

Phyllosilicates

In this lab you will examine specimens of the phyllosilicate or sheet silicate minerals. In regard to compositions, you need only know the precise formulas for the simplified Muscovite and Phlogopite formulas (not the more complex substitutional formulas, though you should be aware of divalent and trivalent cation substitutions, and where they occur in the structure). For all other minerals in this lab, you should simply know that they are hydrous aluminosilicates (Al will substitute for Si) and you should know which of the major cations (Fe, Mg, Ca, Li are part of which minerals) occur in the formula. For example, if biotite were presented to you on an exam you should write that it is a "hydrous aluminosilicate with K, Mg and Fe". Mineral formulae are provided for convenience.

Phyllosilicates

Serpentine Group $(\text{Mg}_3\text{Si}_2\text{O}_5)(\text{OH})_4$

Antigorite

Chrysotile

Mica Group

Muscovite = $\text{KAl}_2(\text{AlSi}_3\text{O}_{10})(\text{OH})_2$

Phlogopite = $\text{KMg}_3(\text{AlSi}_3\text{O}_{10})(\text{OH})_2$

Biotite = $\text{K}(\text{Mg, Fe})_3(\text{AlSi}_3\text{O}_{10})(\text{OH})_2$

Lepidolite = $\text{K}(\text{Li, Al})_{2-3}(\text{AlSi}_3\text{O}_{10})(\text{O, OH, F})_2$

- F commonly substitutes for OH in all of these minerals

Chlorite Group

Chlorite

Clay Mineral Group

Kaolinite = $(\text{Al}_2\text{Si}_2\text{O}_5)(\text{OH})_4$

Talc = $(\text{Mg}_3\text{Si}_4\text{O}_{10})(\text{OH})_2$

Associated Minerals with similar structures

Prehnite

Chrysocolla (usu. amorphous; Si_2O_5 in defect structure)