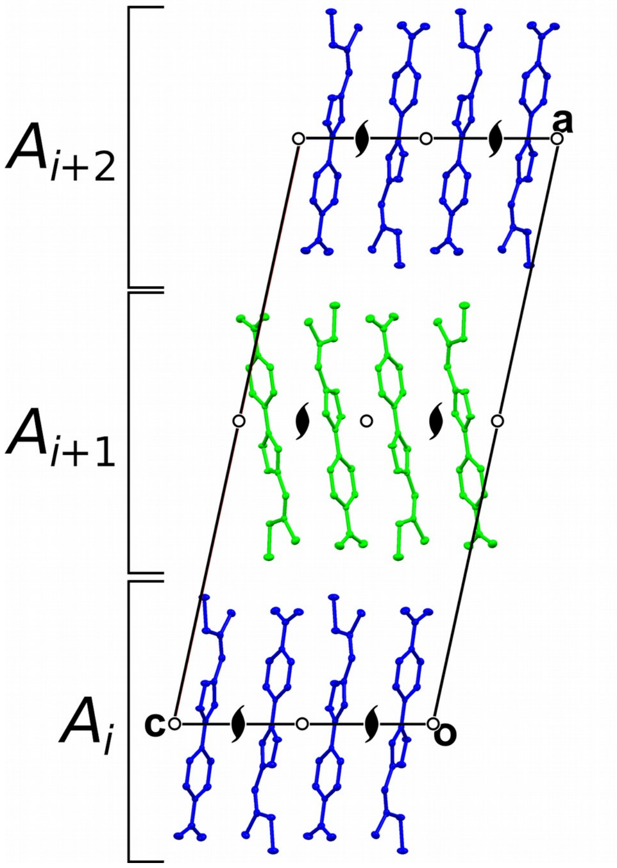
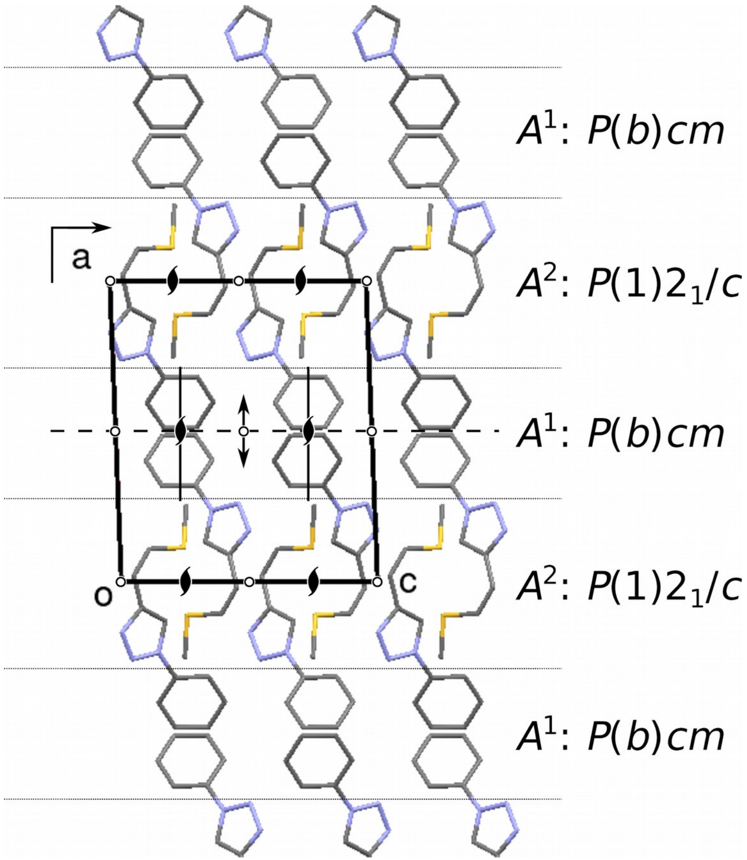
Exercise 1a, solution



One kind of layer with $P(1)2_1/c$ symmetry.

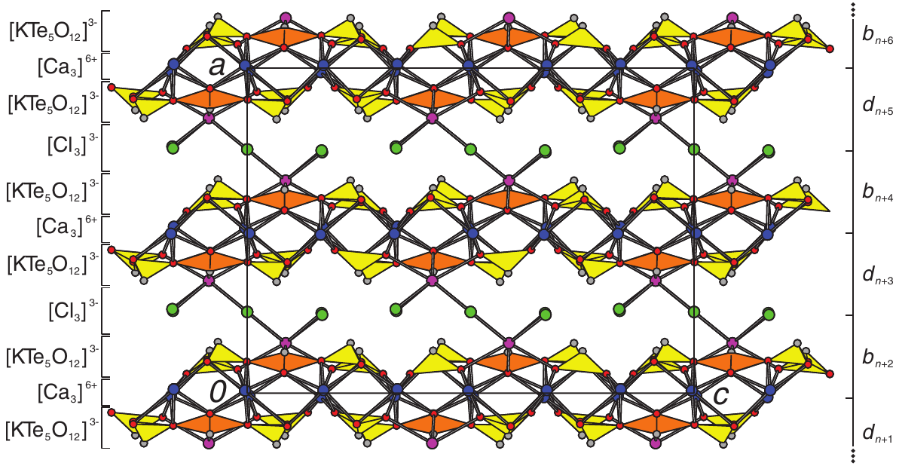
Adjacent layers related by screw rotations and glide reflections.

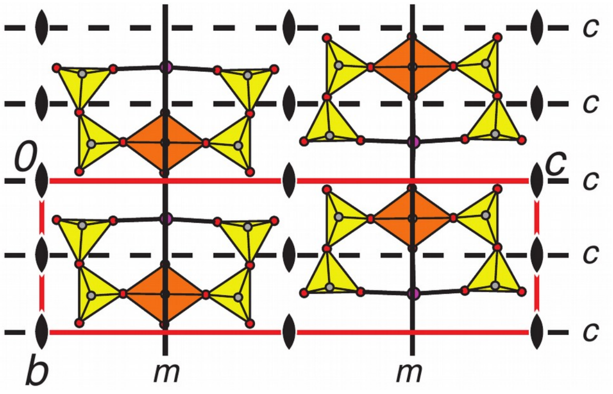
Exercise 1b, solution



Two kinds of layers.
No POs relating adjacent layers.

Exercise 1c, solution





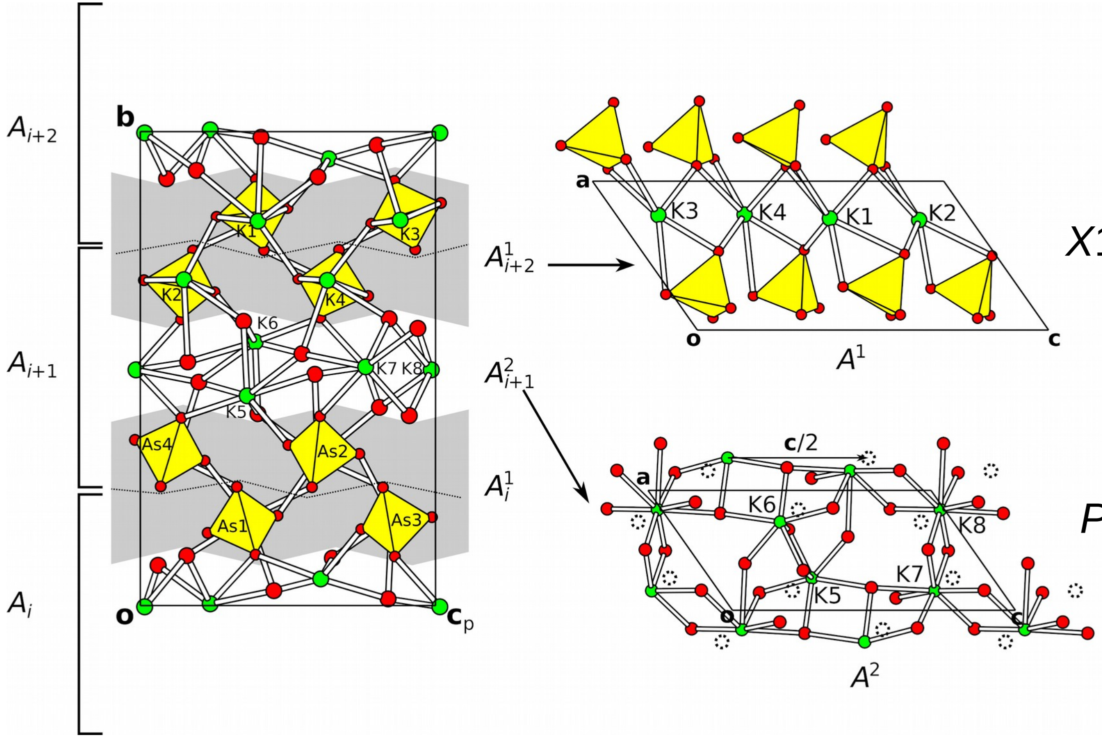
One kind of polar layer with *P*(2)*cm* symmetry.
Cl^- and Ca^{2+} ions located at the layer interface:
They fulfill the symmetry conditions of both adjacent layers.
Adjacent layers related by screw rotations and glide reflections.

Exercise 1d, solution

Solution 2: One kind of layer.
Adjacent layers related by glides and screws.

Solution 1: Two kinds of layers.
One with doubled translation in [001]
No POs relating adjacent layers.

$P\bar{1}(\bar{1})\bar{1}$



$X1(c)1$ [centering (00½)]

$P\bar{1}(\bar{1})\bar{1}$

Exercise 2a, solution

- [100]: 2_2 τ-PO (intrinsic translation $\mathbf{a}_0$)
- [100]: $n_{1,s}$ ρ-PO (intrinsic translation $\mathbf{b}/2+s\mathbf{c}/2$)
- [001]: 2_{s+1} ρ-PO (intrinsic translation $s\mathbf{c}/2+\mathbf{c}/2$)
- [001]: a_2 τ-PO (intrinsic translation $\mathbf{a}_0$)

Exercise 2b, solution

- No POs

Exercise 2c, solution

- $b_n \rightarrow d_{n+1}$:
  - [100]: $c_{5/3}$ ρ-PO (intrinsic translation -**c**/6)
  - [010]: 2 ρ-PO
  - [001]: $2_{2/3}$ ρ-PO (intrinsic translation **c**/3)
- $d_{n+1} \rightarrow b_{n+2}$:
  - [100]: $n_{1,4/3}$ ρ-PO (intrinsic translation **b**/2-**c**/3)
  - [010]: 2_1 ρ-PO (intrinsic translation **b**/2)
  - [001]: $2_{1/3}$ ρ-PO (intrinsic translation **c**/6)

Exercise 2d, solution

- Interpretation 1 (layers of two kinds):
  - No POs between different kinds of layers
- Interpretation 2 (layers of one kind):
  - 2_2 τ-PO (intrinsic translation $\mathbf{b}_0$)
  - $c_{1/2}$ (intrinsic translation $\mathbf{c}/4$)

Exercise 3a, solution

- There are σ-ρ-POs and no reverse-continuation.
- $G_i = P(1)c1$ $G_i \cap G_{i+1} = P(1)c1$.
- $Z = 2N/F = 2[P(1)c1 : P(1)c1] = 2$
- Two orientations of L_{i+1} related by translation along $s\mathbf{c}$.

Exercise 3b, solution

- No σ-ρ-POs.
- $A^1 \rightarrow A^2$
  - $G_i = P(2)cm$ $G_i \cap G_{i+1} = P(1)c1$.
  - $Z = N/F = [P(2)cm : P(1)c1] = 2$
  - Orientations related by { $2_{[100]}$, $m_{[001]}$ } (+ translations)
- $A^2 \rightarrow A^1$
  - $G_i = P(1)c1$ $G_i \cap G_{i+1} = P(1)c1$.
  - $Z = N/F = [P(1)c1 : P(1)c1] = 1$
  - Only one way of placing the A^1 layer

Exercise 3c, solution

- No σ-ρ-POs.
- $A^1 \to A^2$
  - $G_i=P(4)$ $G_i \cap G_{i+1}=P11(2)$.
  - $Z=N/F=[P(4):P11(2)]=2$.
  - Orientations related by { $4^-_{[001]}$, $4^+_{[001]}$ } (+translations and $m_{<110>}$ reflections)
- $A^2 \to A^1$
  - $G_i=Pmm(2)$ $G_i \cap G_{i+1}=P11(2)$.
  - $Z=N/F=[Pmm(2):P11(2)]=2$.
  - Orientations related by { $m_{[100]}$, $m_{[010]}$ } (+translations and $m_{<110>}$ reflections)

Exercise 3d, solution

- Interpretation 1 (layers of two kinds):
  - No σ-ρ-POs
  - $A^1 \rightarrow A^2$:
    - $G_i = X1(1)1$, $G_i \cap G_{i+1} = P1(1)1$.
    - $N/F = [X1(1)1 : P1(1)1] = 2$.
    - Orientations related by translation along **c**/2.
  - $A^1 \rightarrow A^2$:
    - $G_i = P1(1)1$, $G_i \cap G_{i+1} = P1(1)1$.
    - $N/F = [P1(1)1 : P1(1)1] = 1$.
    - Only one way of placing A^2 given A^1.
- Interpretation 2 (layers of one kind)
  - σ-ρ-POs and no reverse continuations
  - $G_i = P1(1)1$, $G_i \cap G_{i+1} = P1(1)1$.
  - $Z = 2N/F = 2[P1(1)1 : P1(1)1] = 2$.
  - Orientations related by translation along **c**/2 (double application of $c_{1/2}$).

Exercise 4a, solution

- See slides.

Exercise 4b, solution

- 3a: M=1, category I
- 3b: M=2, category IV
- 2c: M=1, category III
- 3c: M=2, category IV
- 3d:
  - M=2, category IV
  - M=1, category I

Exercise 5, solution

- 3a: $\begin{array}{cccc} P & (1) & 2_1/c & 1 \\ \{ & (2_2, n_{1,s}) & - & 2_{s+1}/a_2 & \} \end{array}$

- 3b: $P(b)cm \quad \underset{[r,s]}{} \quad P(1)2_1/c1$

- 2c: $\begin{array}{ccccc} P & (2) & c & m & \\ \{ & (n_{r,s+1}) & 2_r & 2_s & \} \\ \{ & (n_{r',s'+1}) & 2_{r'} & 2_{s'} & \} \end{array}$

Exercise 5, solution

- 3c: $P(4/m) \quad [r,s] \quad Pmm(a)$

- 3d: $X1(c)1 \quad [r,s] \quad P\bar{1}(\bar{1})\bar{1}$

$$\begin{array}{ccccc} P & \bar{1} & (\bar{1}) & \bar{1} & \\ \{ & - & (2_2/n_{r,s}) & - & \} \end{array}$$