})$ (2) $2(0,0,\frac{1}{2})$ $0,\frac{1}{4},z$ (3) $d(\frac{1}{4},0,\frac{3}{4})$ $x,\frac{3}{8},z$ (4) $d(0,\frac{3}{4},\frac{3}{4})$ $\frac{1}{8},y,z$

For $(\frac{1}{2},0,\frac{1}{2})+$ set

(1) $t(\frac{1}{2},0,\frac{1}{2})$ (2) $2(0,0,\frac{1}{2})$ $\frac{1}{4},0,z$ (3) $d(\frac{3}{4},0,\frac{3}{4})$ $x,\frac{1}{8},z$ (4) $d(0,\frac{1}{4},\frac{3}{4})$ $\frac{3}{8},y,z$

For $(\frac{1}{2},\frac{1}{2},0)+$ set

(1) $t(\frac{1}{2},\frac{1}{2},0)$ (2) 2 $\frac{1}{4},\frac{1}{4},z$ (3) $d(\frac{3}{4},0,\frac{1}{4})$ $x,\frac{3}{8},z$ (4) $d(0,\frac{3}{4},\frac{1}{4})$ $\frac{3}{8},y,z$

Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; $t(0,\frac{1}{2},\frac{1}{2})$; $t(\frac{1}{2},0,\frac{1}{2})$; (2); (3)

Positions

Multiplicity, Wyckoff letter, Site symmetry		Coordinates $(0,0,0)+$	$(0,\frac{1}{2},\frac{1}{2})+$	$(\frac{1}{2},0,\frac{1}{2})+$	$(\frac{1}{2},\frac{1}{2},0)+$	Reflection conditions
						General:
16 b 1		(1) x,y,z	(2) $\bar{x},\bar{y},z$	(3) $x+\frac{1}{4},\bar{y}+\frac{1}{4},z+\frac{1}{4}$	(4) $\bar{x}+\frac{1}{4},y+\frac{1}{4},z+\frac{1}{4}$	hkl : $h+k,h+l,k+l=2n$ $0kl$: $k+l=4n,\ k,l=2n$ $h0l$: $h+l=4n,\ h,l=2n$ $hk0$: $h,k=2n$ $h00$: $h=4n$ $0k0$: $k=4n$ $00l$: $l=4n$
						Special: as above, plus
8 a ..2		$0,0,z$	$\frac{1}{4},\frac{1}{4},z+\frac{1}{4}$			hkl : $h=2n+1$ or $h+k+l=4n$

Symmetry of special projections

Along [001] $p2gg$
$\mathbf{a}'=\frac{1}{2}\mathbf{a}$ $\mathbf{b}'=\frac{1}{2}\mathbf{b}$
Origin at $0,0,z$

Along [100] $c1m1$
$\mathbf{a}'=\frac{1}{2}\mathbf{b}$ $\mathbf{b}'=\frac{1}{2}\mathbf{c}$
Origin at $x,0,0$

Along [010] $c11m$
$\mathbf{a}'=\frac{1}{2}\mathbf{c}$ $\mathbf{b}'=\frac{1}{2}\mathbf{a}$
Origin at $0,y,0$

Maximal non-isomorphic subgroups

I [2] $F1d1$ $(Cc, 9)$ $(1;\ 3)+$
[2] $Fd11$ $(Cc, 9)$ $(1;\ 4)+$
[2] $F112$ $(C2, 5)$ $(1;\ 2)+$

IIa none

IIb none

Maximal isomorphic subgroups of lowest index

IIc [3] $Fddd2$ ($\mathbf{a}'=3\mathbf{a}$ or $\mathbf{b}'=3\mathbf{b}$) (43); [3] $Fddd2$ ($\mathbf{c}'=3\mathbf{c}$) (43)

Minimal non-isomorphic supergroups

I [2] $Fddd$ (70); [2] $I4_1md$ (109); [2] $I4_1cd$ (110); [2] $I\bar{4}2d$ (122)

II [2] $Pnn2$ ($\mathbf{a}'=\frac{1}{2}\mathbf{a},\mathbf{b}'=\frac{1}{2}\mathbf{b},\mathbf{c}'=\frac{1}{2}\mathbf{c}$) (34)