

$Pna2_1$

$C_{2v}^9$

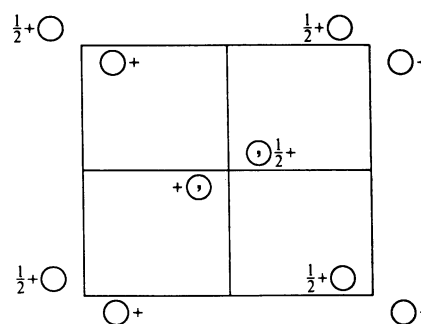
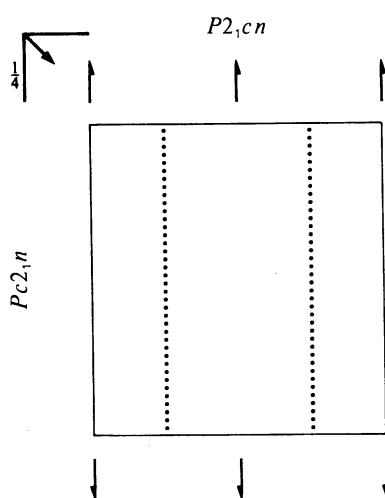
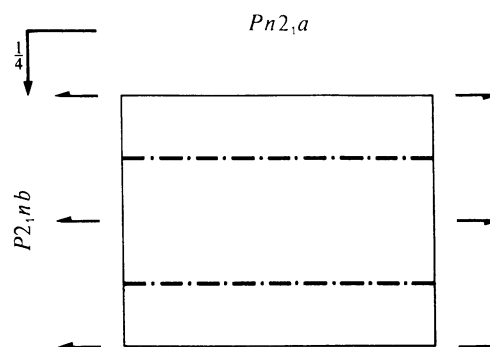
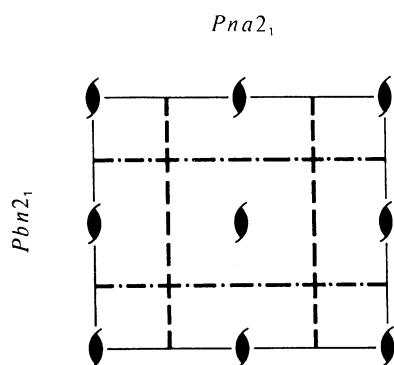
$mm2$

Orthorhombic

No. 33

$Pna2_1$

Patterson symmetry  $Pmmm$



Origin on  $112_1$

Asymmetric unit  $0 \leq x \leq \frac{1}{2}; 0 \leq y \leq \frac{1}{2}; 0 \leq z \leq 1$

Symmetry operations

- (1) 1      (2)  $2(0, 0, \frac{1}{2})$   $0, 0, z$       (3)  $a$   $x, \frac{1}{4}, z$       (4)  $n(0, \frac{1}{2}, \frac{1}{2})$   $\frac{1}{4}, y, z$

**Generators selected** (1);  $t(1,0,0)$ ;  $t(0,1,0)$ ;  $t(0,0,1)$ ; (2); (3)

**Positions**

Multiplicity, Wyckoff letter, Site symmetry	Coordinates				Reflection conditions
					General:
4 <i>a</i> 1	(1) $x,y,z$	(2) $\bar{x},\bar{y},z+\frac{1}{2}$	(3) $x+\frac{1}{2},\bar{y}+\frac{1}{2},z$	(4) $\bar{x}+\frac{1}{2},y+\frac{1}{2},z+\frac{1}{2}$	$0kl : k+l=2n$ $h0l : h=2n$ $h00 : h=2n$ $0k0 : k=2n$ $00l : l=2n$

**Symmetry of special projections**

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

Along [100]  $c1m1$   
 $\mathbf{a}' = \mathbf{b}$      $\mathbf{b}' = \mathbf{c}$   
Origin at  $x,\frac{1}{4},0$

Along [010]  $p11g$   
 $\mathbf{a}' = \mathbf{c}$      $\mathbf{b}' = \frac{1}{2}\mathbf{a}$   
Origin at  $0,y,0$

**Maximal non-isomorphic subgroups**

**I**    [2]  $P1a1$  ( $Pc$ , 7)    1; 3  
      [2]  $Pn11$  ( $Pc$ , 7)    1; 4  
      [2]  $P112_1$  ( $P2_1$ , 4)    1; 2

**IIa** none

**IIb** none

**Maximal isomorphic subgroups of lowest index**

**IIc**    [3]  $Pna2_1$  ( $\mathbf{a}' = 3\mathbf{a}$ ) (33); [3]  $Pna2_1$  ( $\mathbf{b}' = 3\mathbf{b}$ ) (33); [3]  $Pna2_1$  ( $\mathbf{c}' = 3\mathbf{c}$ ) (33)

**Minimal non-isomorphic supergroups**

**I**    [2]  $Pnna$  (52); [2]  $Pccn$  (56); [2]  $Pbcn$  (60); [2]  $Pnma$  (62)

**II**    [2]  $Ccm2_1$  ( $Cmc2_1$ , 36); [2]  $Ama2$  (40); [2]  $Bbe2$  ( $Aea2$ , 41); [2]  $Ima2$  (46); [2]  $Pca2_1$  ( $\mathbf{b}' = \frac{1}{2}\mathbf{b}$ ) (29);  
      [2]  $Pnm2_1$  ( $\mathbf{a}' = \frac{1}{2}\mathbf{a}$ ) ( $Pmn2_1$ , 31); [2]  $Pba2$  ( $\mathbf{c}' = \frac{1}{2}\mathbf{c}$ ) (32)