

*Fdd2*

$C_{2v}^{19}$

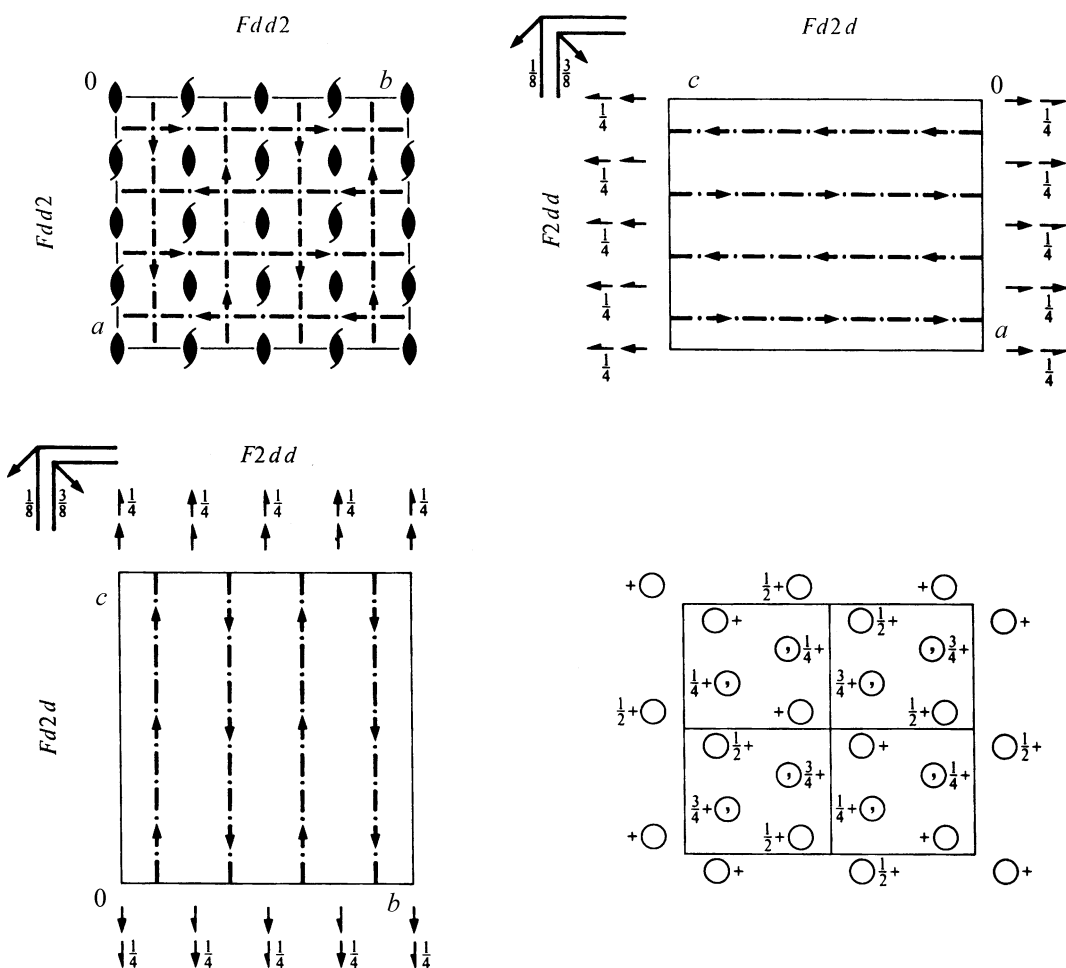
*mm2*

Orthorhombic

No. 43

*Fdd2*

Patterson symmetry *Fmmm*



Origin on 112

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

**Symmetry operations**

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

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

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

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

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

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

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

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

**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

$hkl$ :  $h = 2n + 1$

or  $h+k+l = 4n$

8 *a* ..2 0,0,z  $\frac{1}{4}, \frac{1}{4}, z + \frac{1}{4}$

**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