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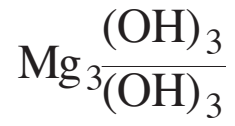
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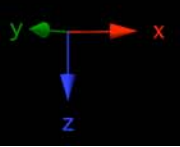
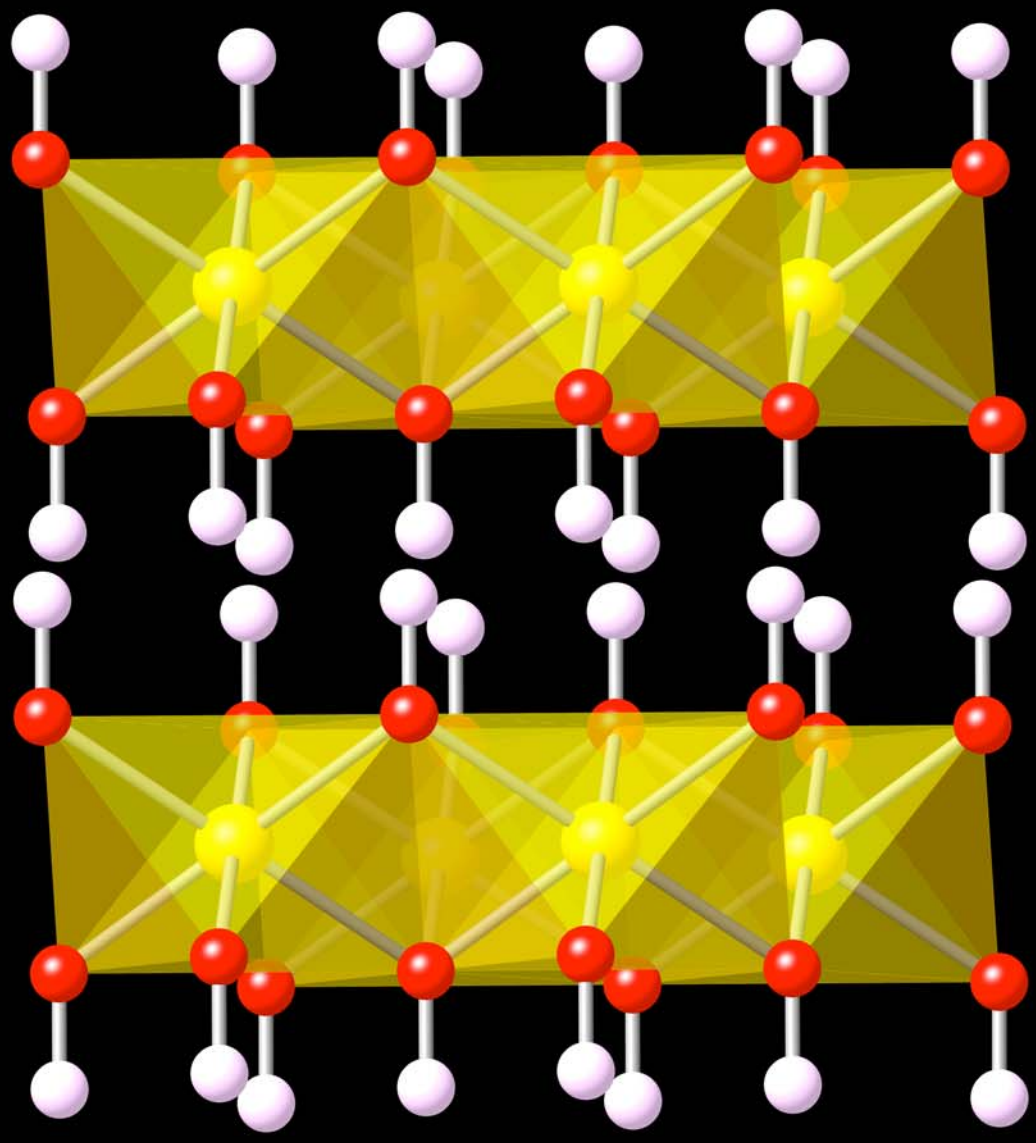
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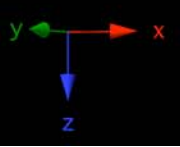
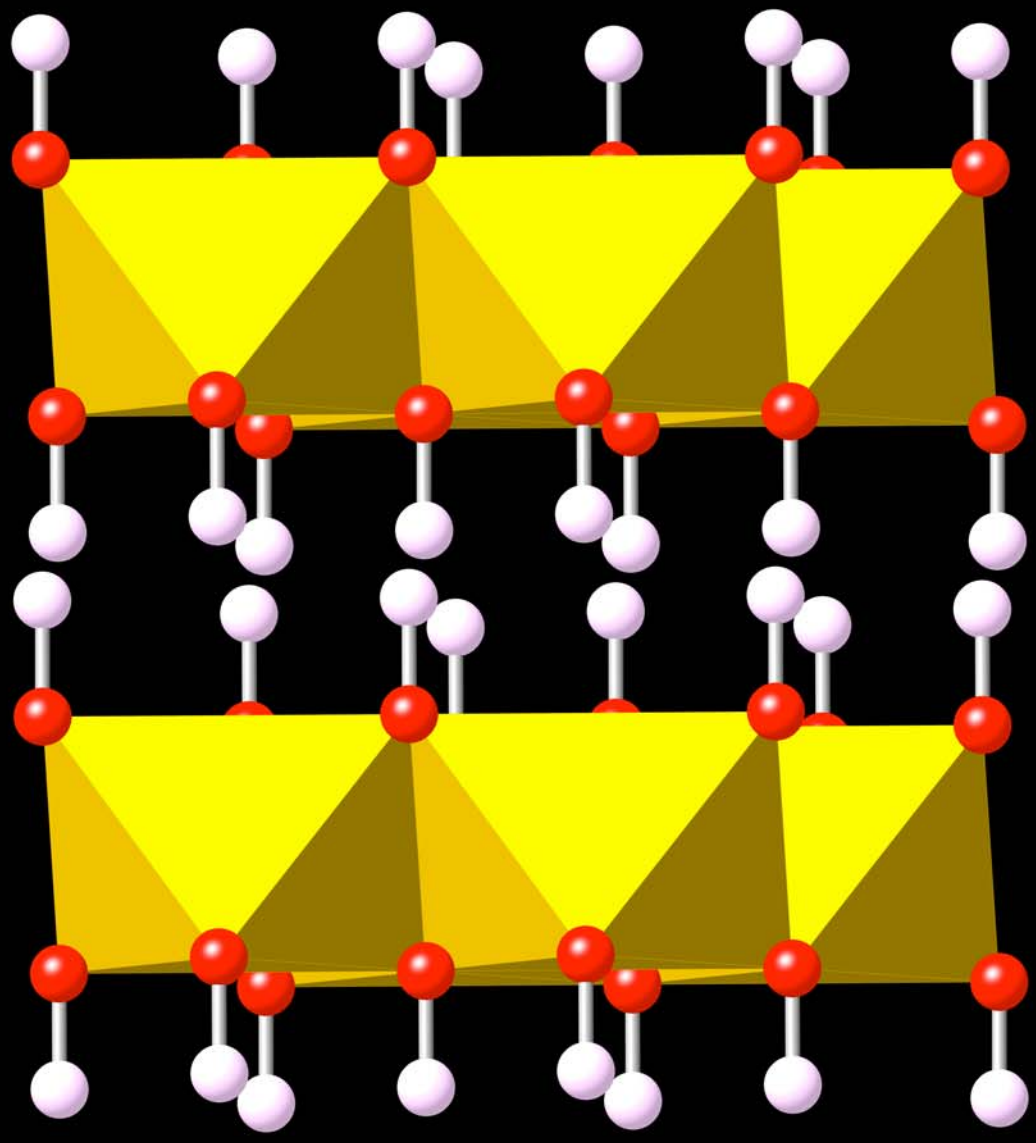


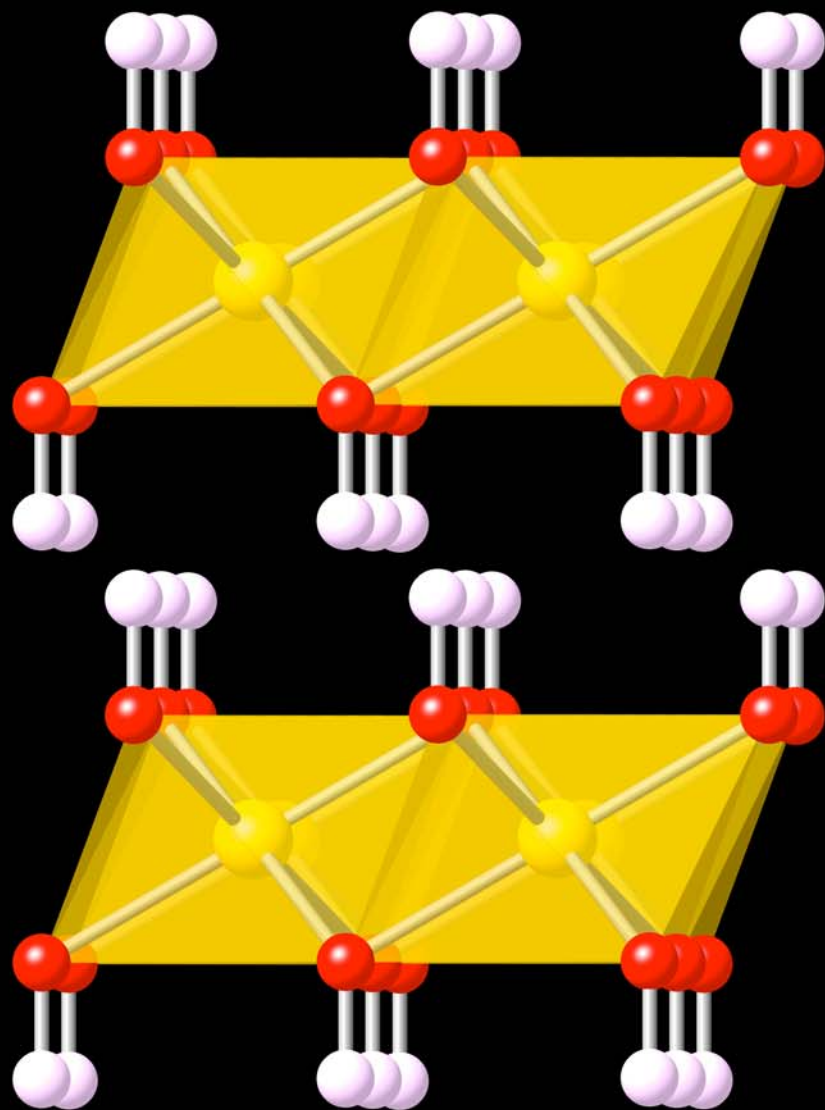
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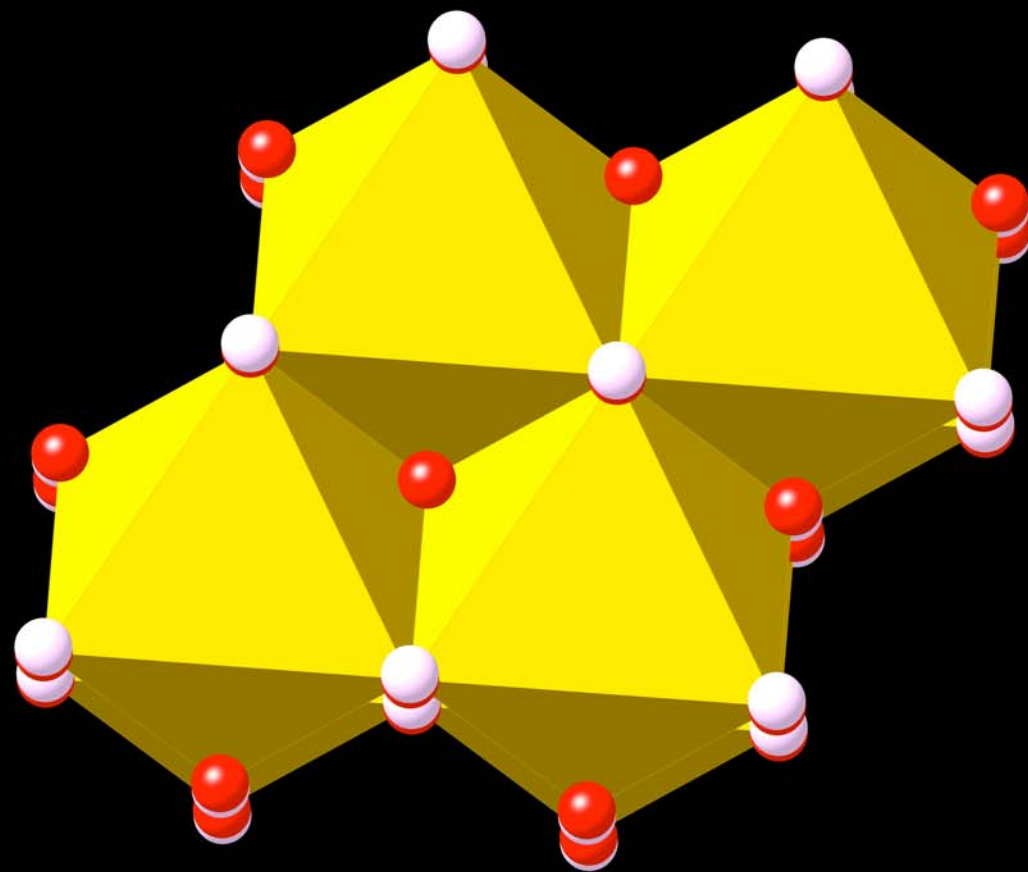


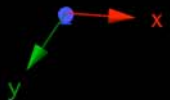
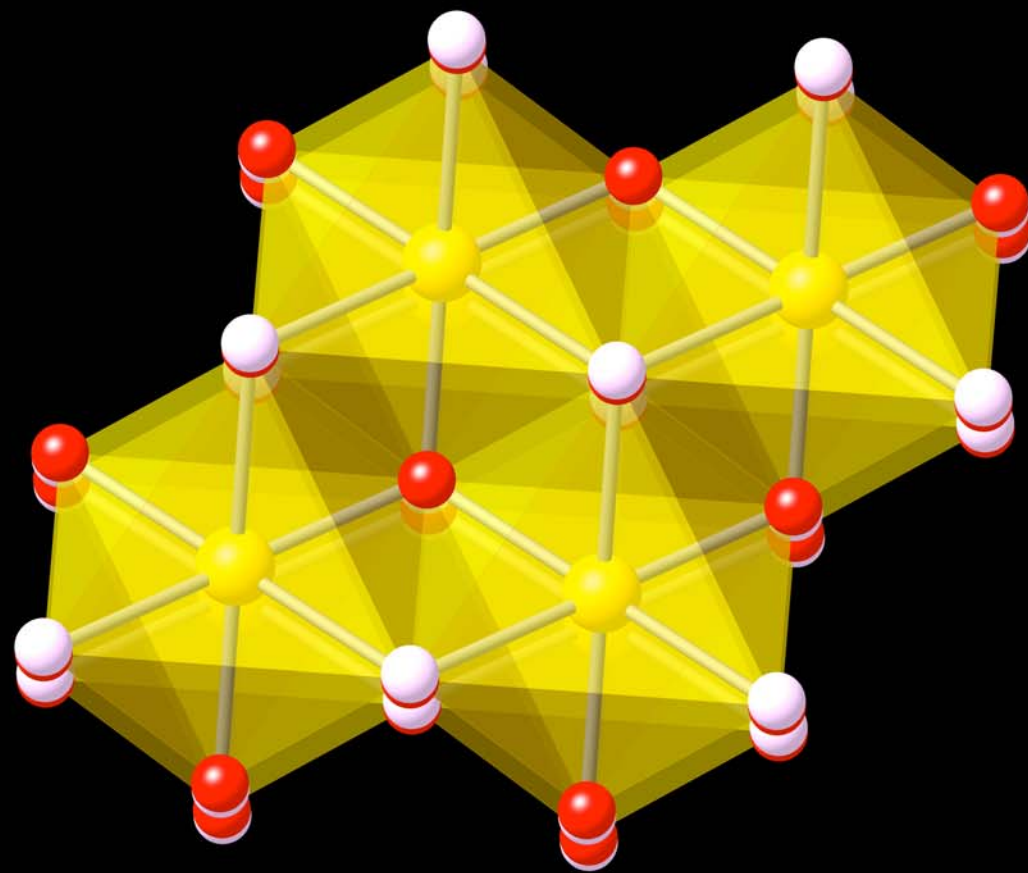








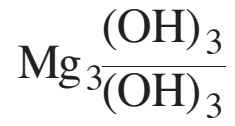






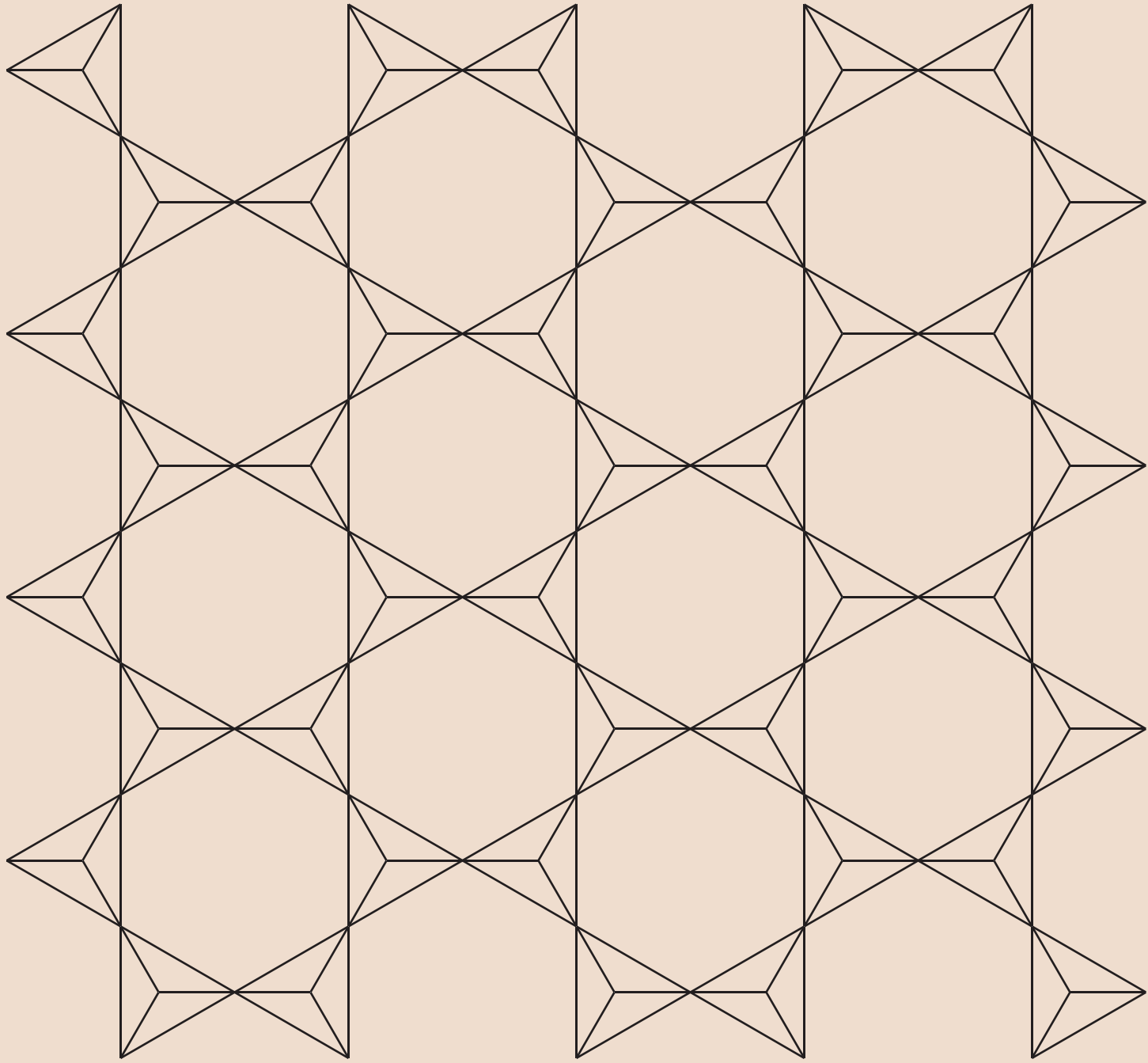
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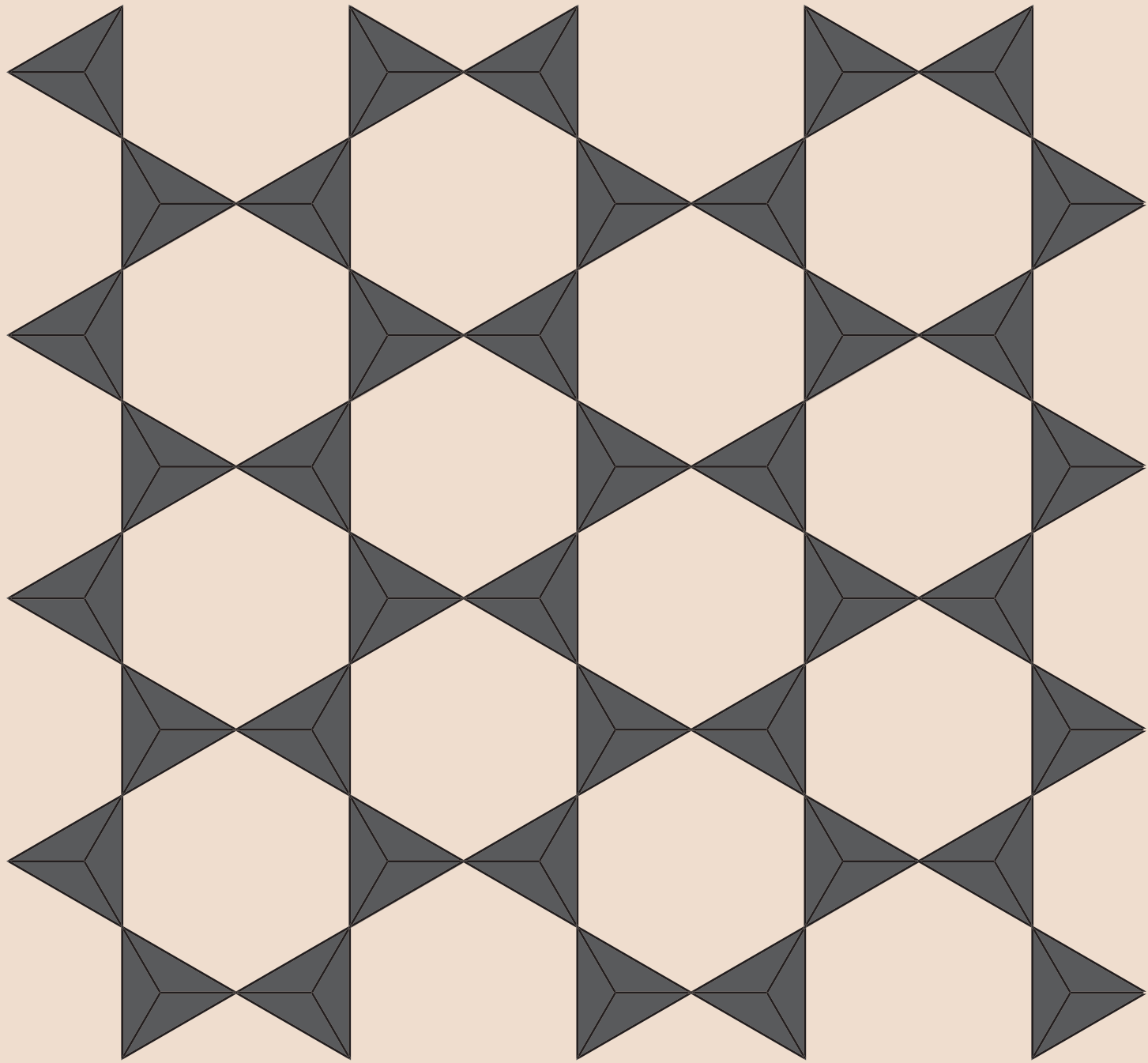


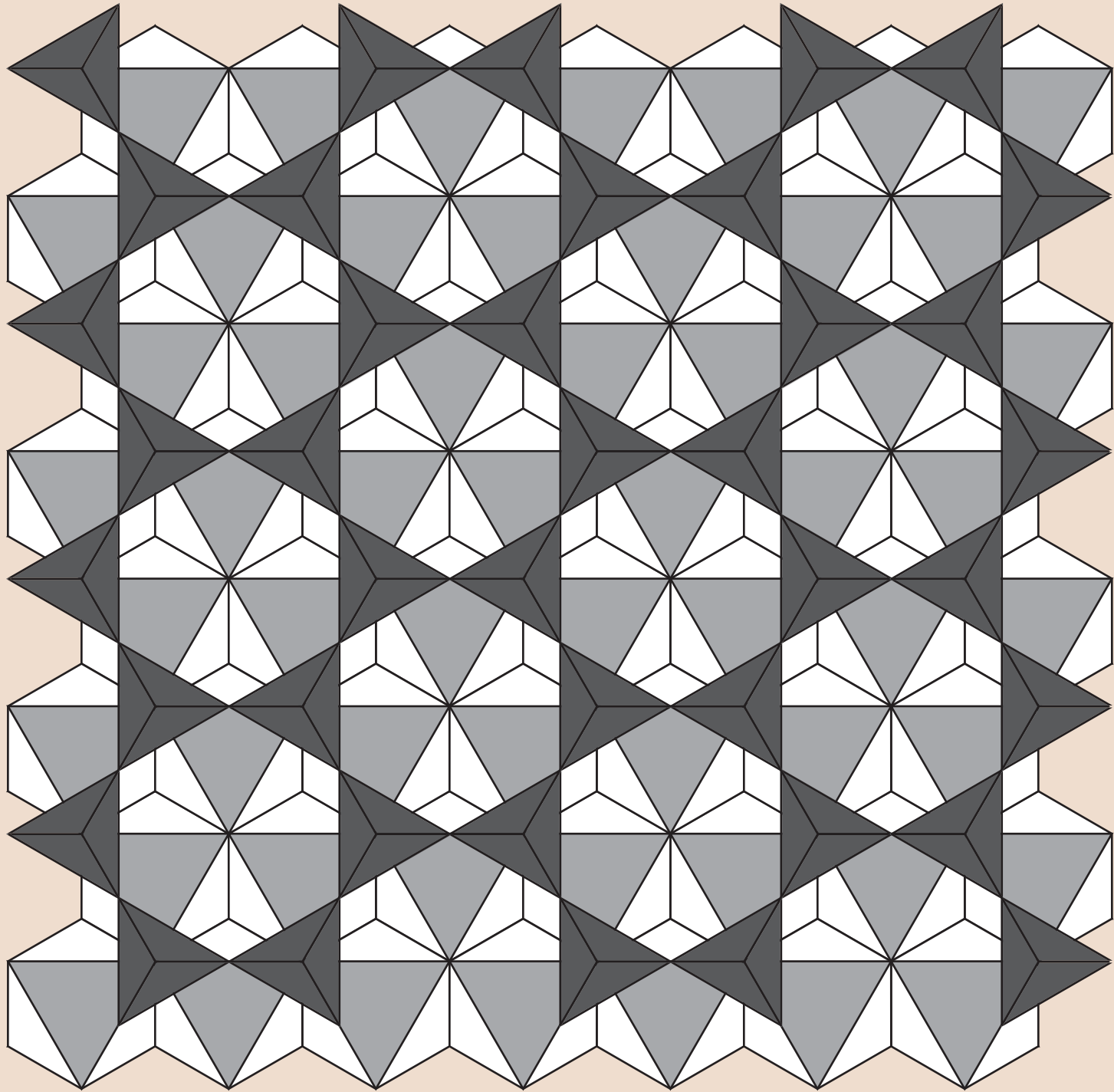


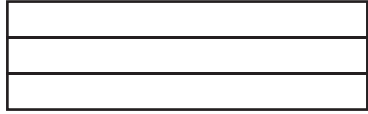
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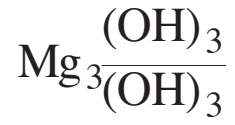
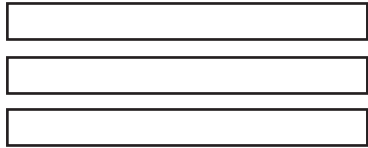




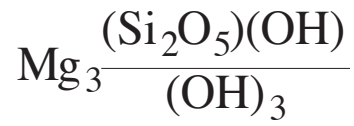
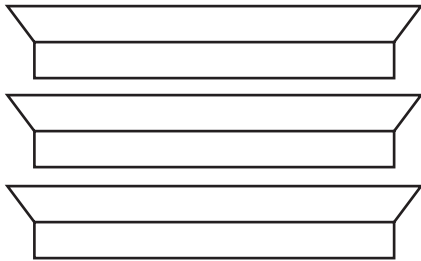




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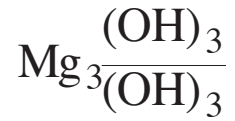
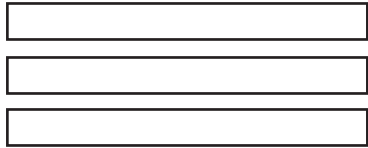


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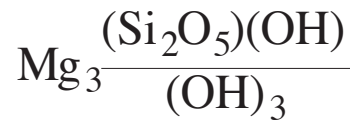
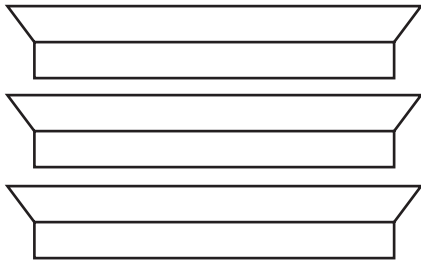




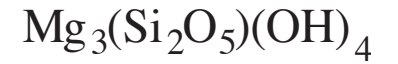
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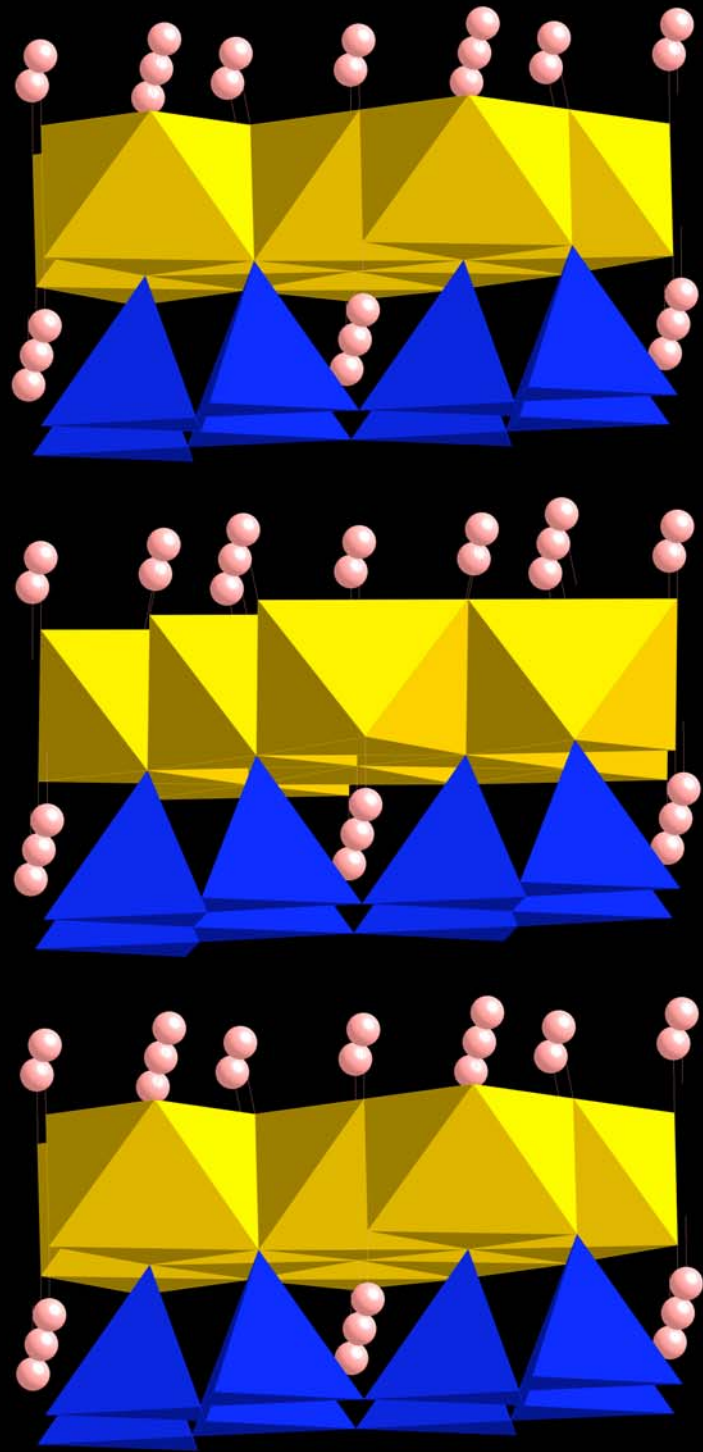


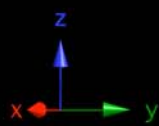
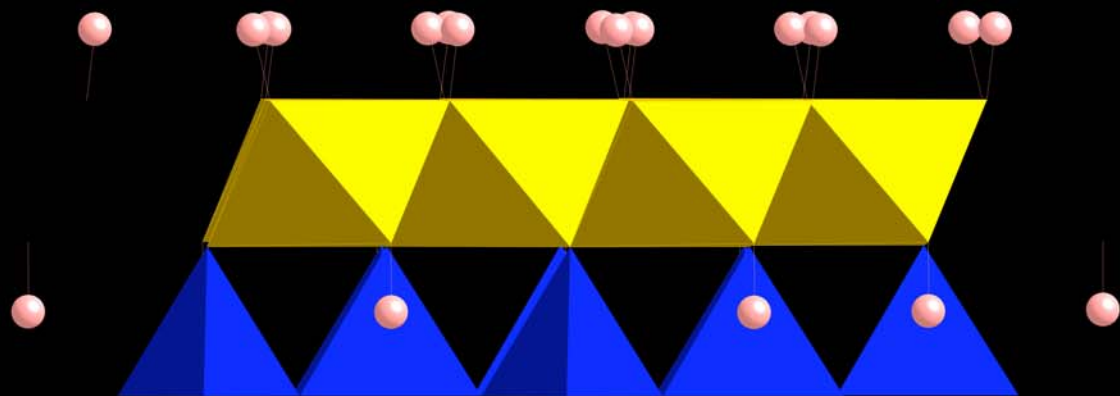
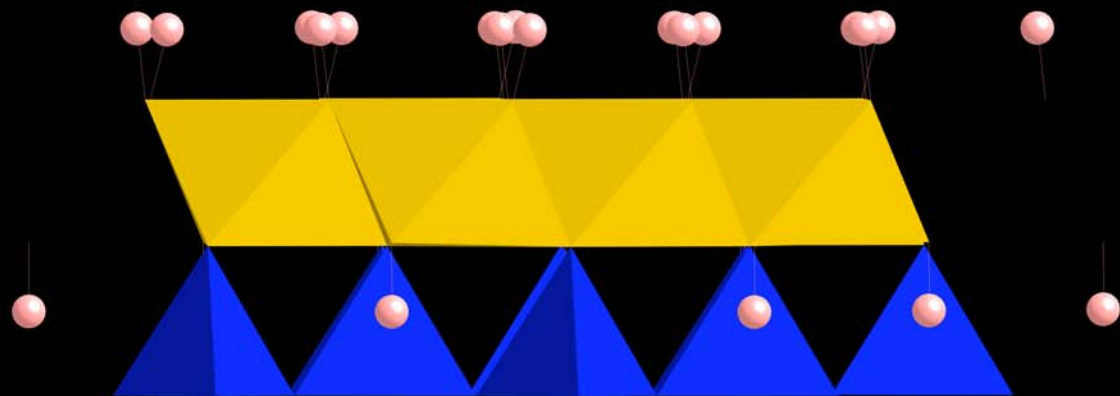
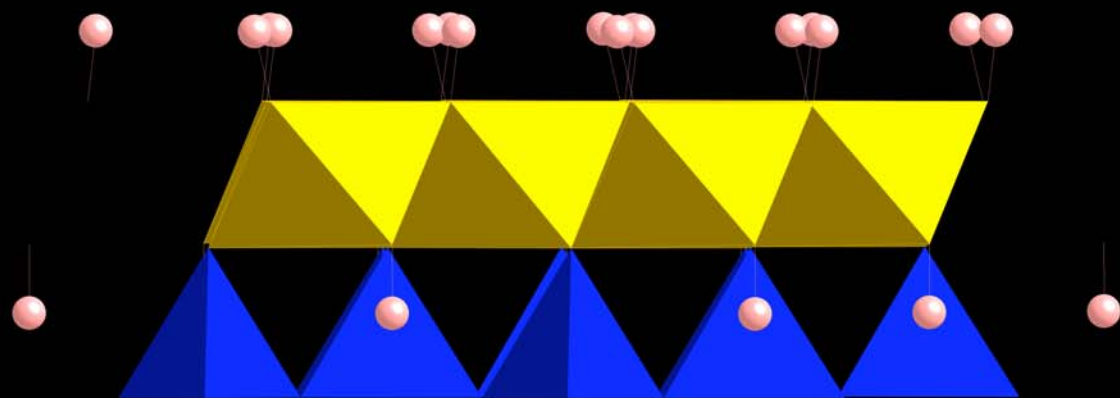
Brucite



Antigorite
Lizardite
(Serpentine)







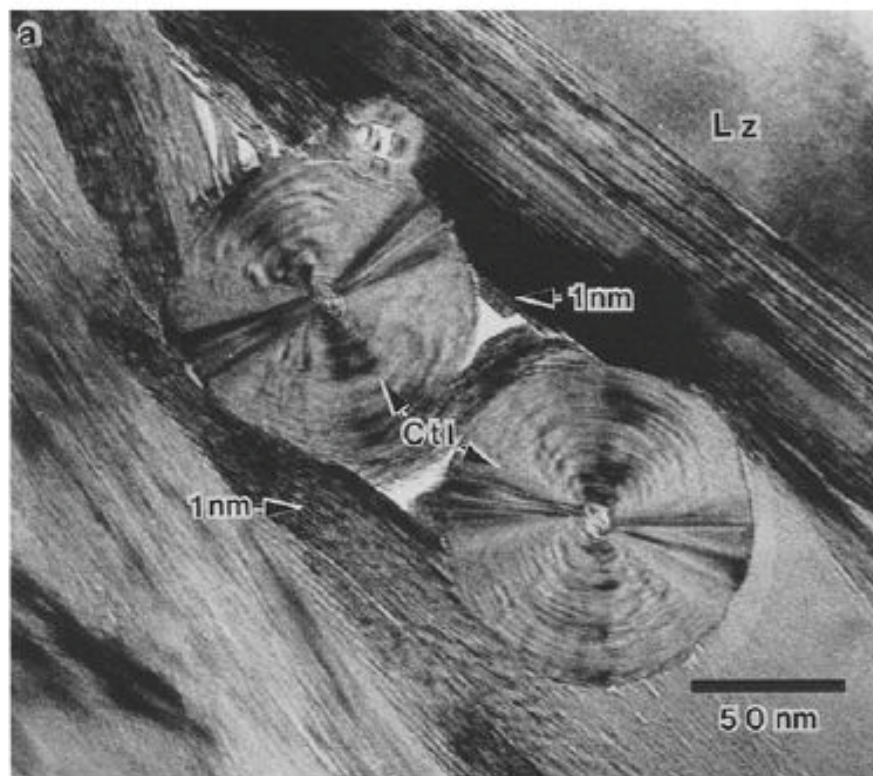


Fig. 3a, b. TEM micrographs (a and b) of disrupted regions containing chrysotile fibers (*Ctl*) as well as lizardite (*Lz*), phlogopite (*Phl*), and 1.0-nm material. The disrupted region (b) also contains curved serpentine (*C*) associated with fragments of lizardite

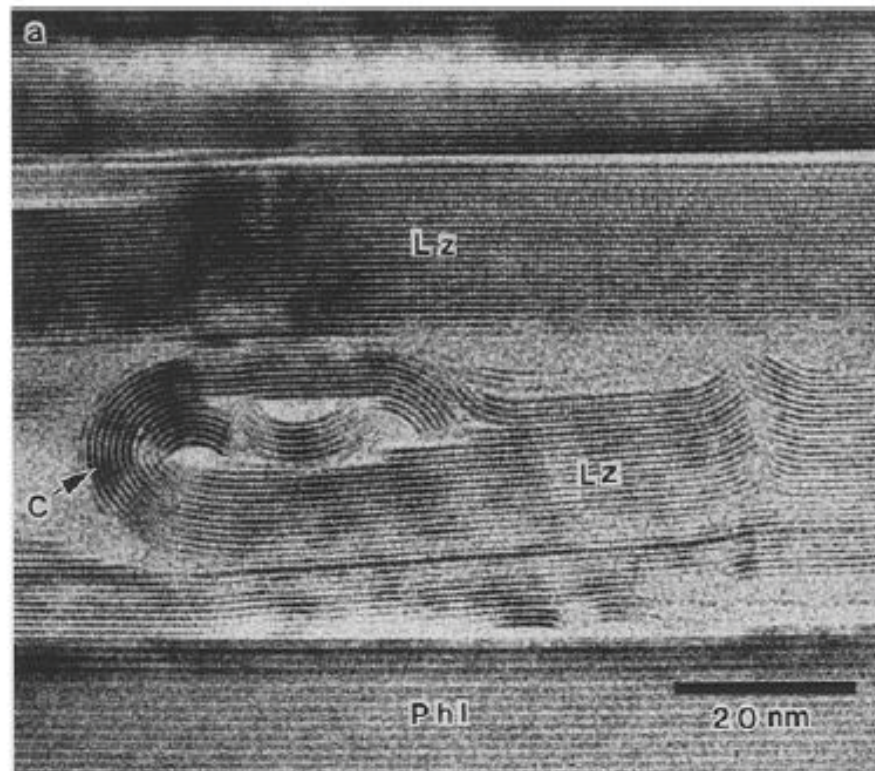
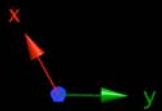
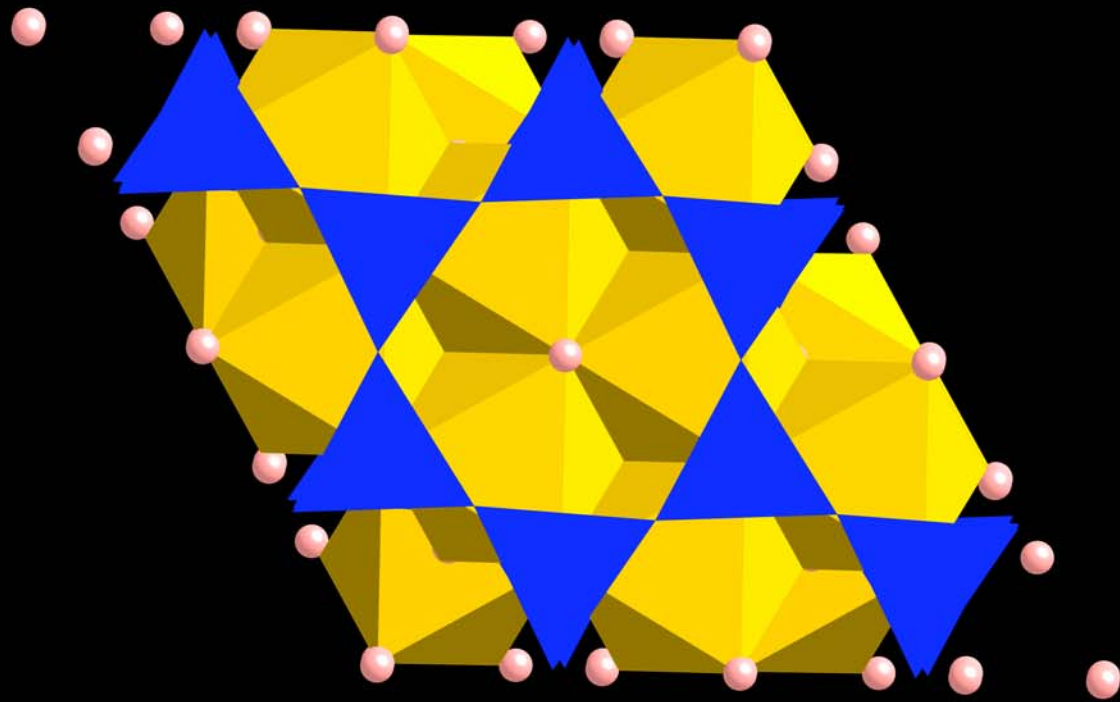


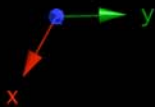
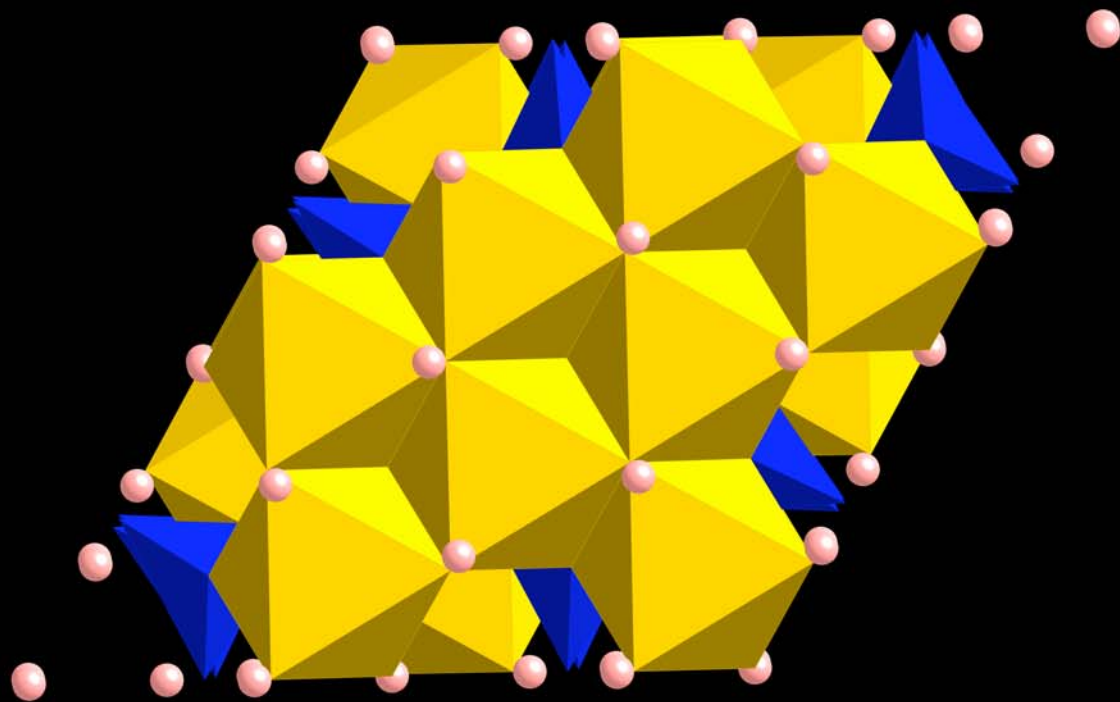
Fig. 4a, b. TEM micrographs of deformed lamellar material with curled serpentine (*C*) intergrown with lizardite (*Lz*). Curled serpentine occurs (a) along a narrow cleavage fracture and (b) in a void next to kinked and bent lamellae

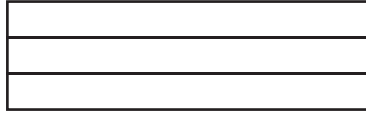
Serpentinization of phlogopite phenocrysts from a micaceous kimberlite

Thomas G. Sharp¹, Max T. Otten², and Peter R. Buseck³

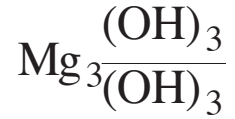
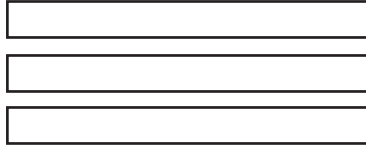
Contrib. Mineral Petrol (1990) 104: 530-539



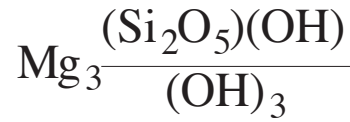
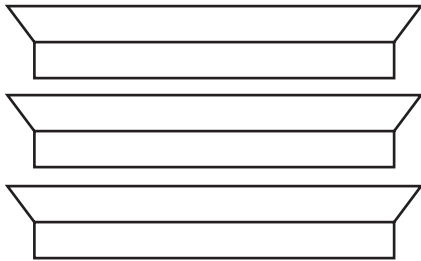




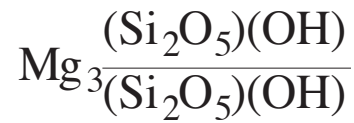
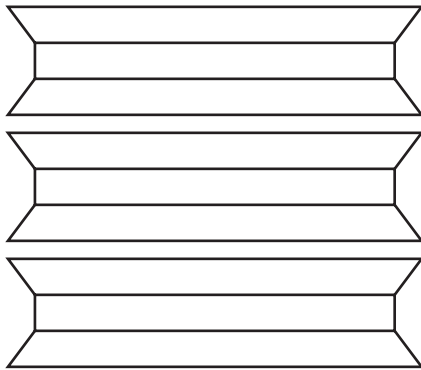
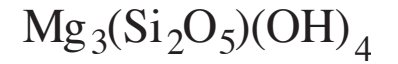
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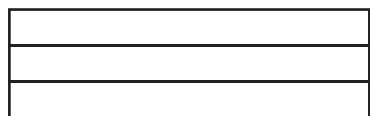


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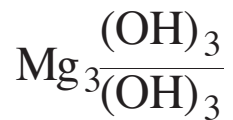
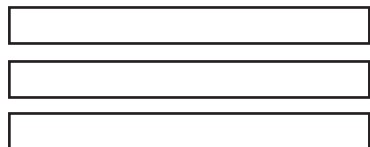


Antigorite
Lizardite
(Serpentine)

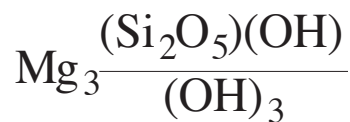
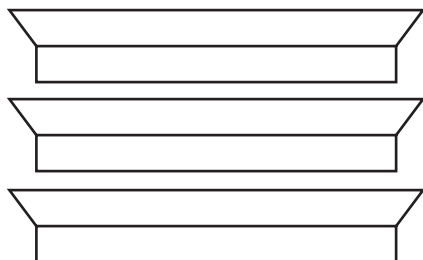




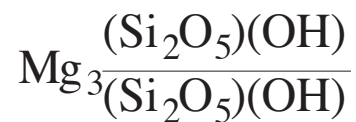
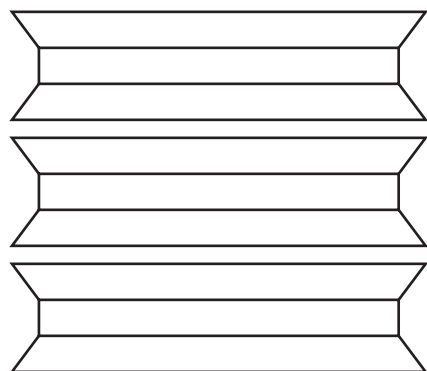
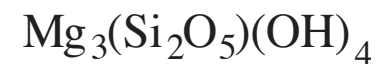
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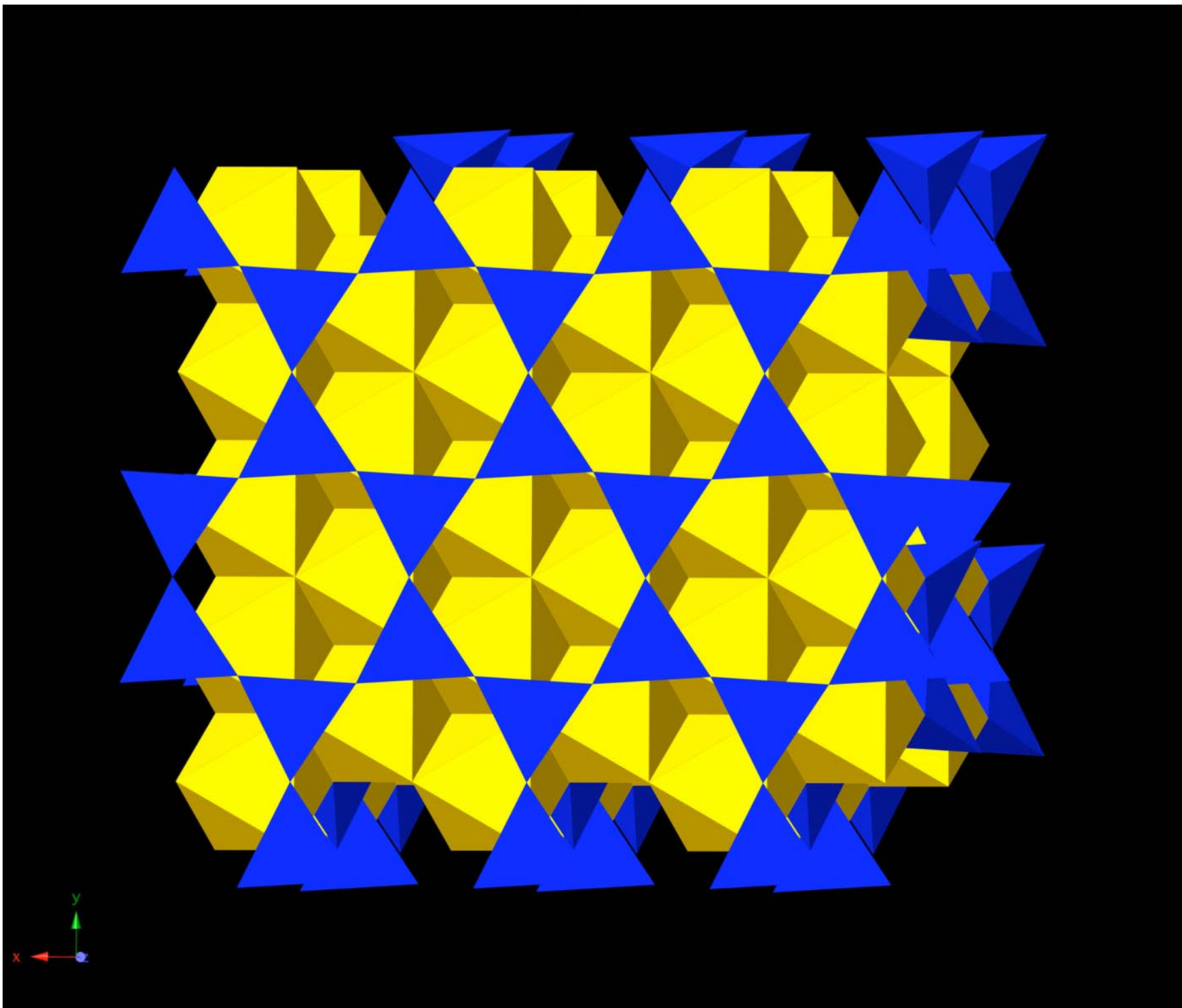


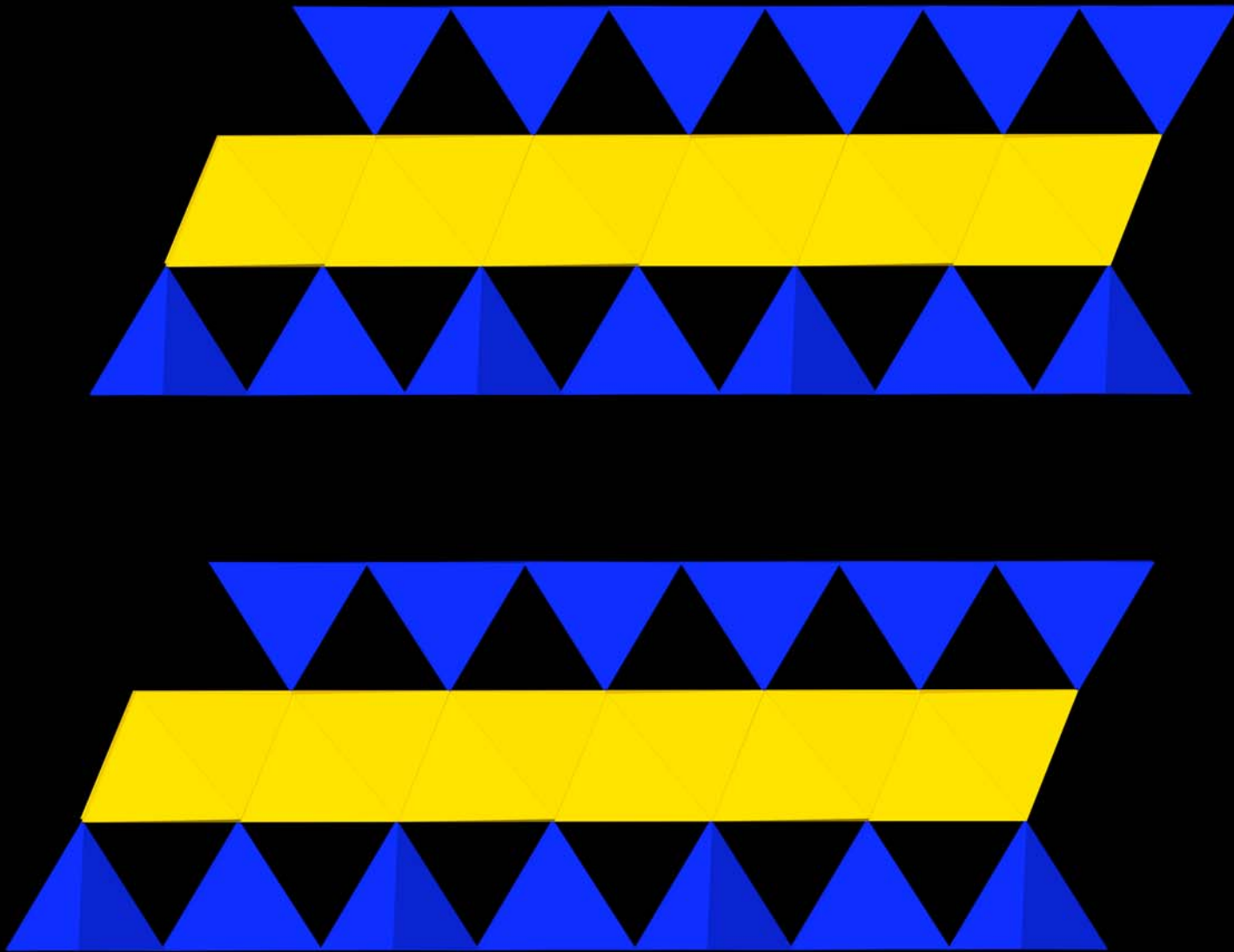
Antigorite
Lizardite
(Serpentine)

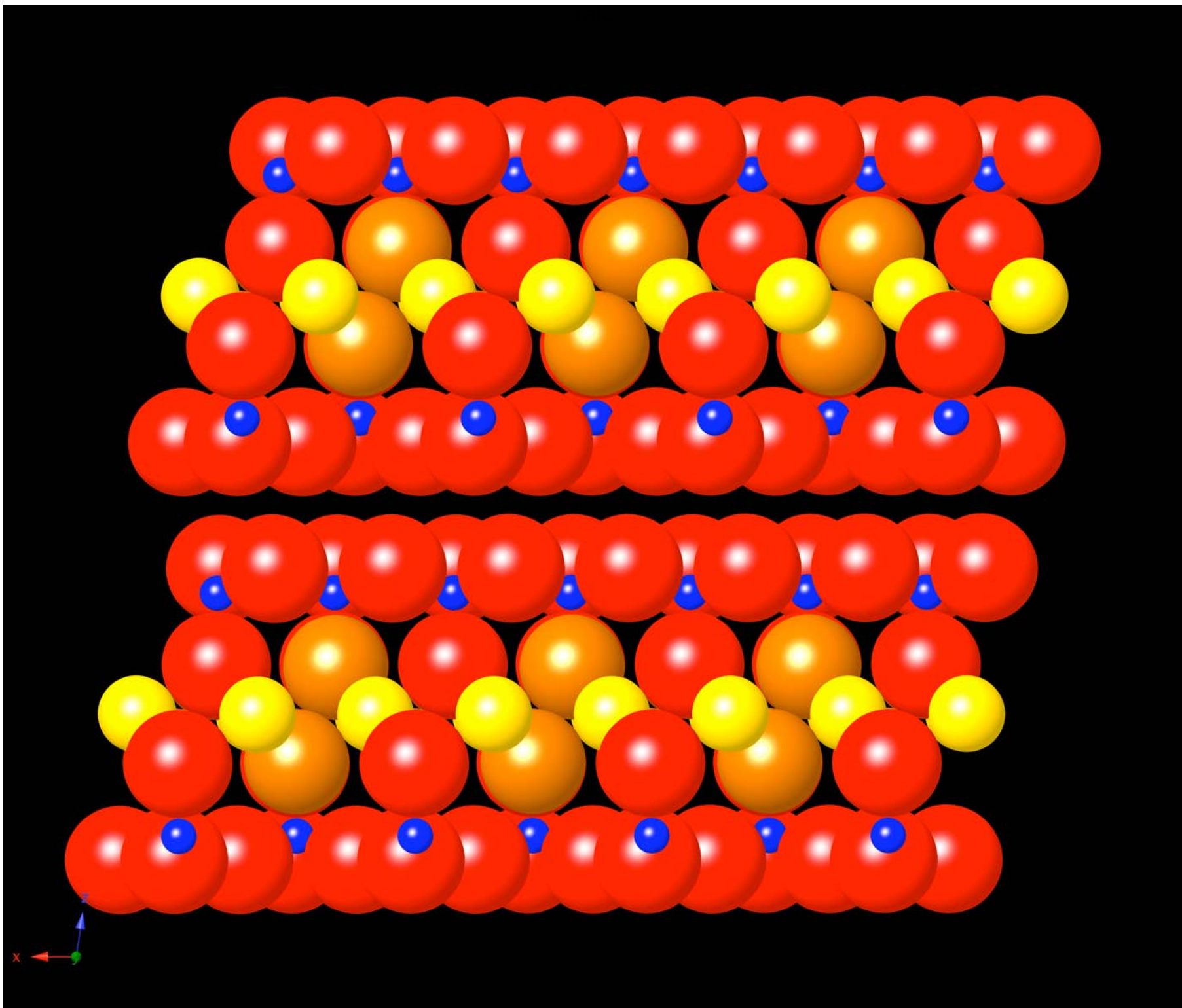


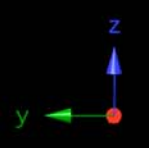
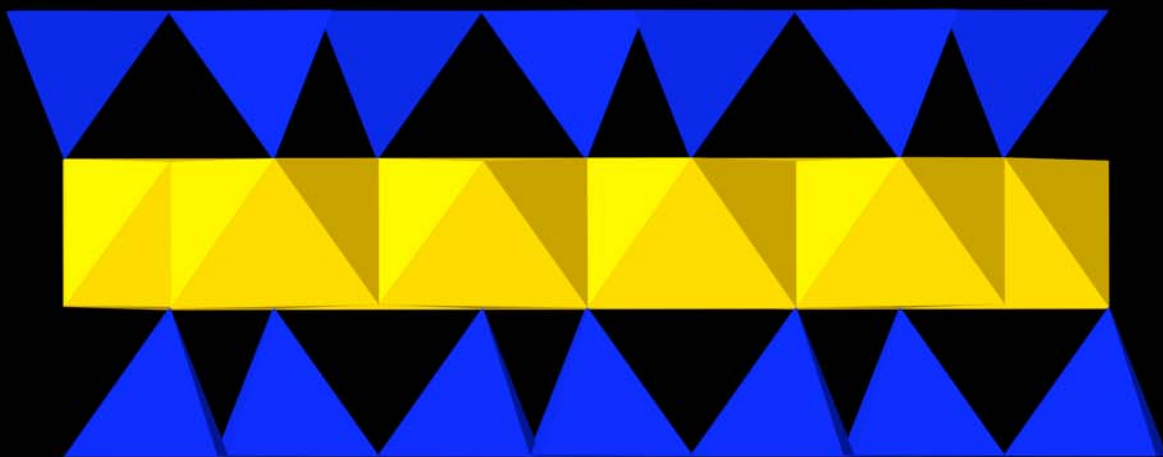
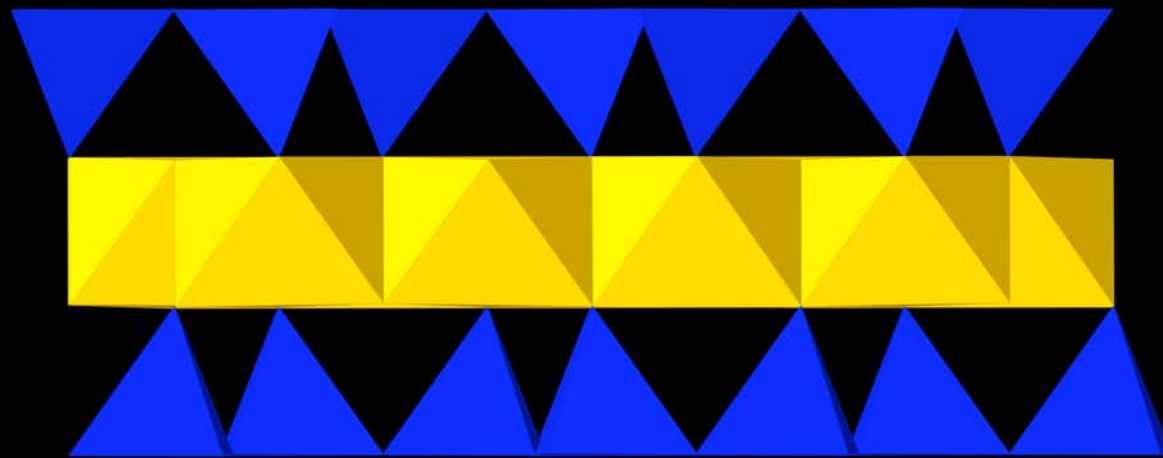
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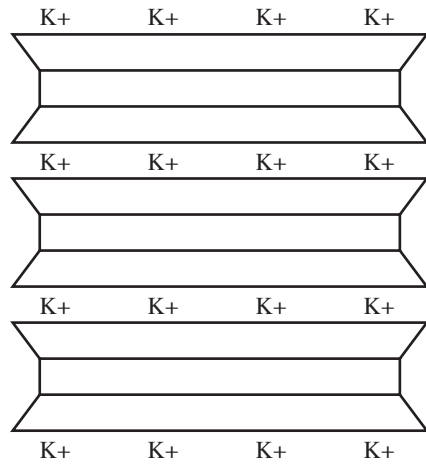


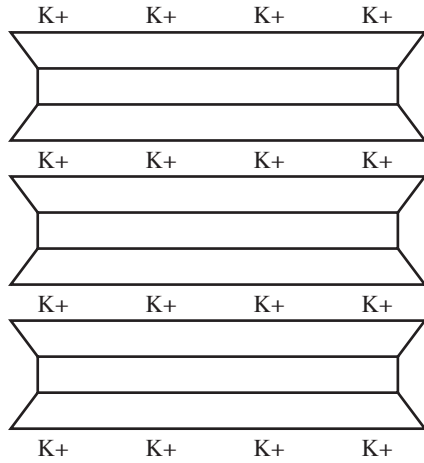












Phlogopite



Annite



Clintonite

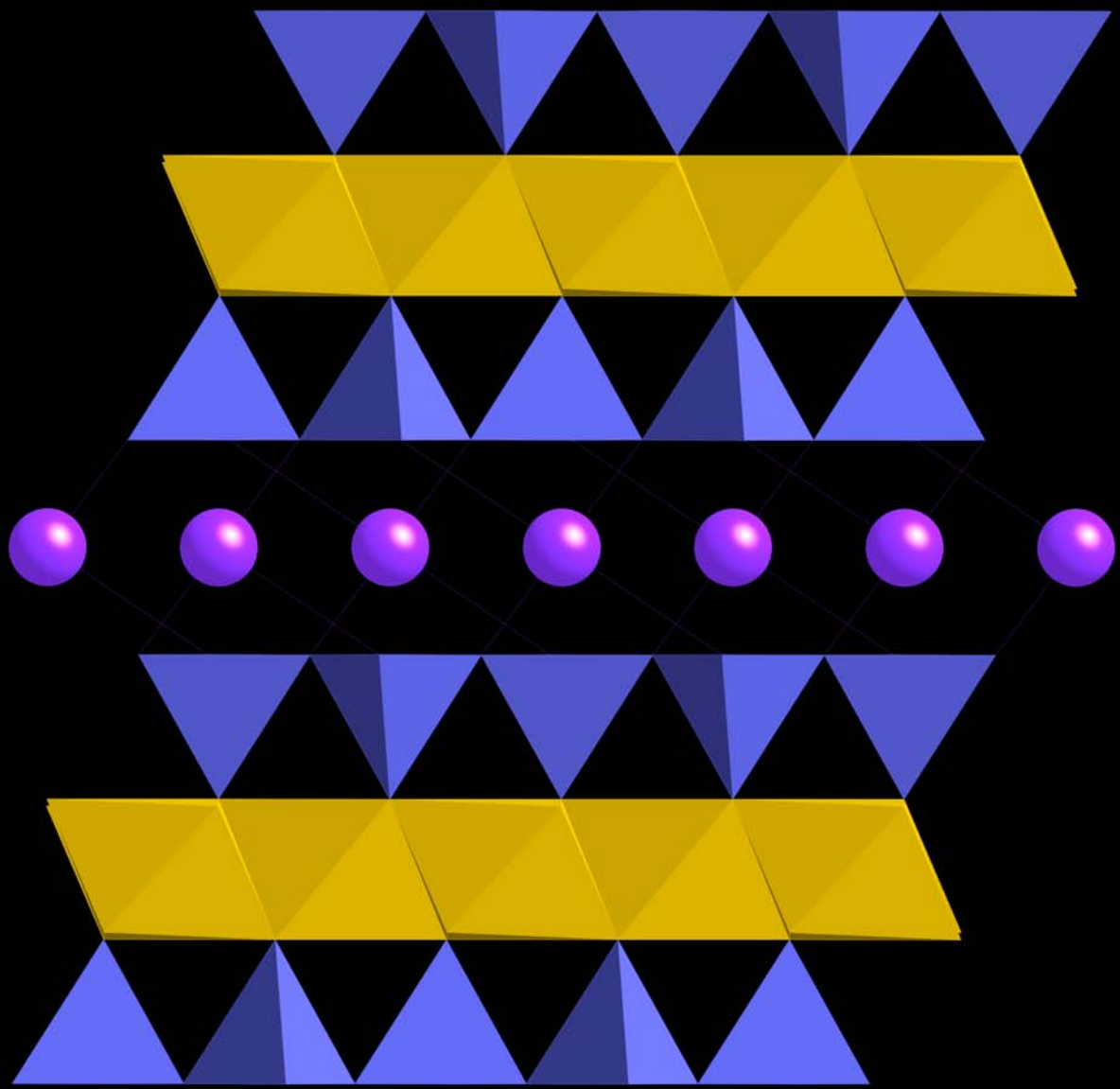


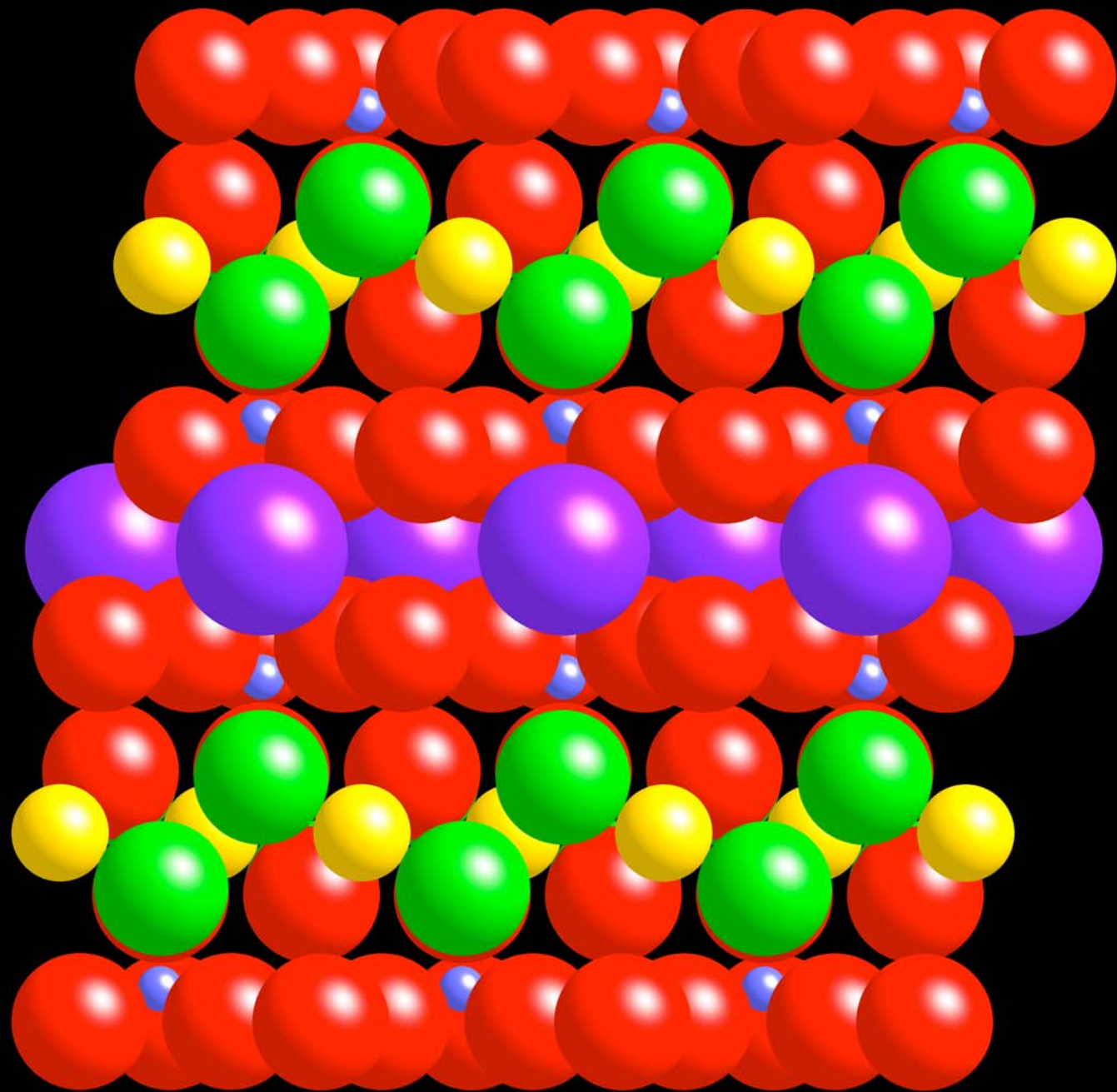
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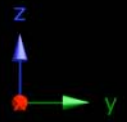
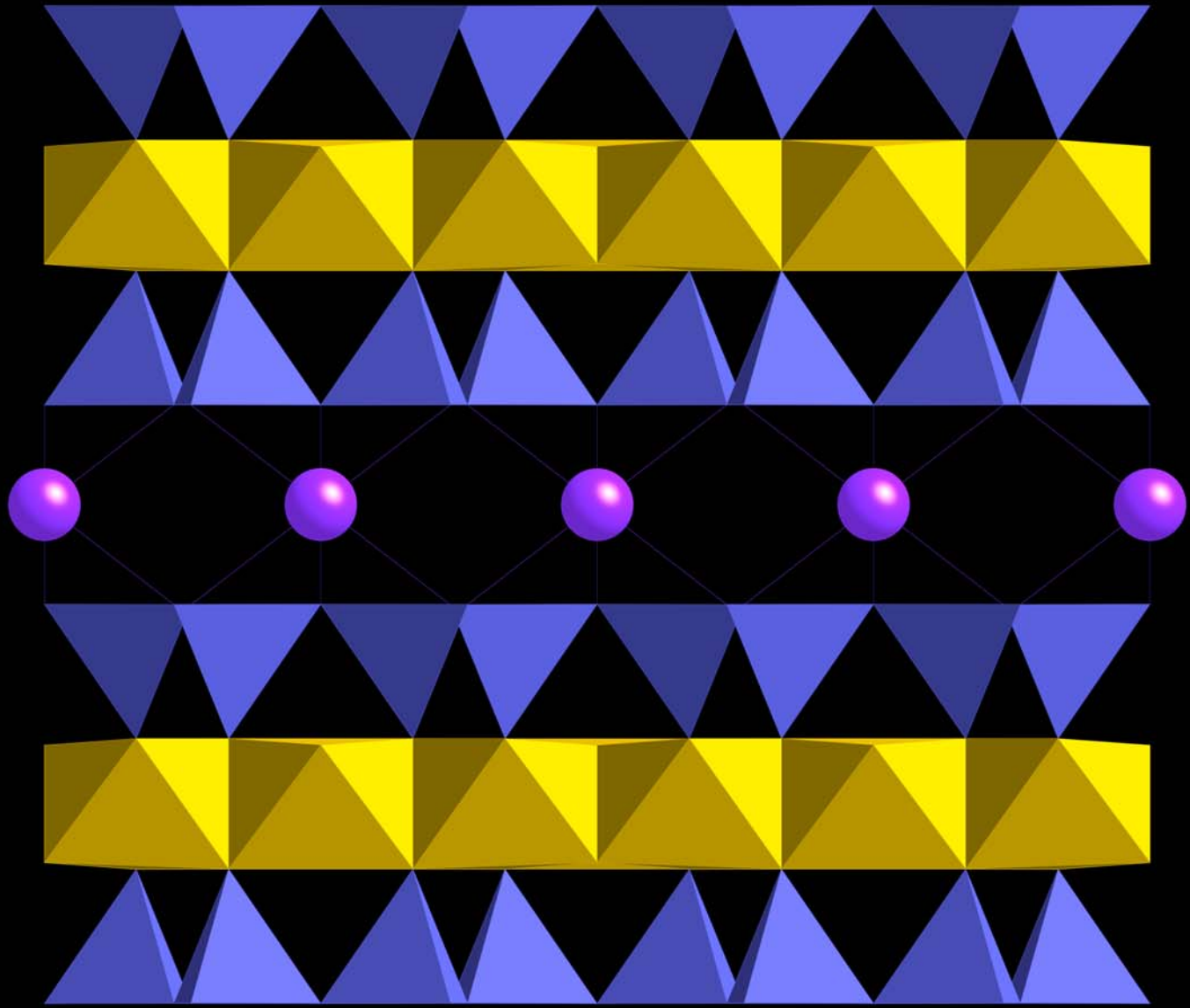


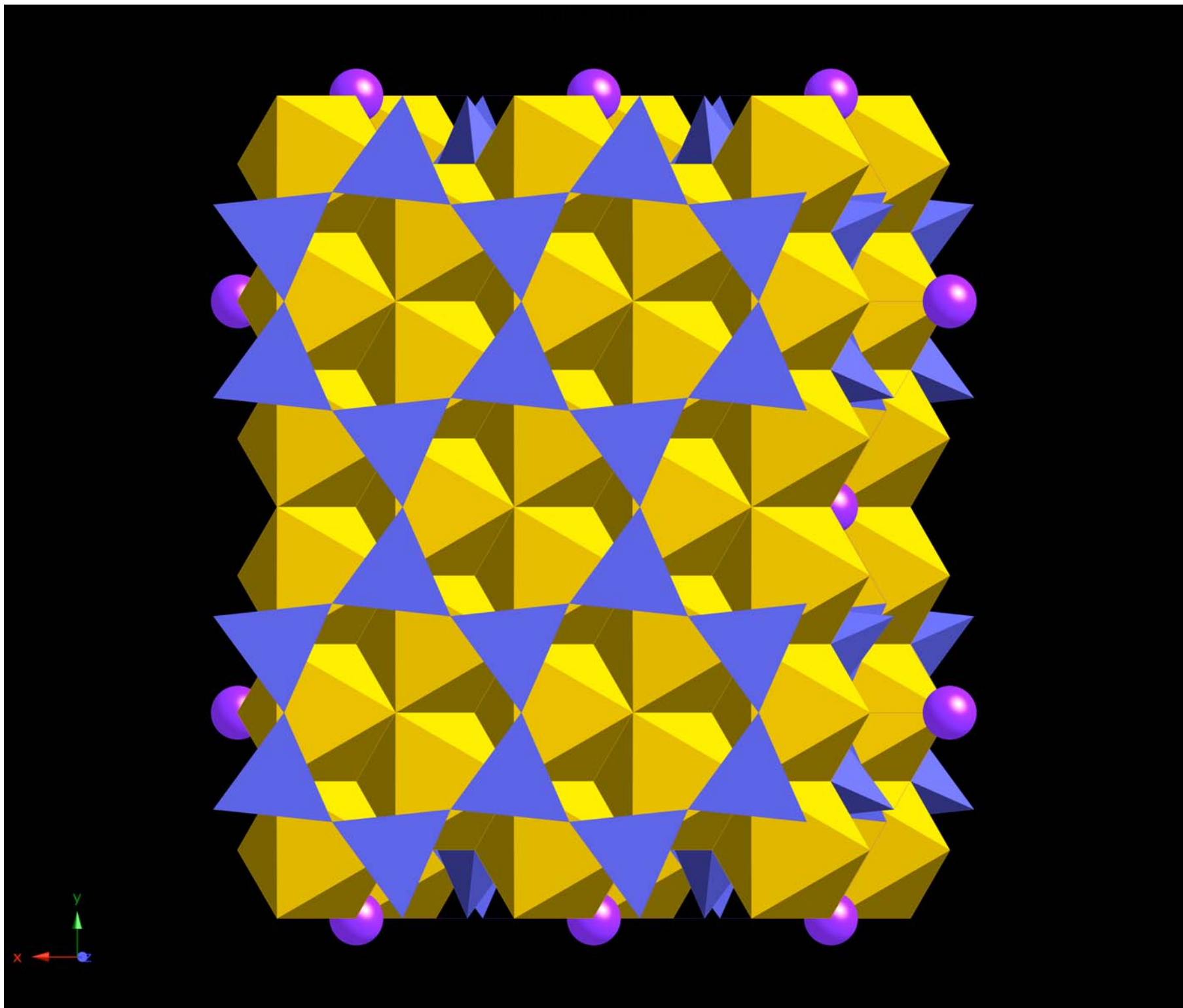
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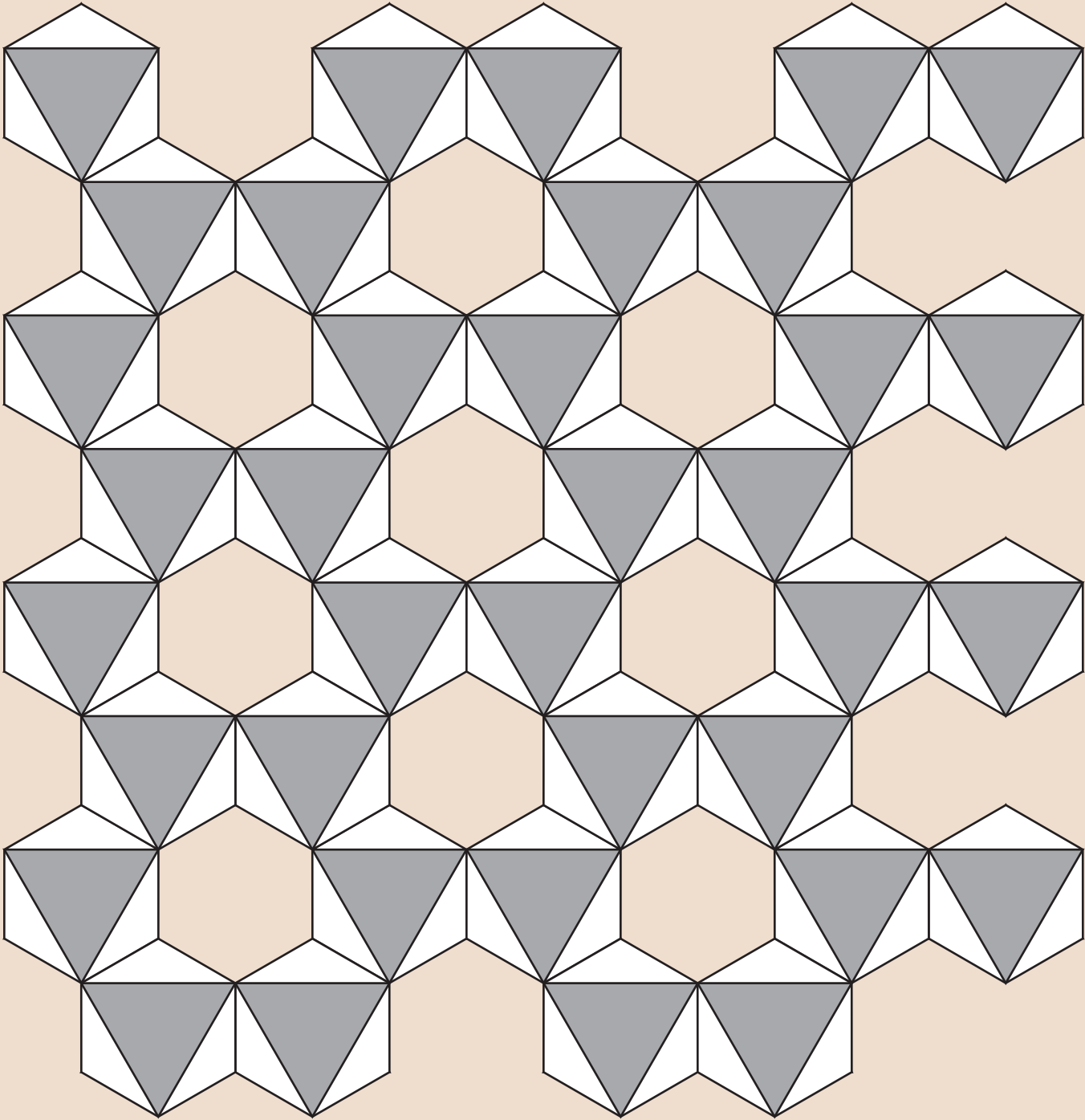


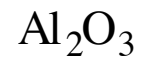
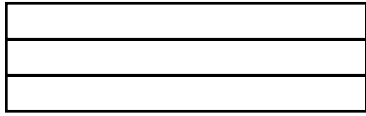


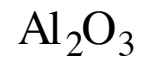
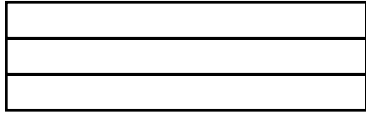




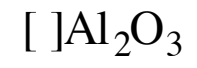


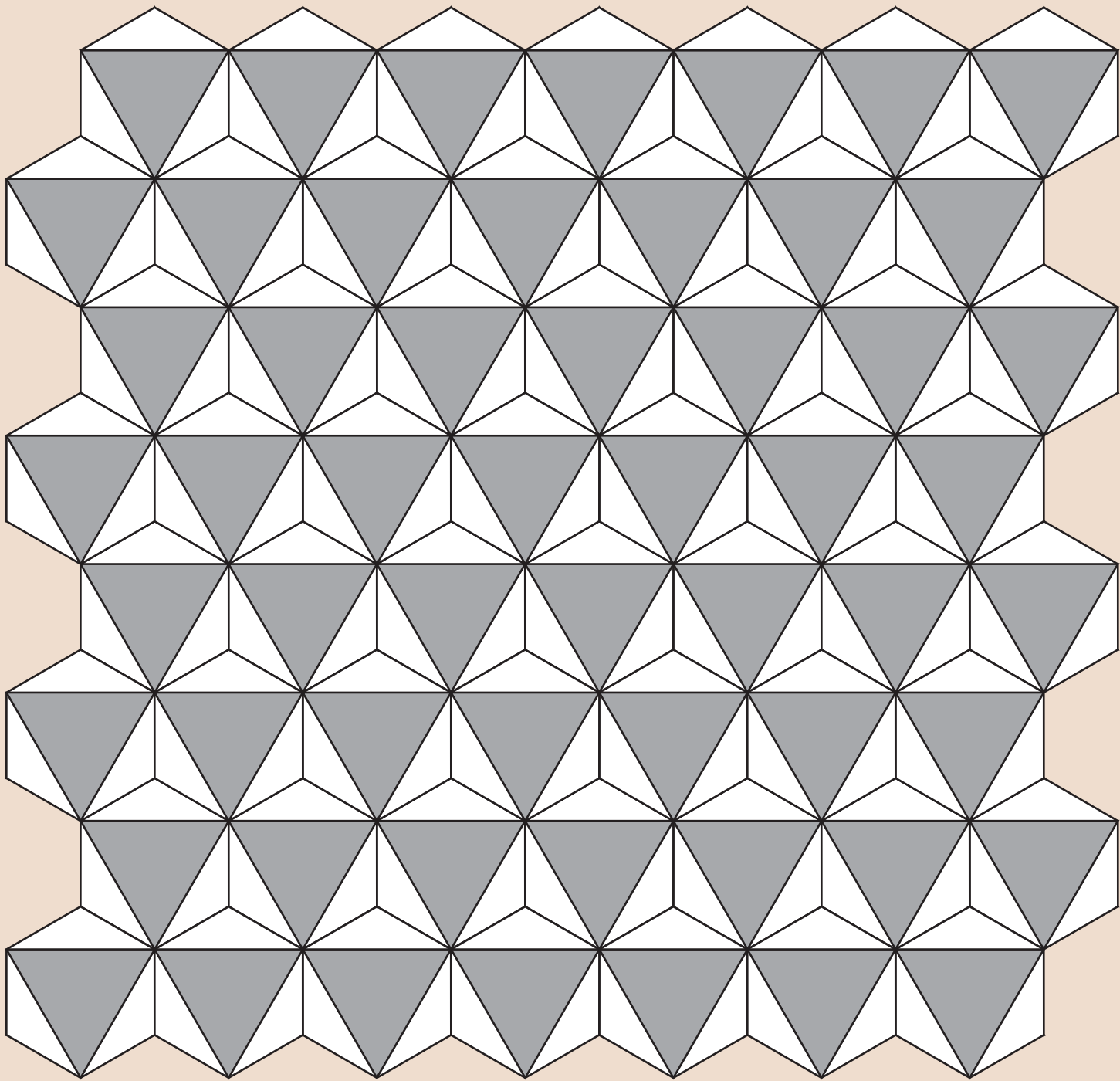


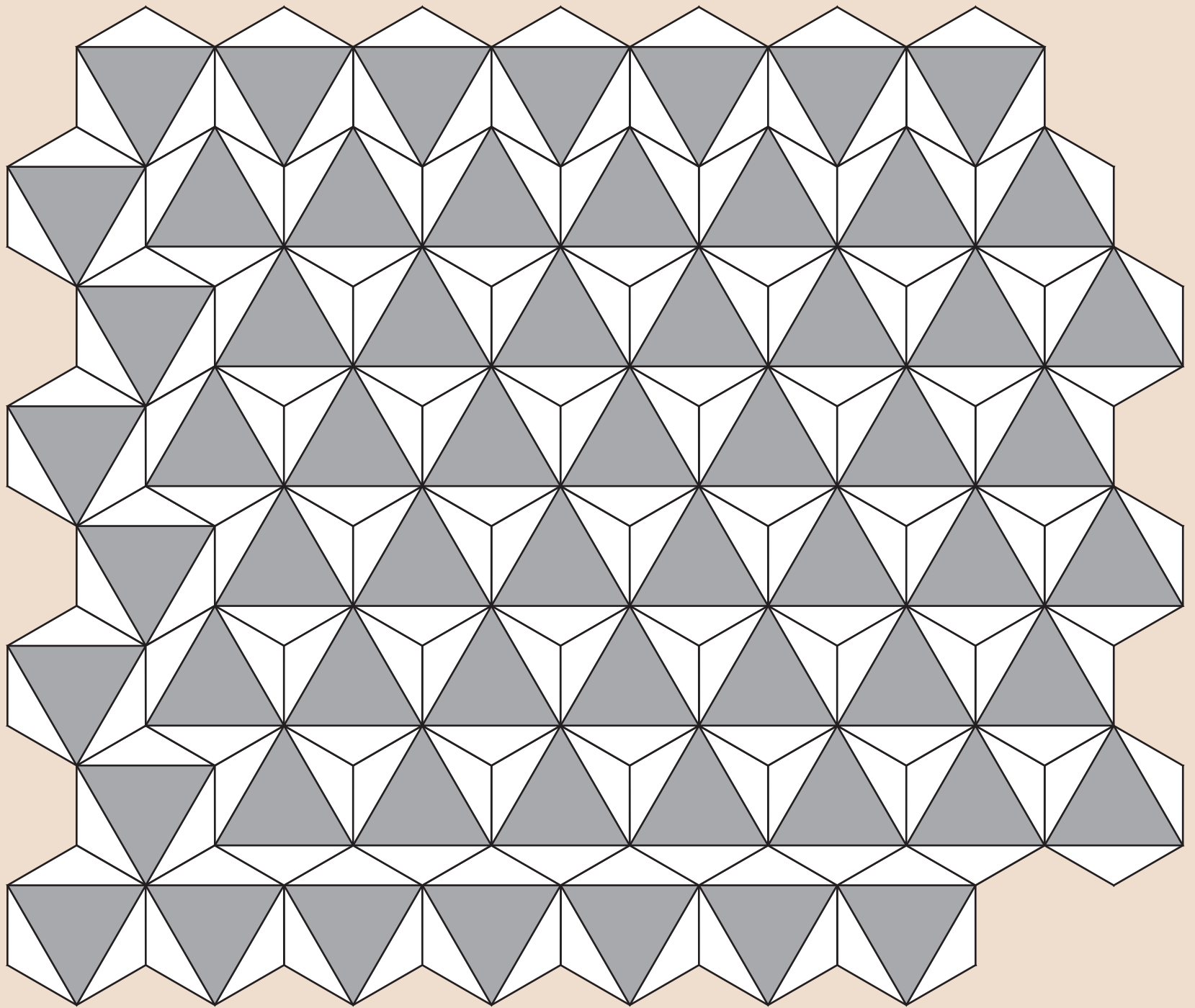


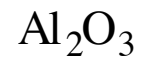
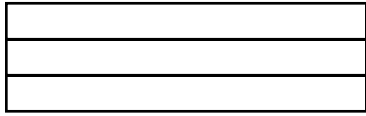


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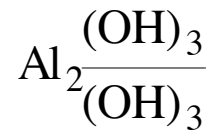
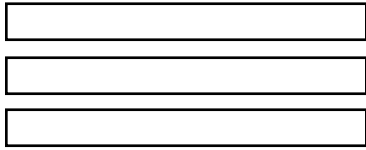
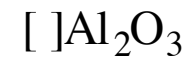


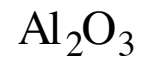
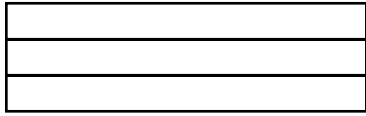




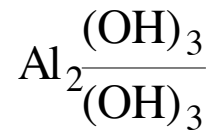
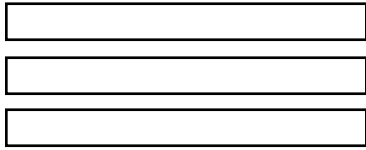
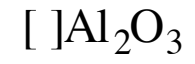


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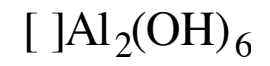


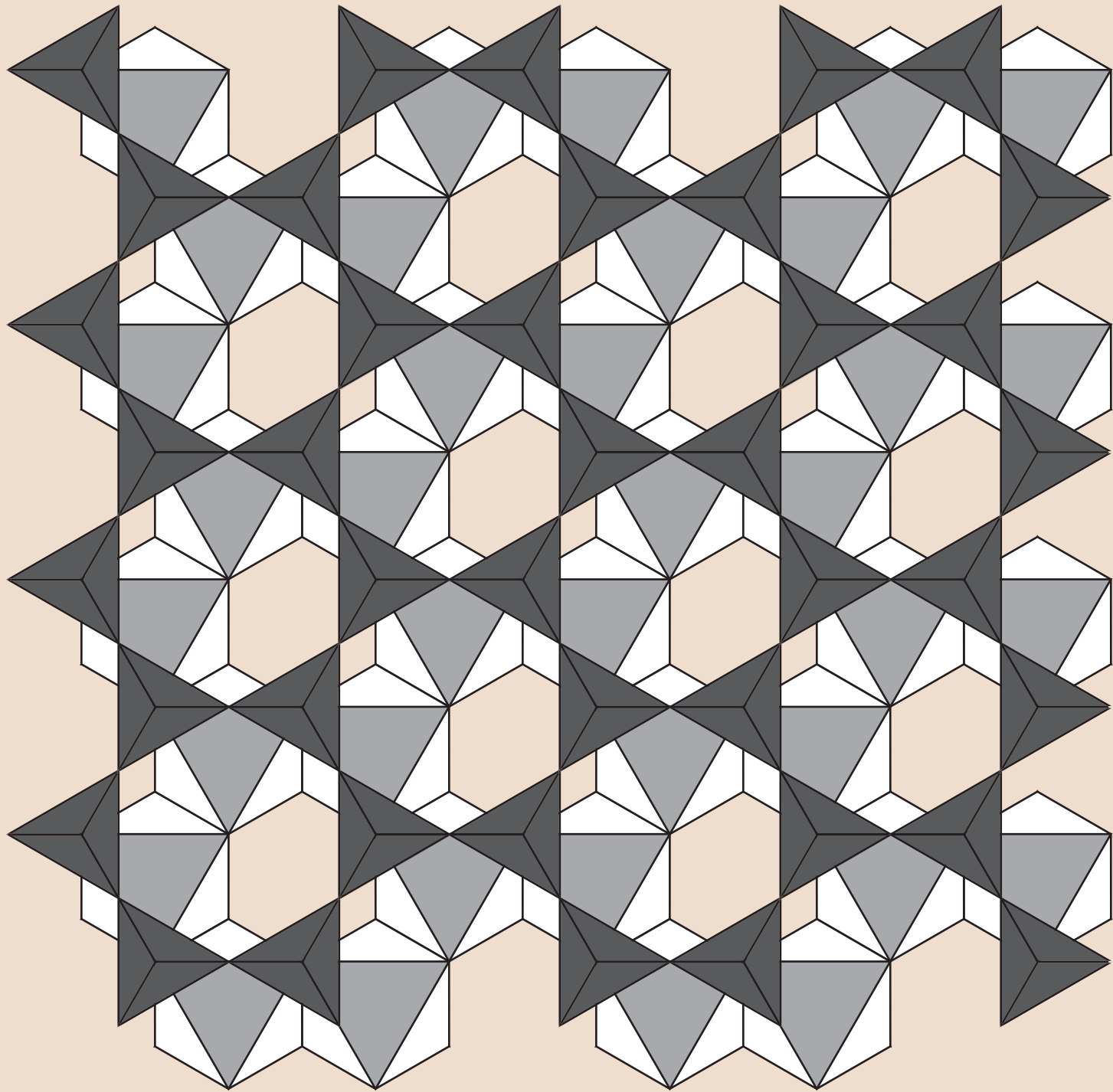


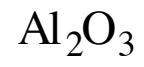
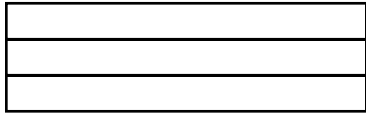
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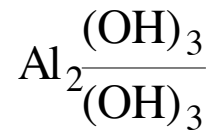
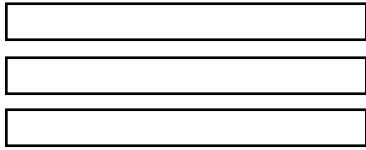
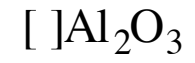
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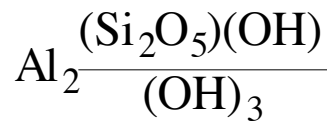
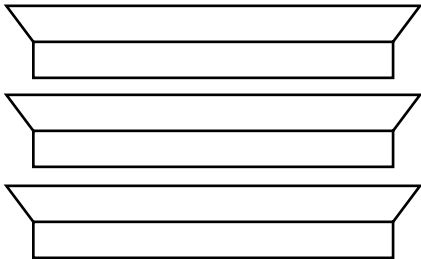
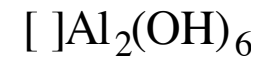


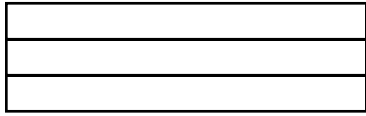


Corundum

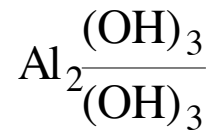
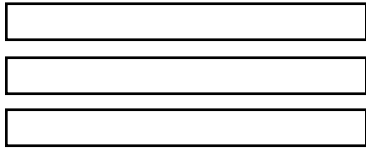
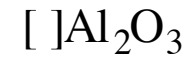


Gibbsite

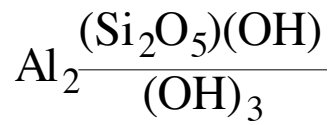
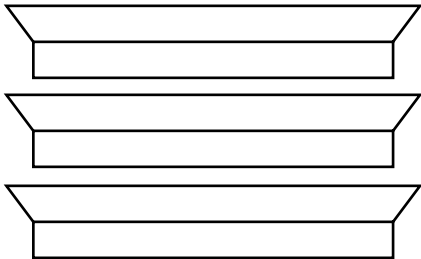
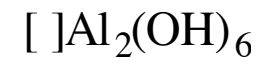




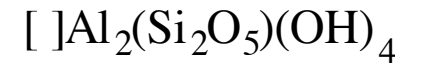
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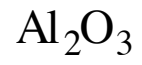
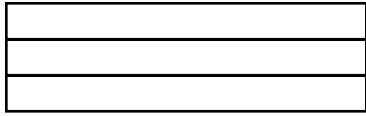


Gibbsite

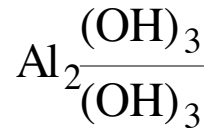
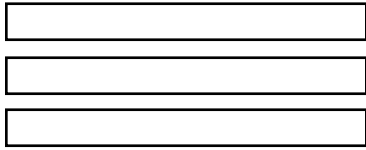
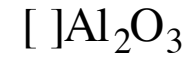


Kaolinite

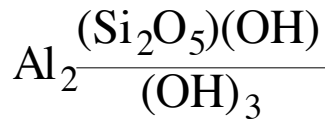
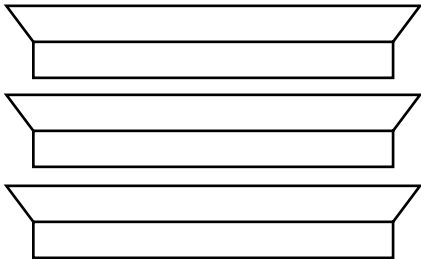
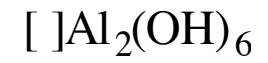




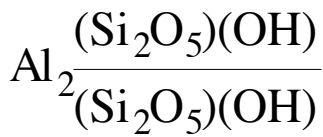
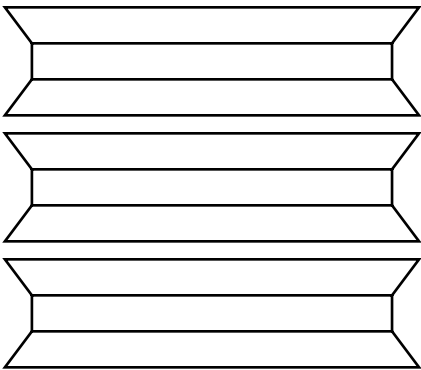
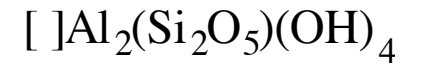
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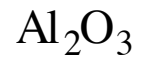
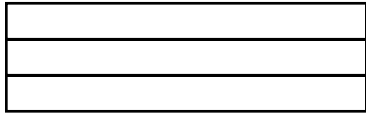


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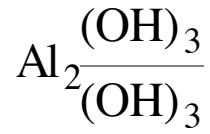
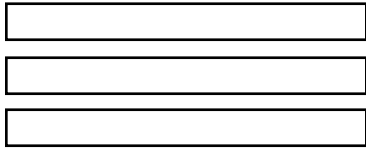
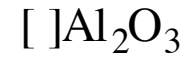


Kaolinite

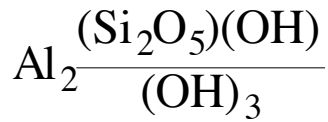
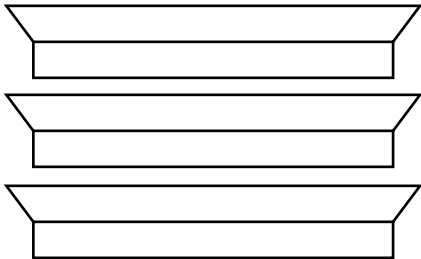
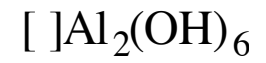




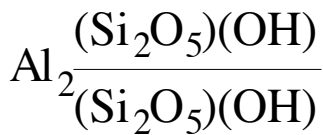
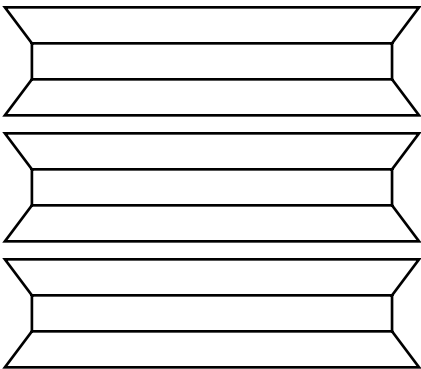
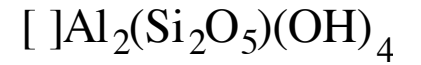
Corundum



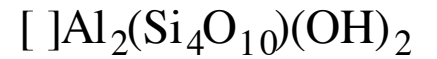
Gibbsite

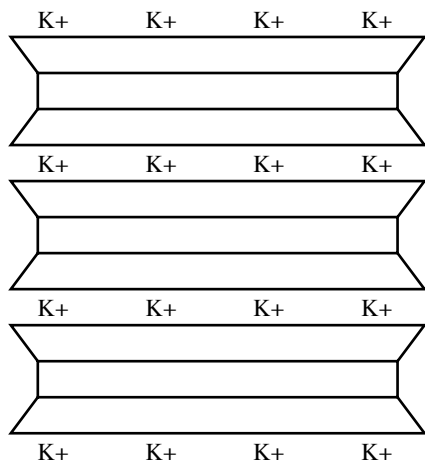


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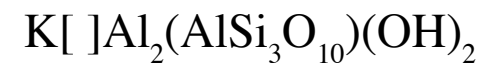


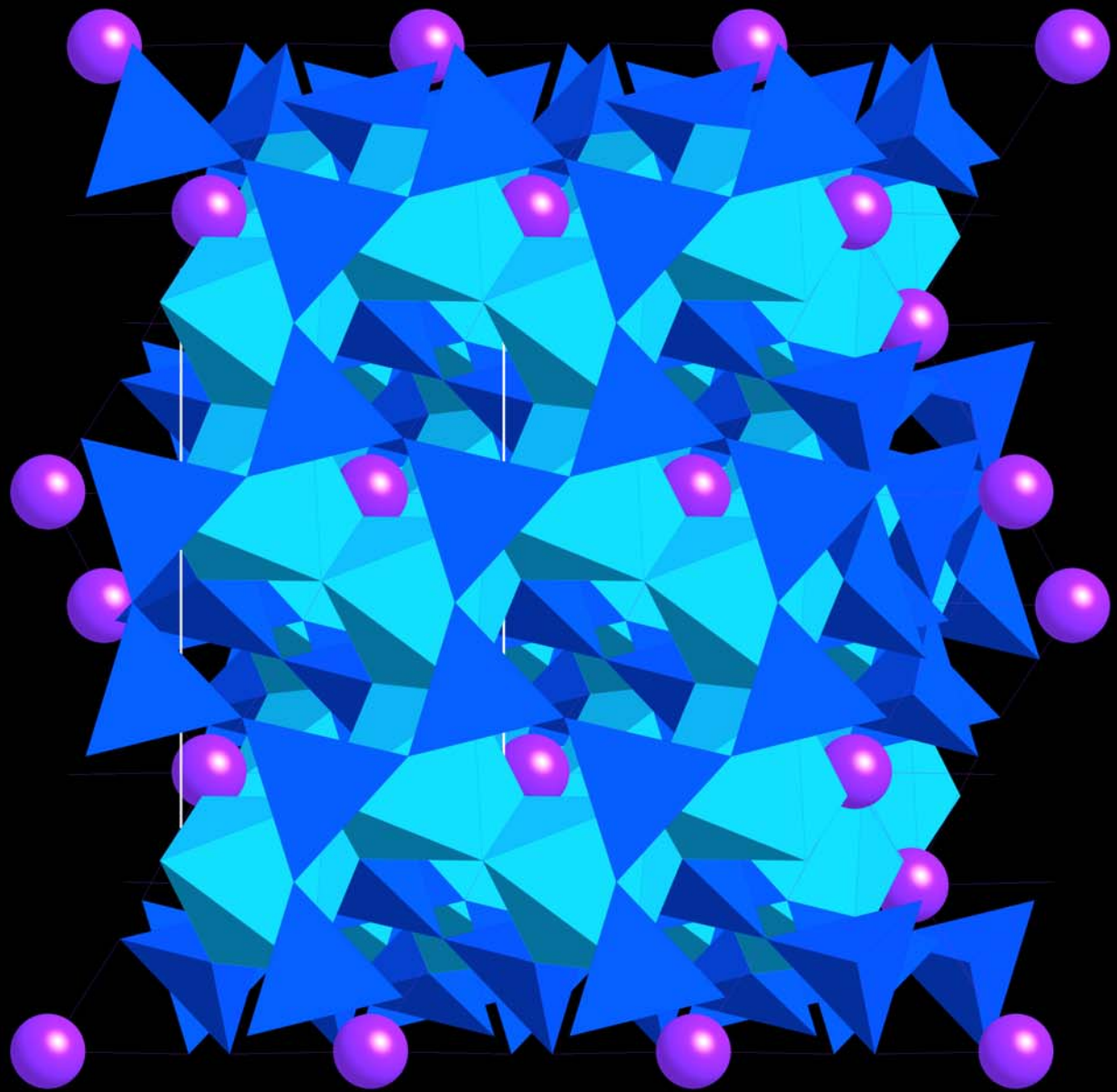
Pyrophyllite

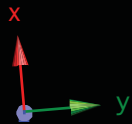
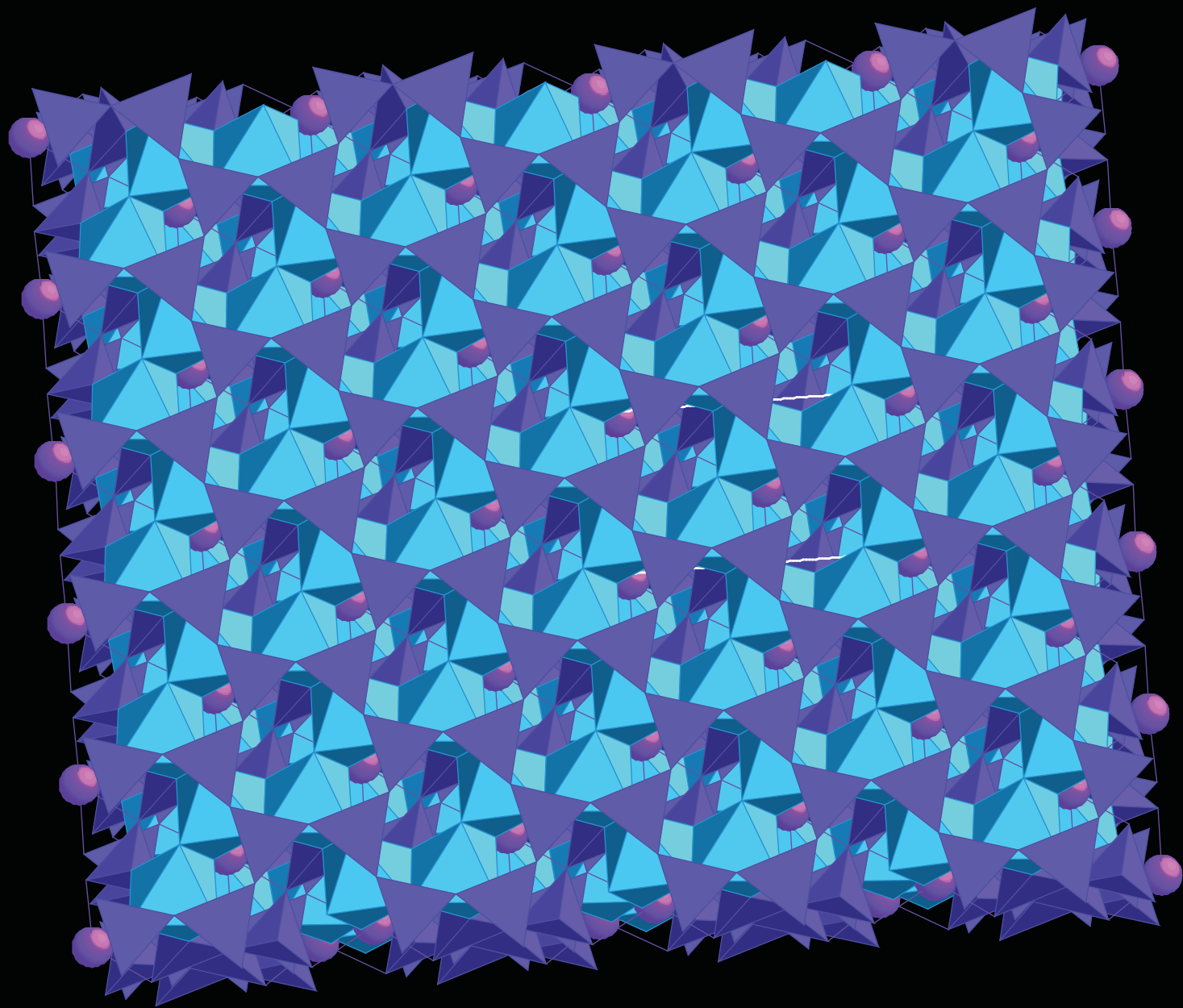


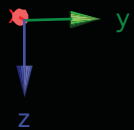
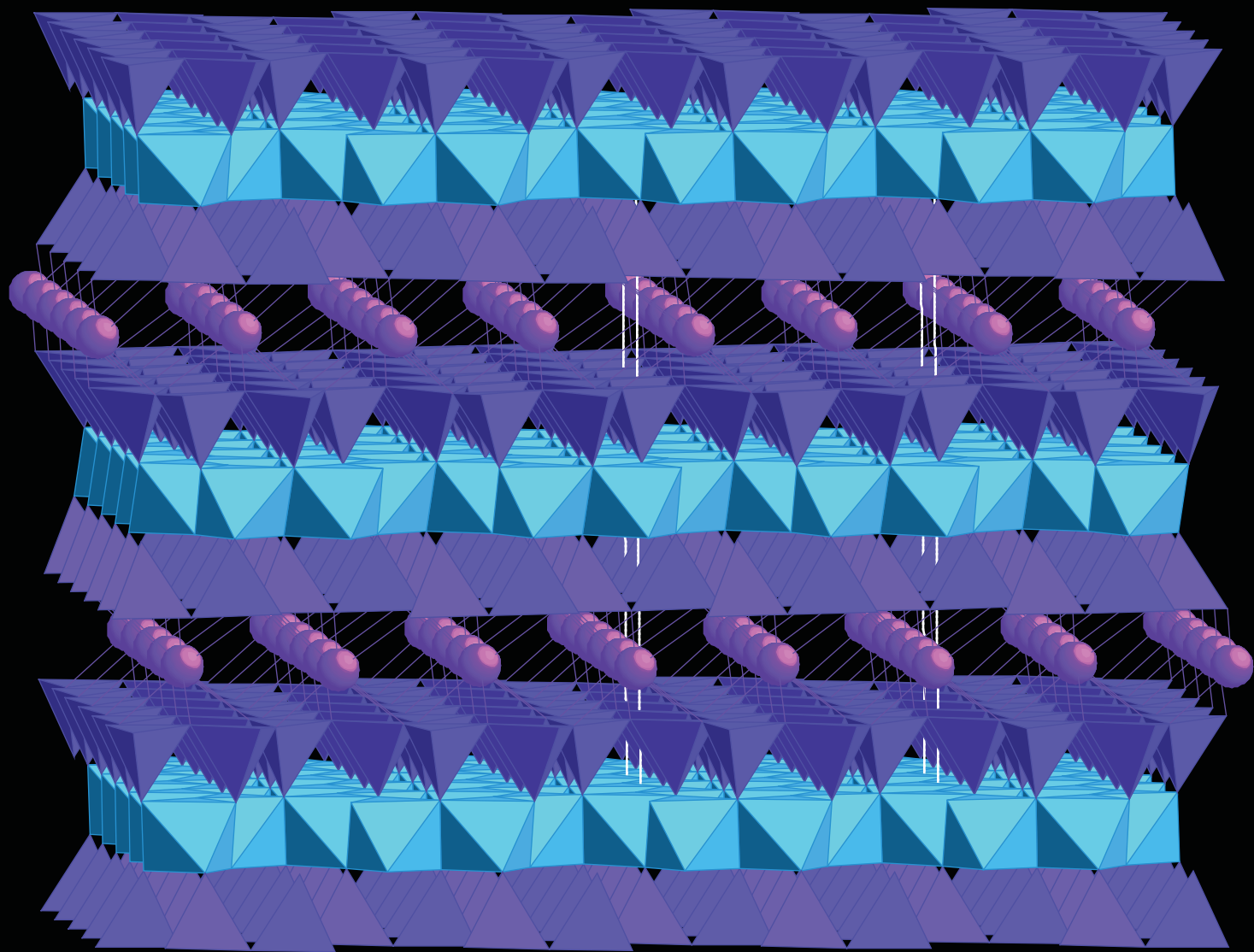


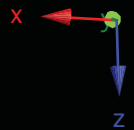
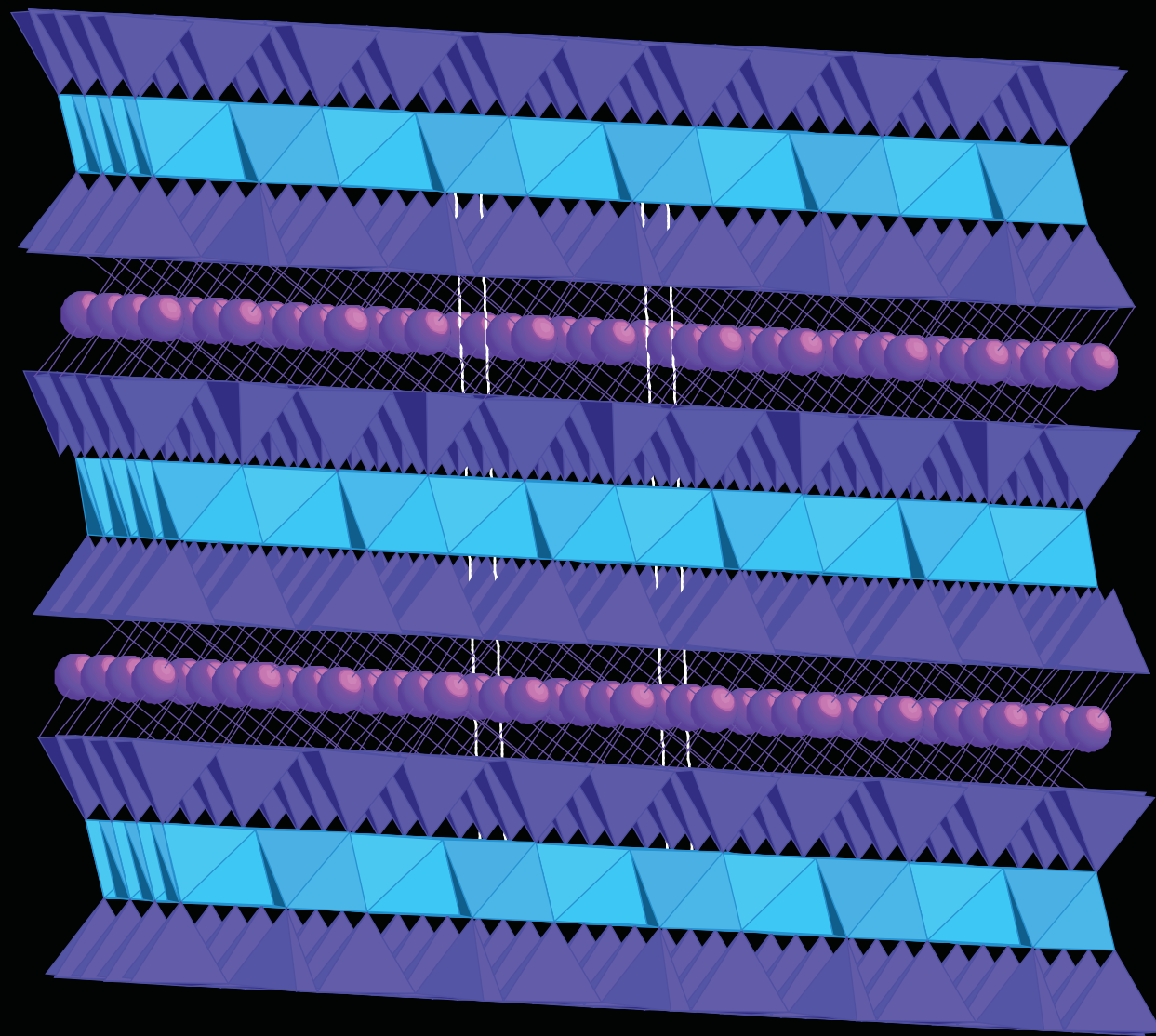
Muscovite

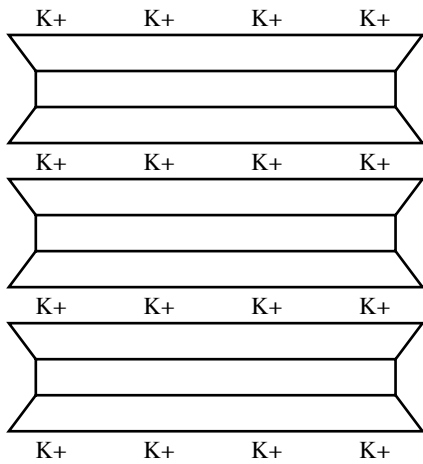




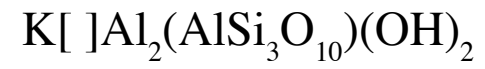






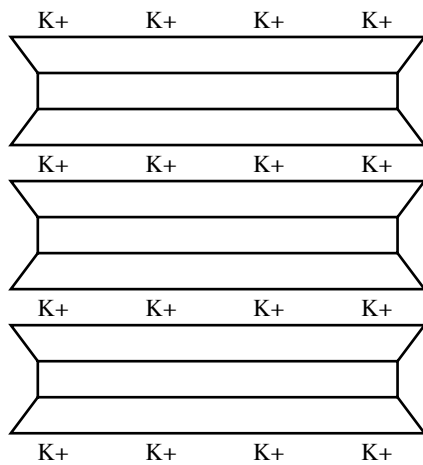


Muscovite



Paragonite





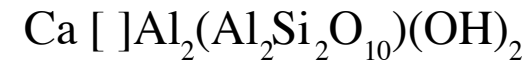
Muscovite



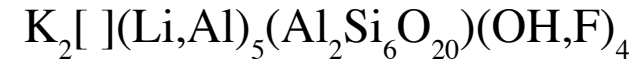
Paragonite

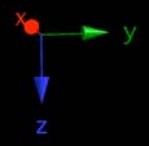
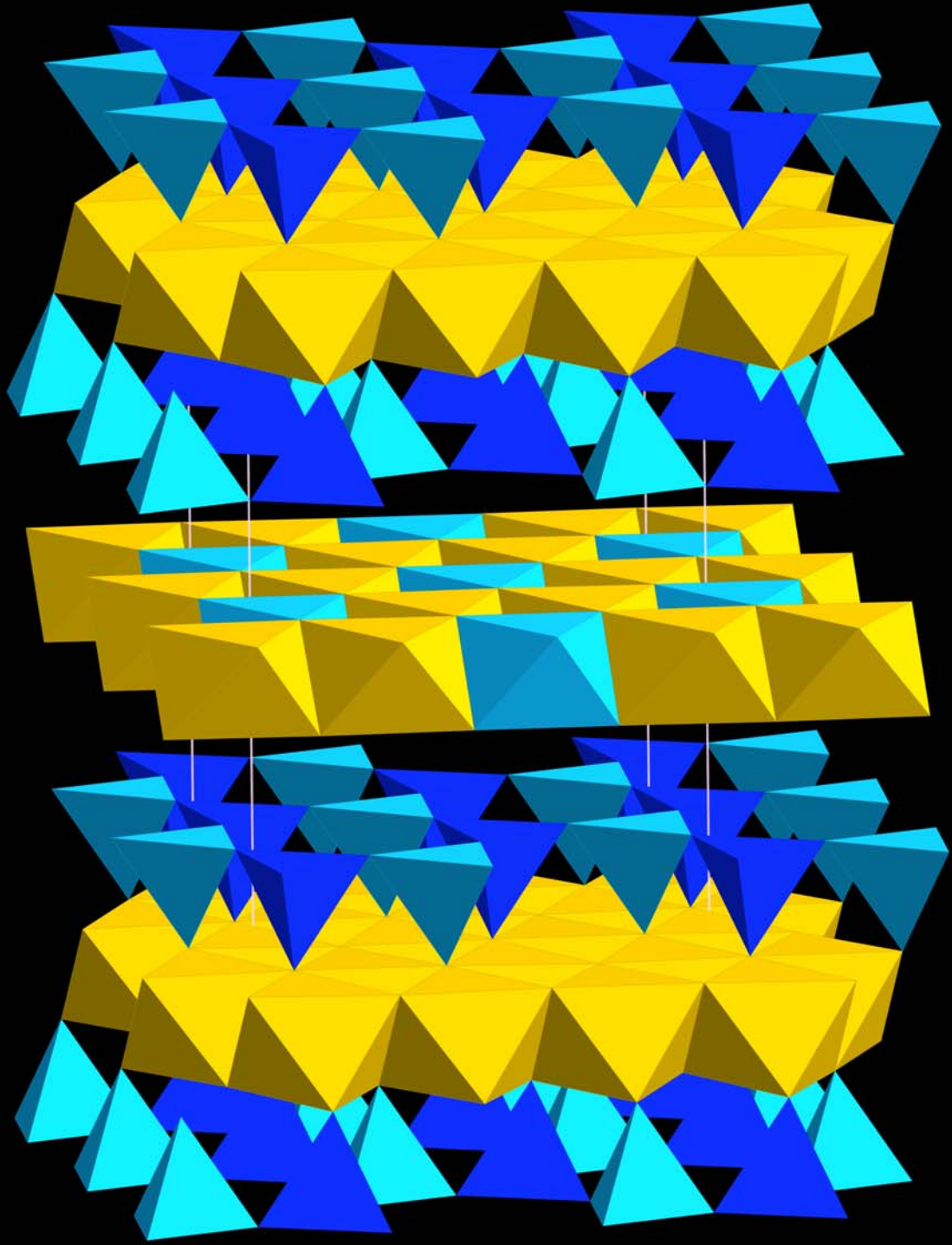


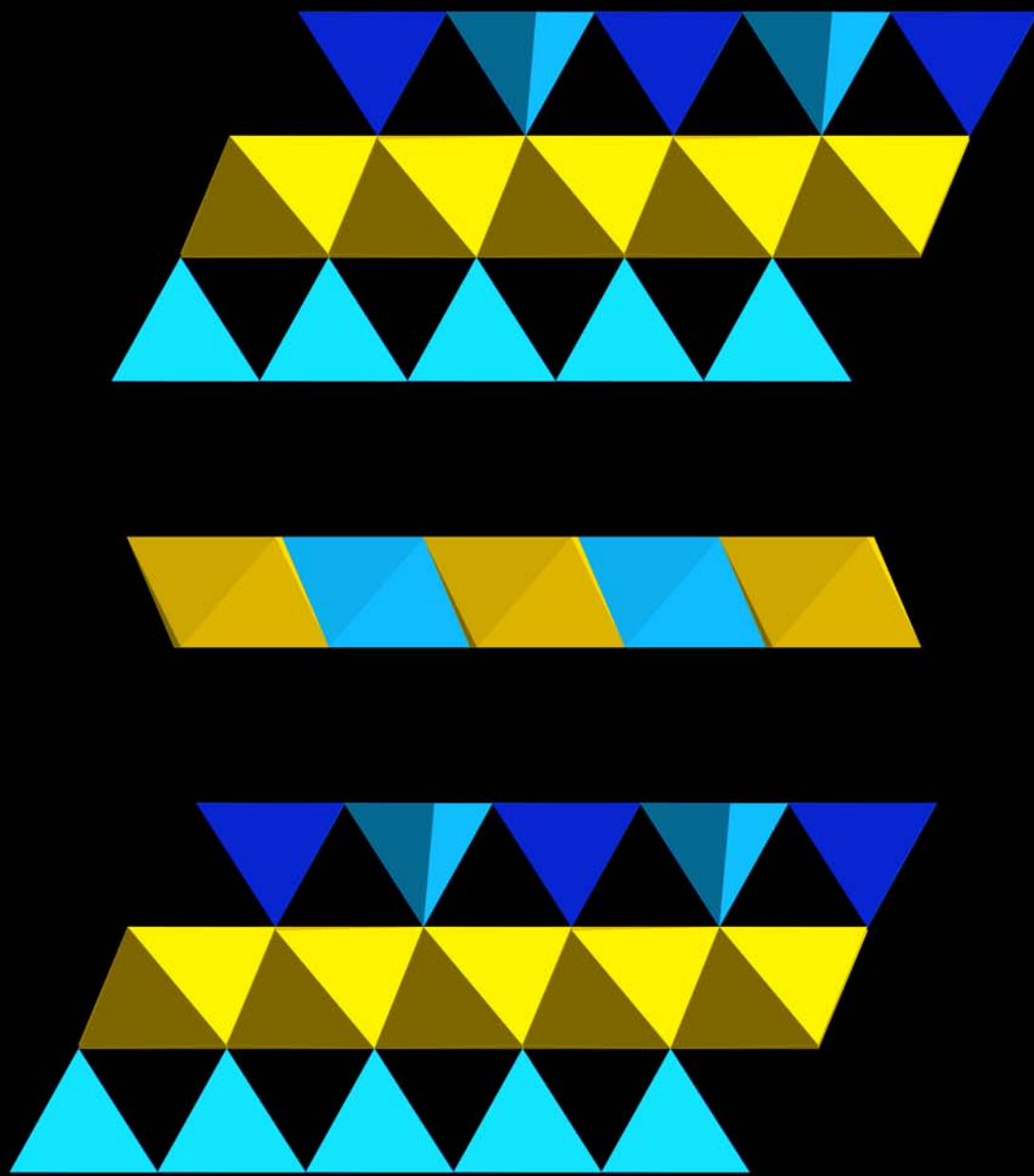
Margarite

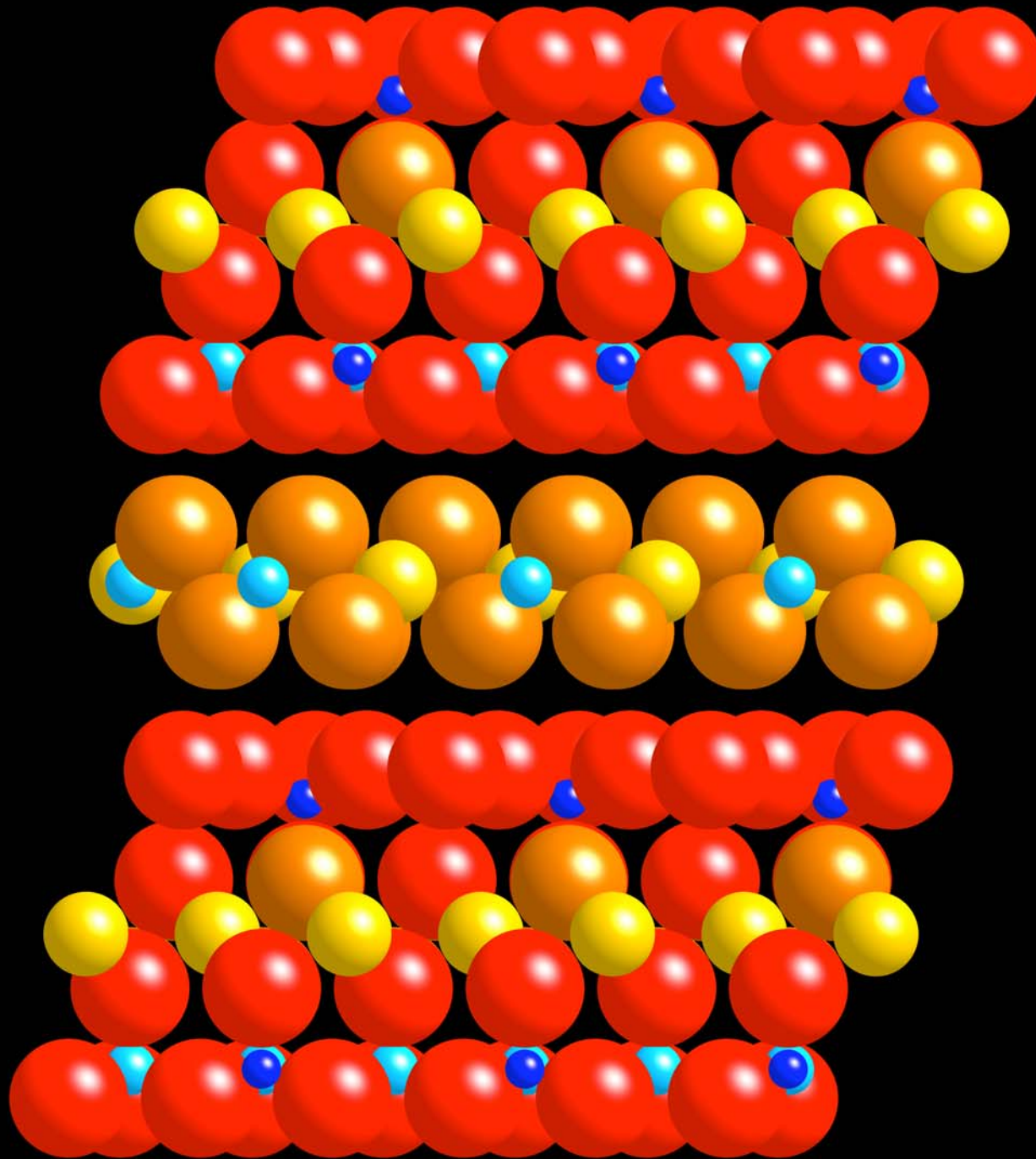


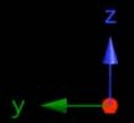
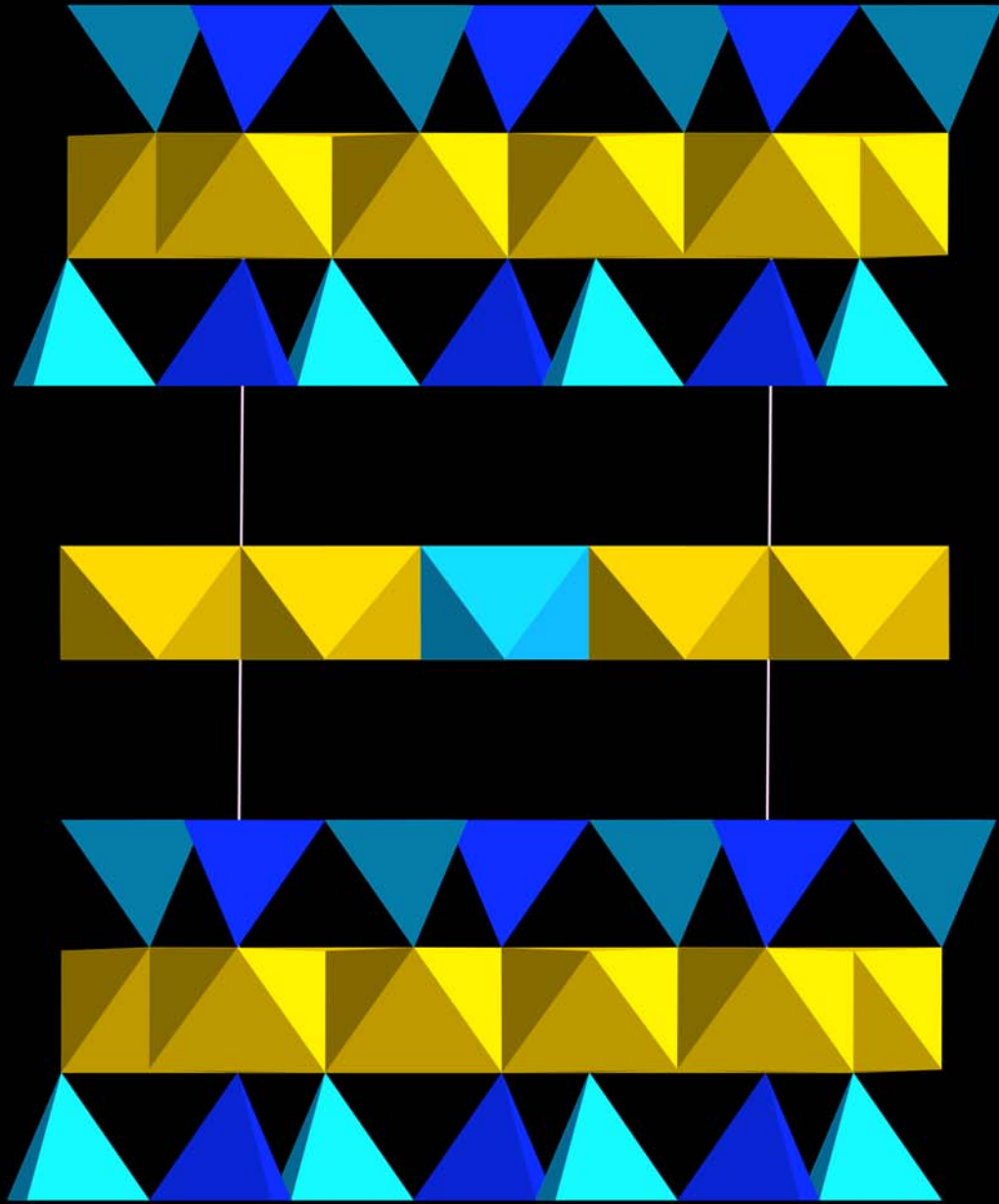
Lepidolite



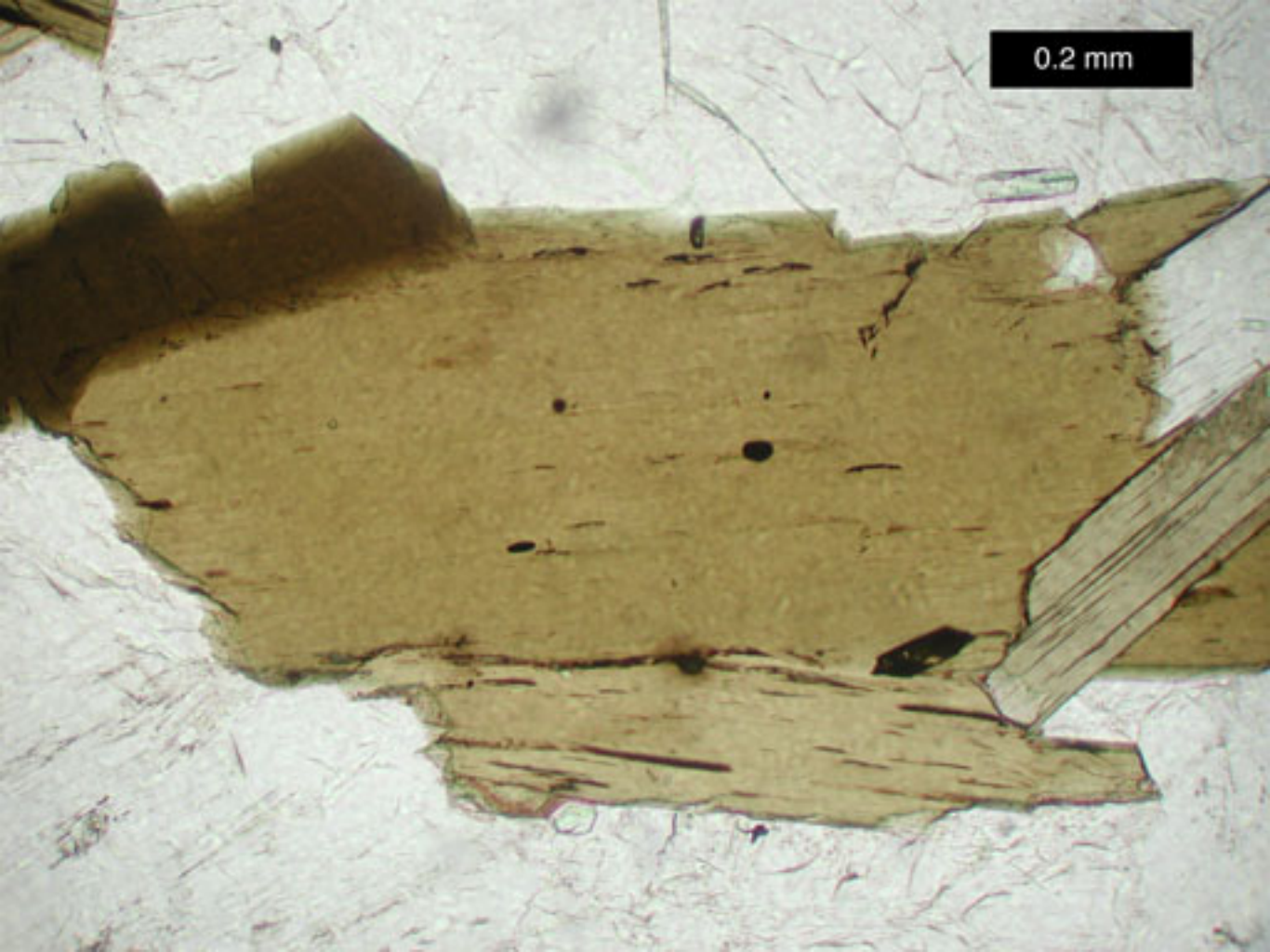


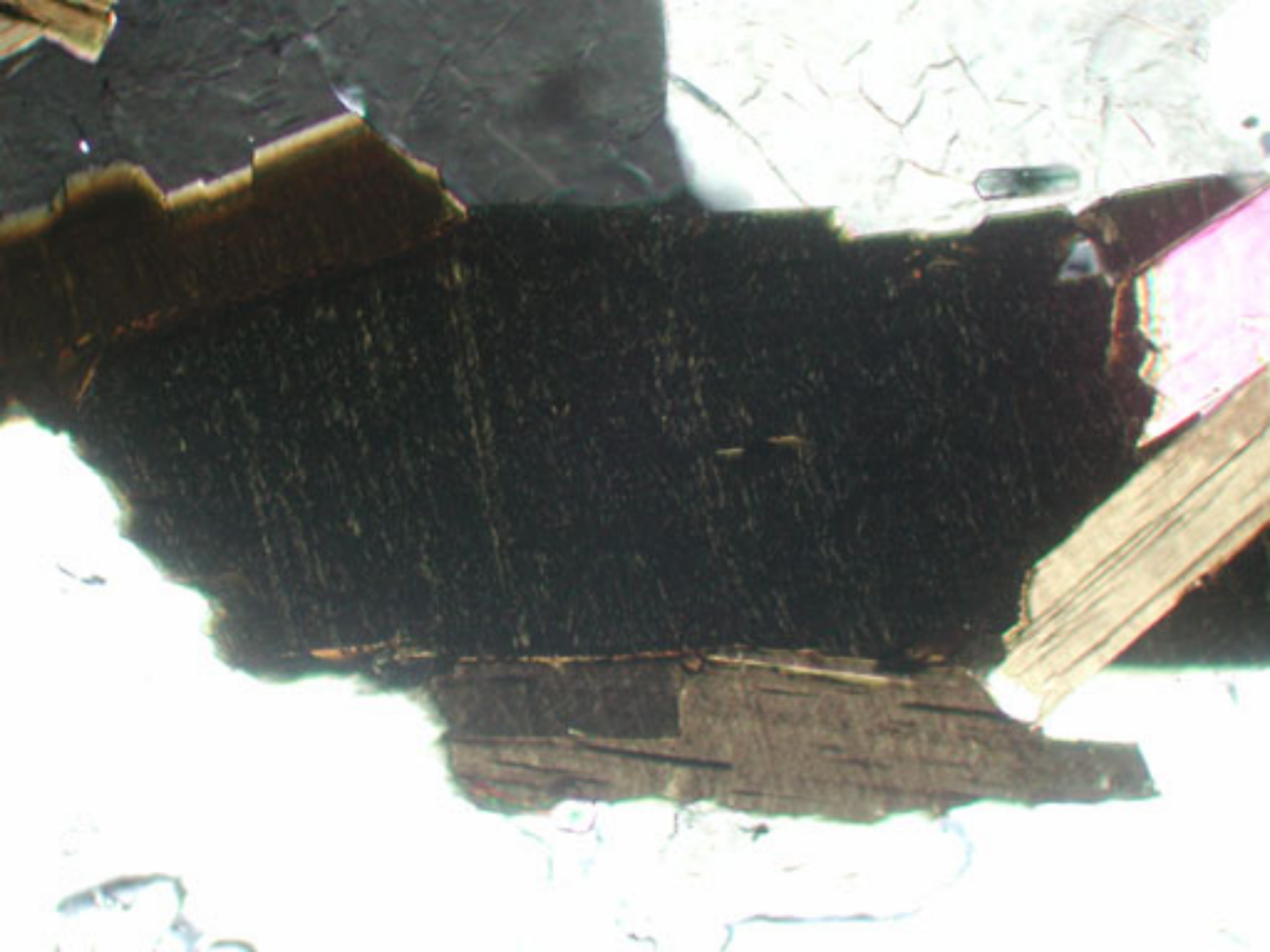


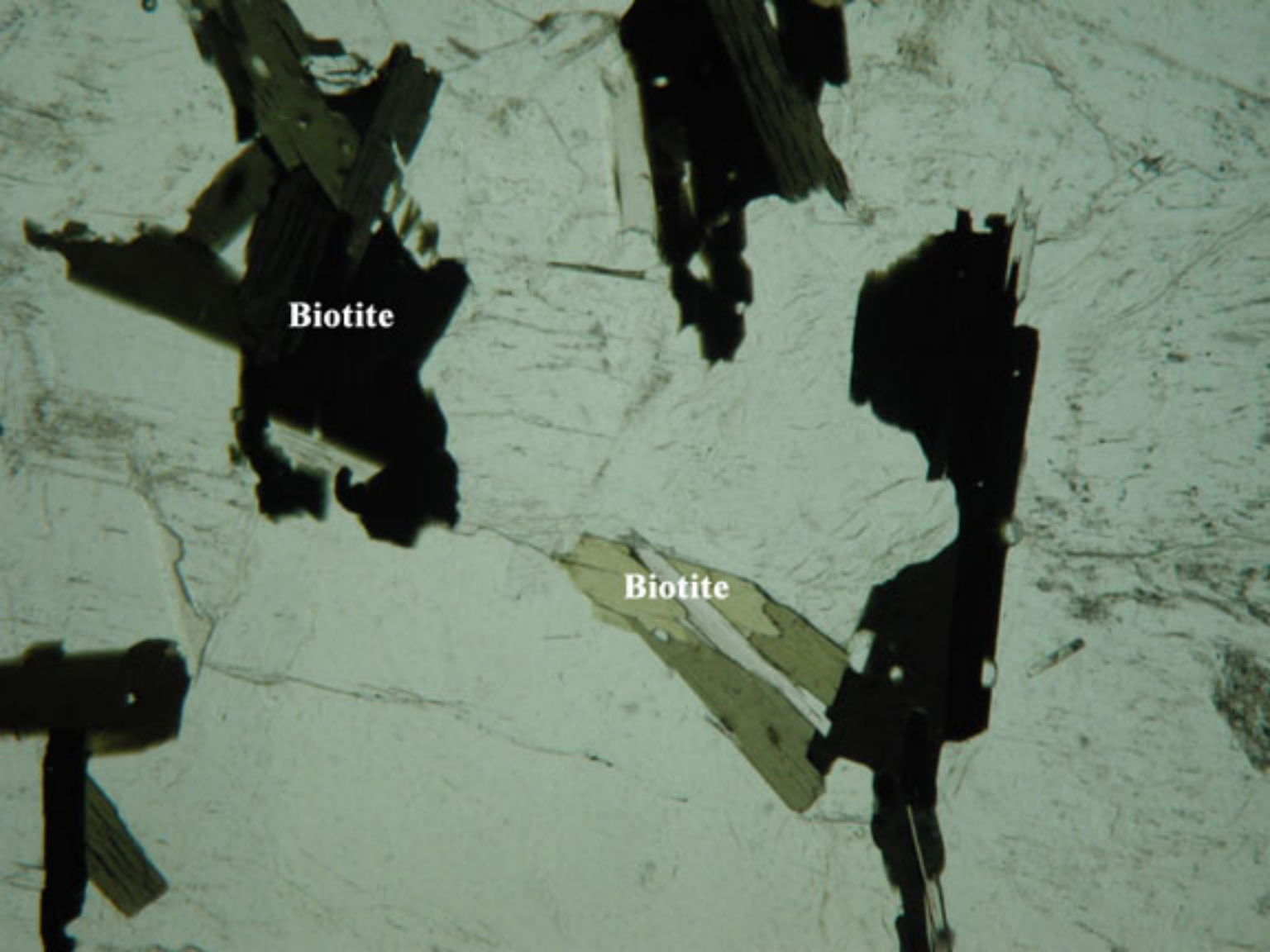




0.2 mm

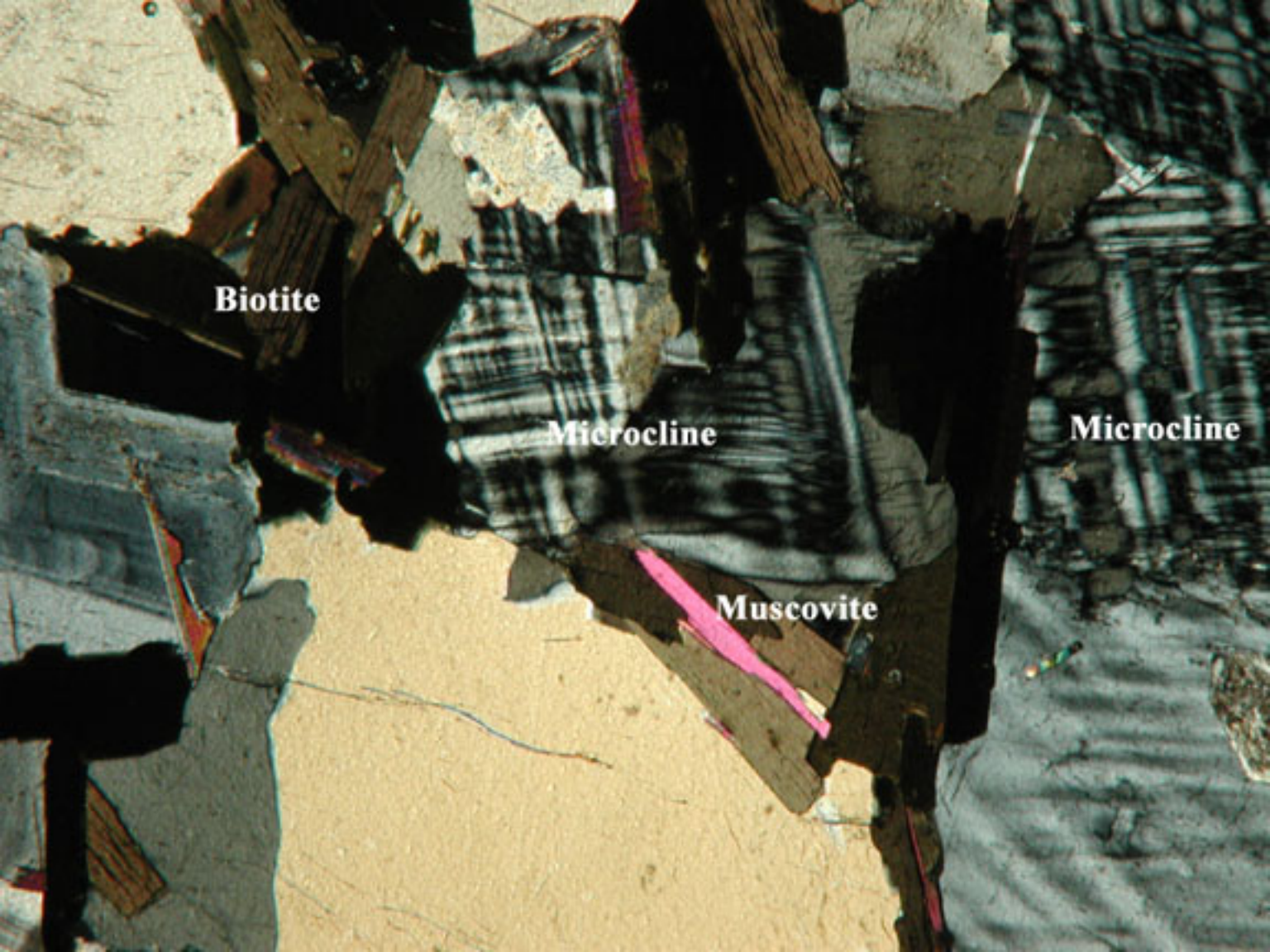




A photomicrograph showing several dark, irregularly shaped Biotite crystals embedded in a light-colored, textured matrix. The crystals exhibit various orientations and sizes, with some showing distinct cleavage patterns. The matrix has a fine, fibrous or crystalline texture. Two specific crystals are highlighted with white text labels.

Biotite

Biotite



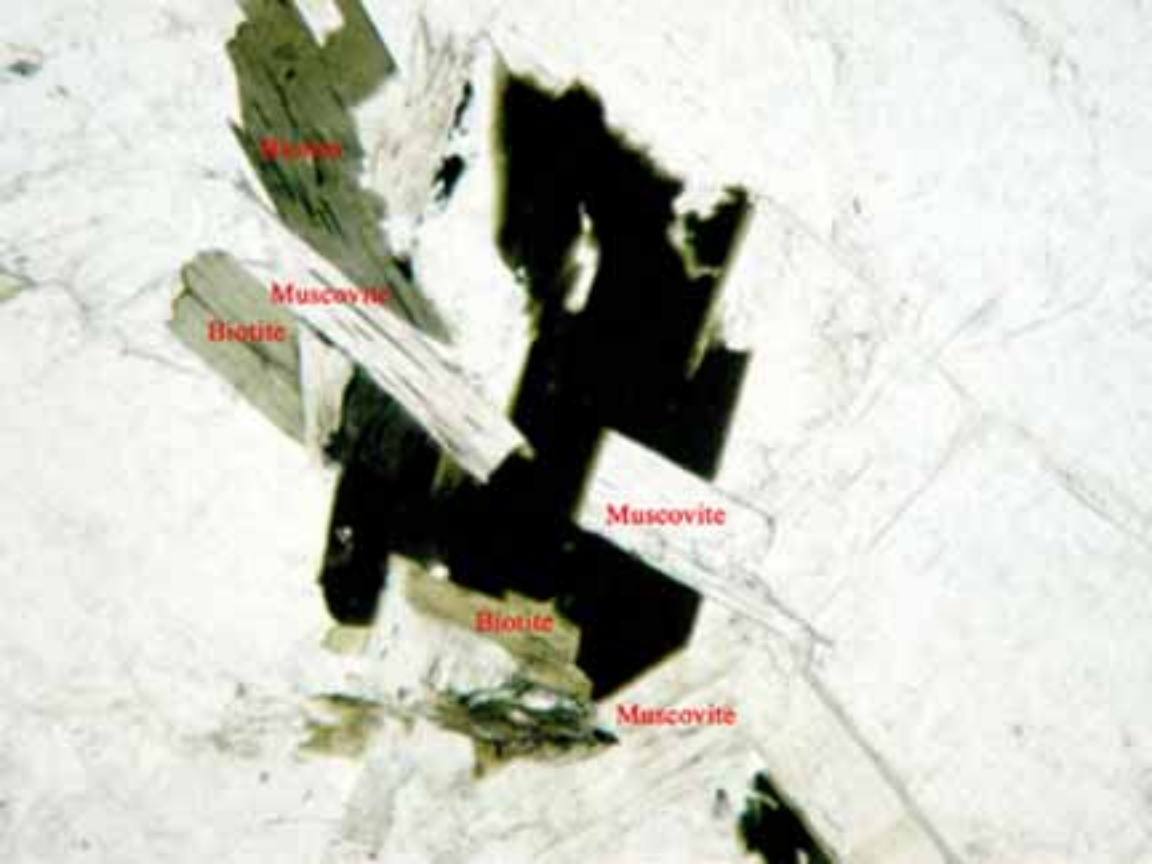
A polarized light micrograph of a rock thin section. The image shows several distinct mineral grains with different textures and colors. A large, dark, irregularly shaped grain is labeled 'Biotite'. Two large, light-colored, rectangular grains with a grid-like internal texture are labeled 'Microcline'. A smaller, elongated, pinkish grain is labeled 'Muscovite'. The background consists of a fine-grained, light-colored matrix. The lighting is polarized, creating bright and dark areas within the grains.

Biotite

Microcline

Microcline

Muscovite



Quartz

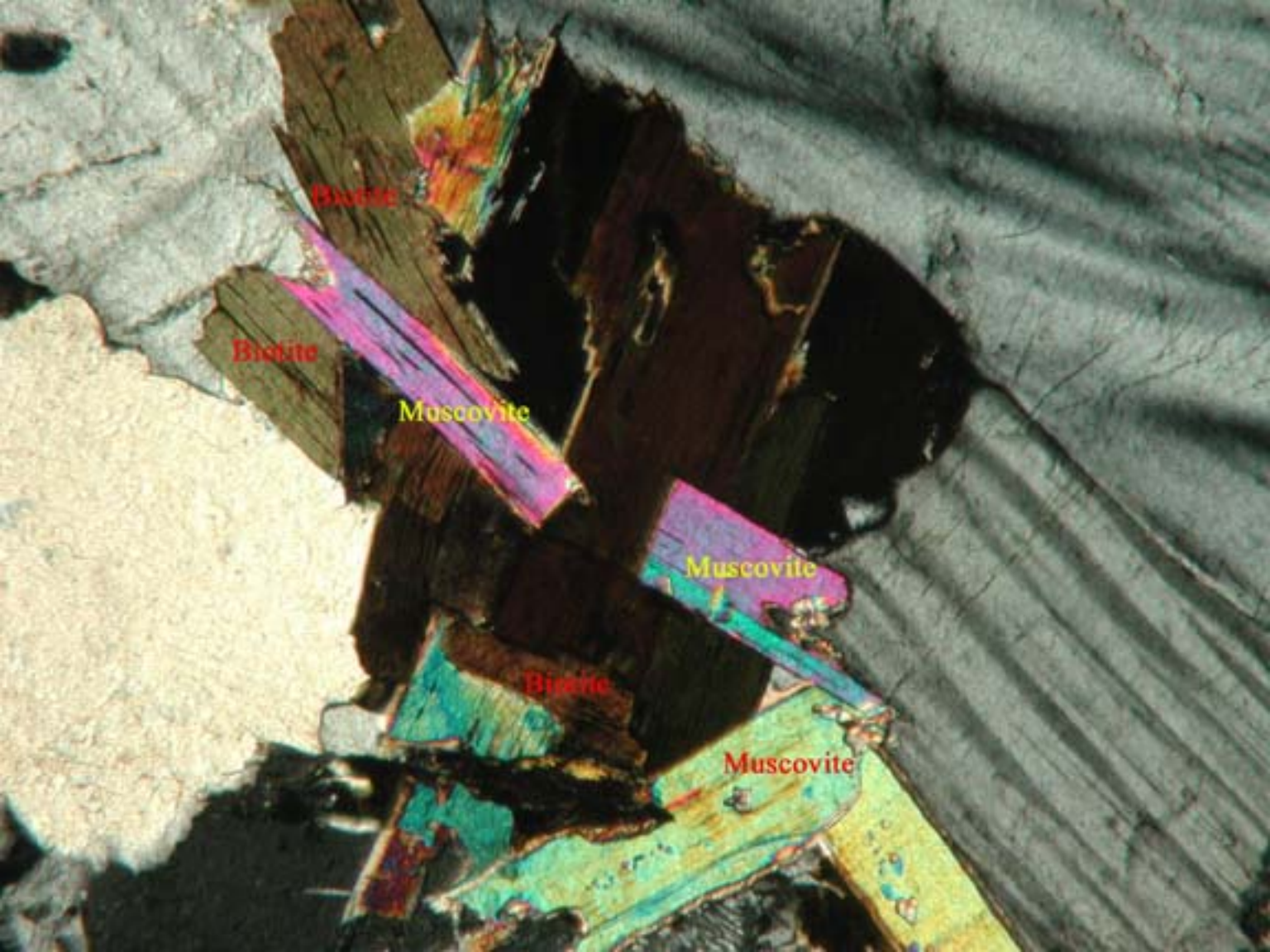
Muscovite

Biotite

Muscovite

Biotite

Muscovite



Biotite

Biotite

Muscovite

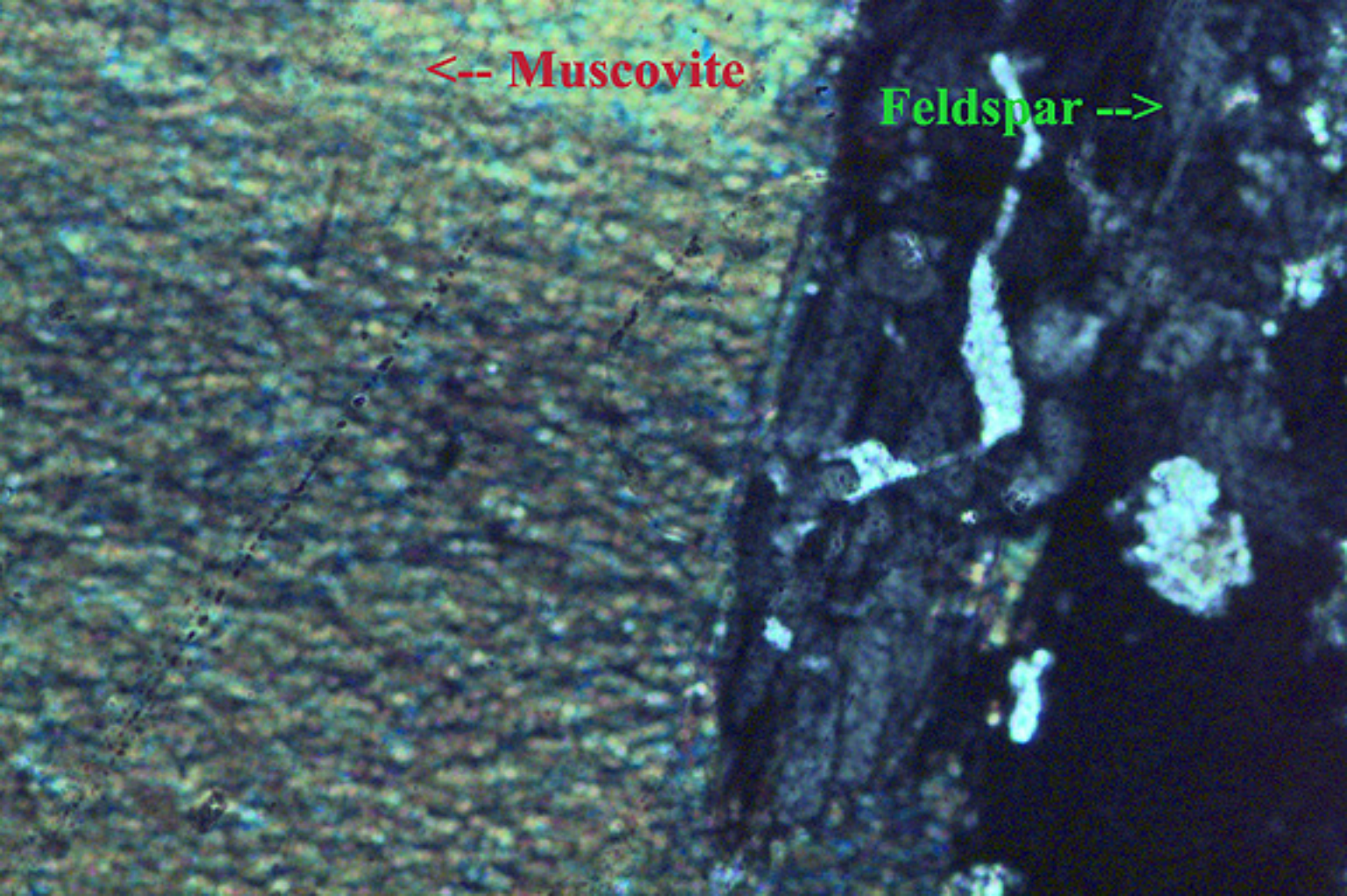
Muscovite

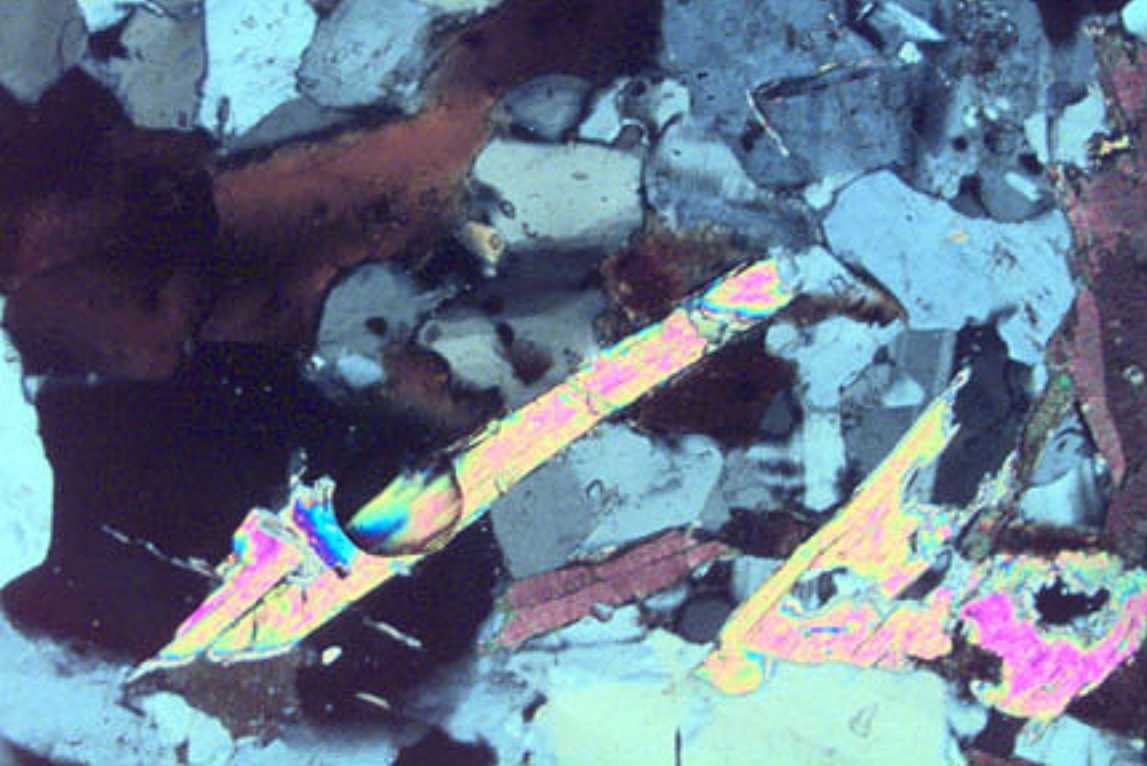
Biotite

Muscovite

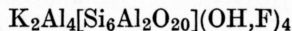
<-- Muscovite

Feldspar -->





Muscovite



MONOCLINIC (-)

α	1.552-1.574
β	1.582-1.610
γ	1.587-1.616
δ	0.036-0.049
$2V_\alpha$	30°-47°

$\alpha : z = 0^\circ - 5^\circ, \beta : x = 1^\circ - 3^\circ$

$\gamma = y, \text{ O.A.P. } \perp (010)$

Dispersion : $r > v$

D 2.77-2.88

H $2\frac{1}{2}$ -3

Cleavage : {001} perfect.

Twinning : Composition plane {001}, twin axis [310].

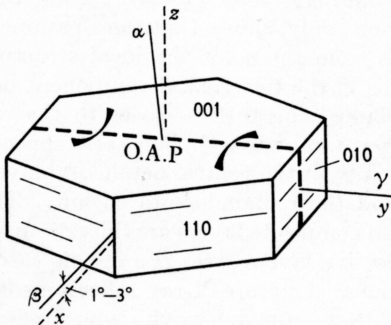
Colour : Colourless, or light shades of green, red or brown ; colourless in thin section.

Pleochroism : Weak ; absorption greater for vibration directions in the plane of cleavage.

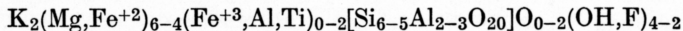
Unit cell : The most common polymorph has
 a 5.19, b 9.04, c 20.08 Å, β 95° 30'.

$Z=2$. Space group $C2/c$.

Insoluble in acids.



Biotite



MONOCLINIC (-)

α	1.565-1.625
β	1.605-1.696
γ	1.605-1.696
δ	0.04-0.08
$2V_\alpha$	$0^\circ-25^\circ$

$\gamma: x = 0^\circ$ to 9°

$\beta = \gamma$; O.A.P. (010)

Dispersion: Weak:

Fe-rich biotites $r < v$

Mg-rich biotites $r \geq v$

D 2.7-3.3

H $2\frac{1}{2}-3$

Cleavage: {001} perfect.

Twinning: Composition plane {001}, twin axis [310].

Colour: Black, deep shades of brown, reddish brown or green; yellow, brown or green in thin section.

Pleochroism: Strong;

α greyish yellow, brownish green or brown;

$\beta = \gamma$ dark brown, dark green or dark reddish brown.

Unit cell: a 5.3, b 9.2, c 10.2 Å, β 100° .

$Z=1$. Space group Cm (1M polymorph).

Bleached and attacked by sulphuric acid.

