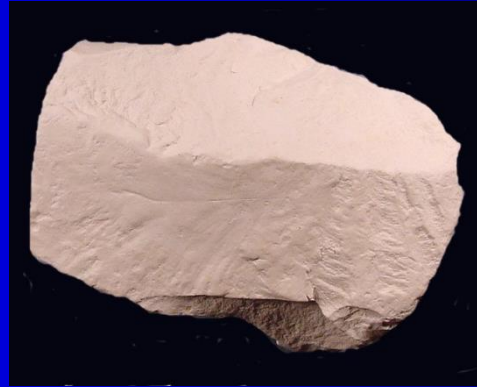


# Sedimentary Rock-Forming Minerals and Materials



Calcite



Kaolinite



Montmorillonite



Siderite



Gypsum



Sylvite

# Minerals of Sedimentary Rocks

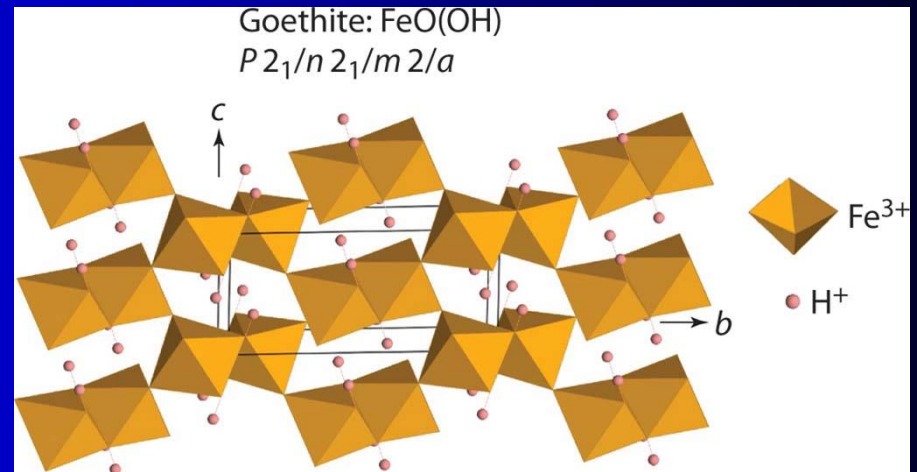
- Formed by chemical weathering of minerals that are unstable under surface conditions – clay minerals, oxides (hematite, magnetite), hydroxides (goethite, brucite, gibbsite)
- Minerals that precipitate from solution – carbonates, evaporites (halite, sylvite, gypsum), Precambrian iron formation (BIF)
- Detrital minerals – survive physical and chemical weathering processes – e.g. quartz, garnet, rutile, ilmenite, magnetite





## Goethite [FeO(OH)]

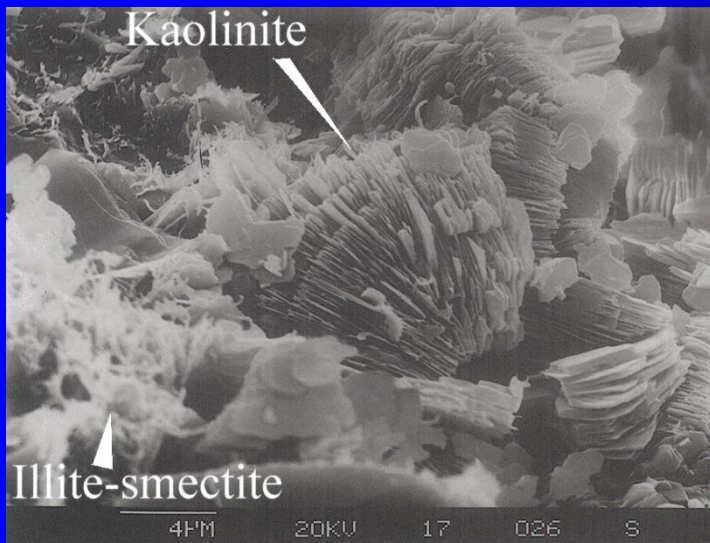
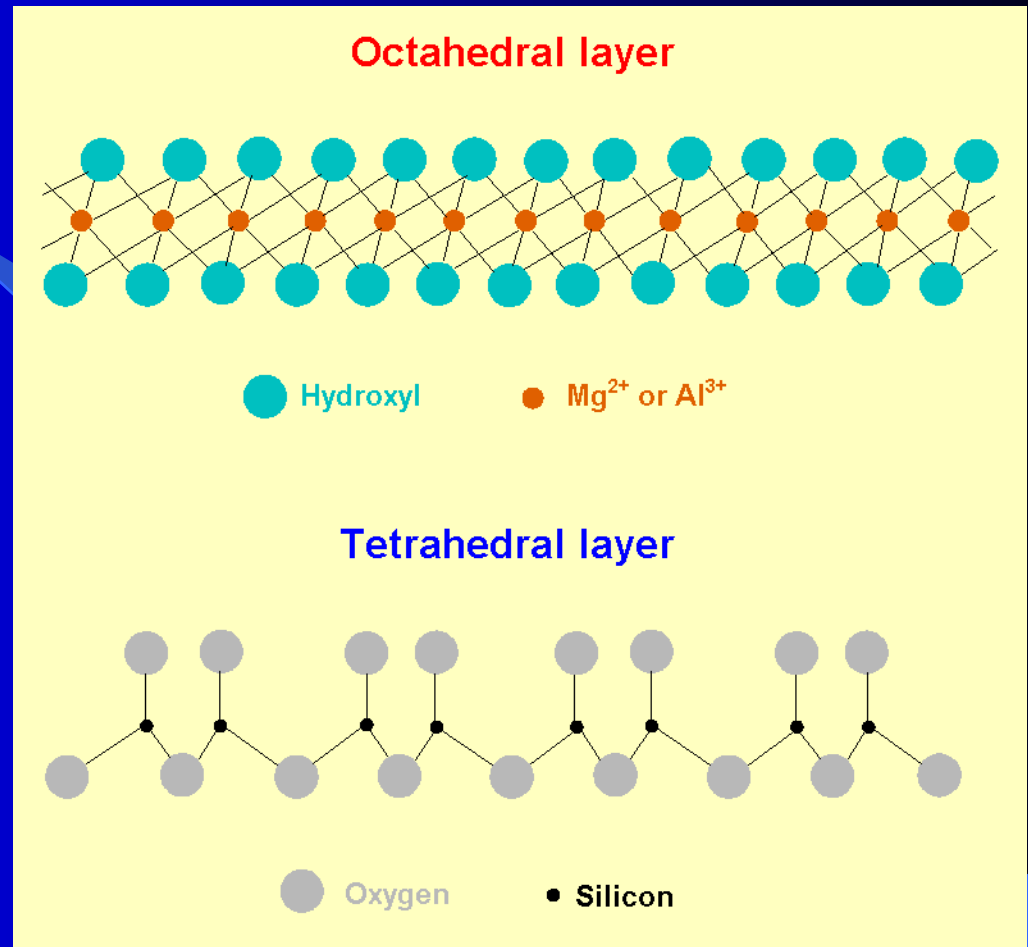
Limonite [FeO(OH)·nH<sub>2</sub>O] - unidentified massive hydroxides and oxides of iron, with no visible crystals, and a yellow-brown streak.



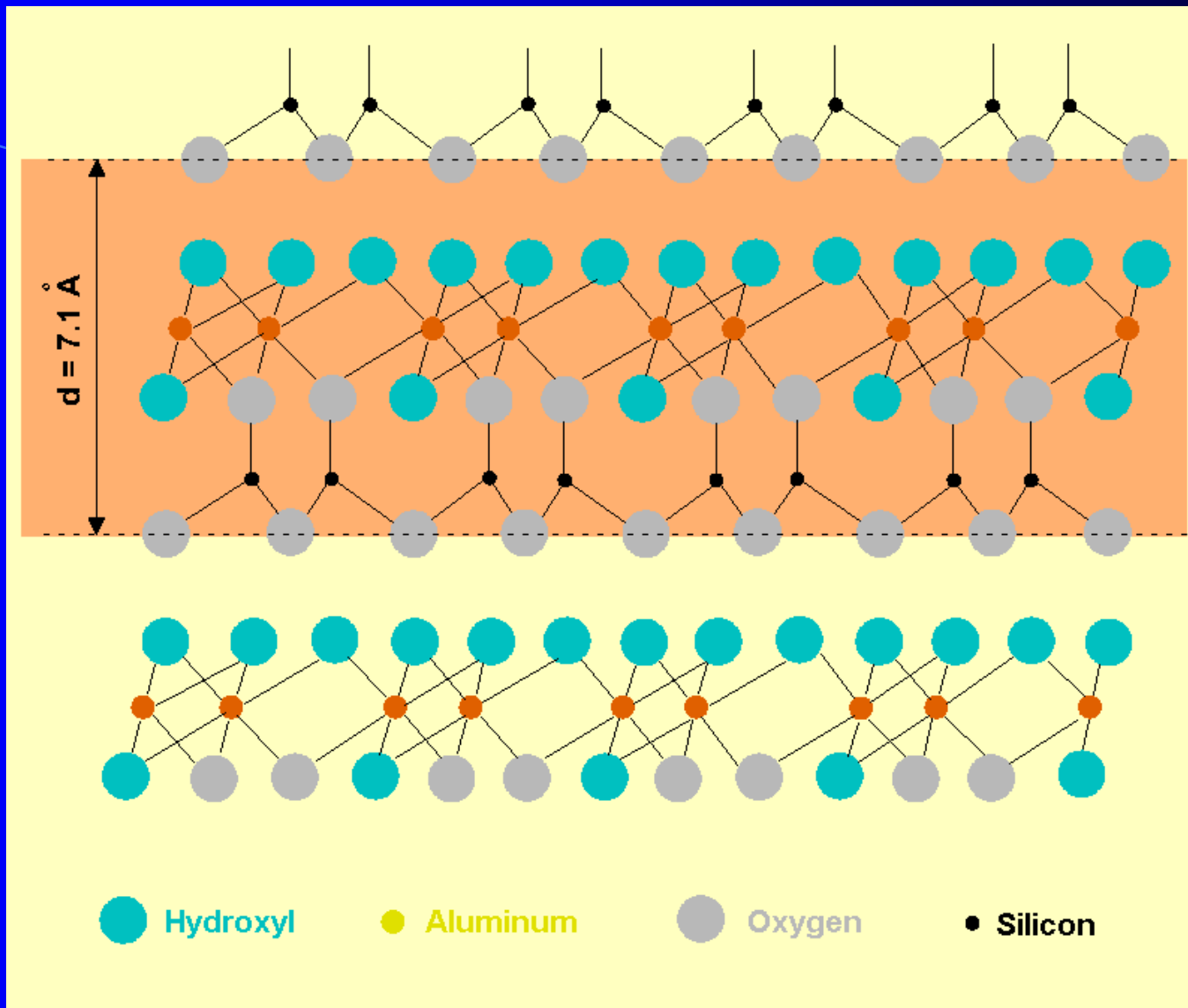
# Clay Minerals



The basic building blocks of the clay minerals are tetrahedral layers and octahedral layers {Brucite  $[Mg(OH)_2]$  or Gibbsite  $[Al(OH)_3]$ }

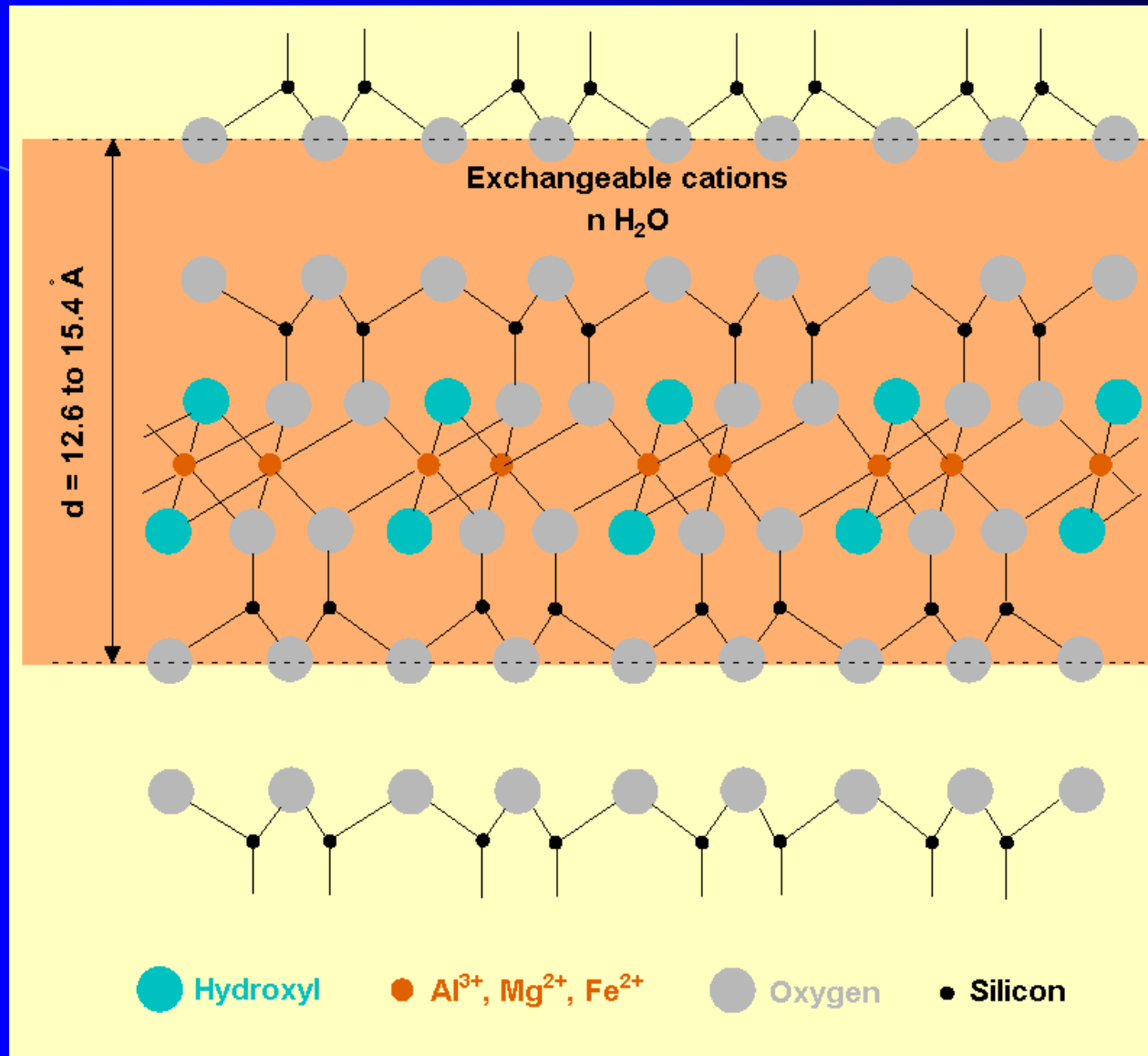


## 1:1 layer clays (e.g. Kaolinite)

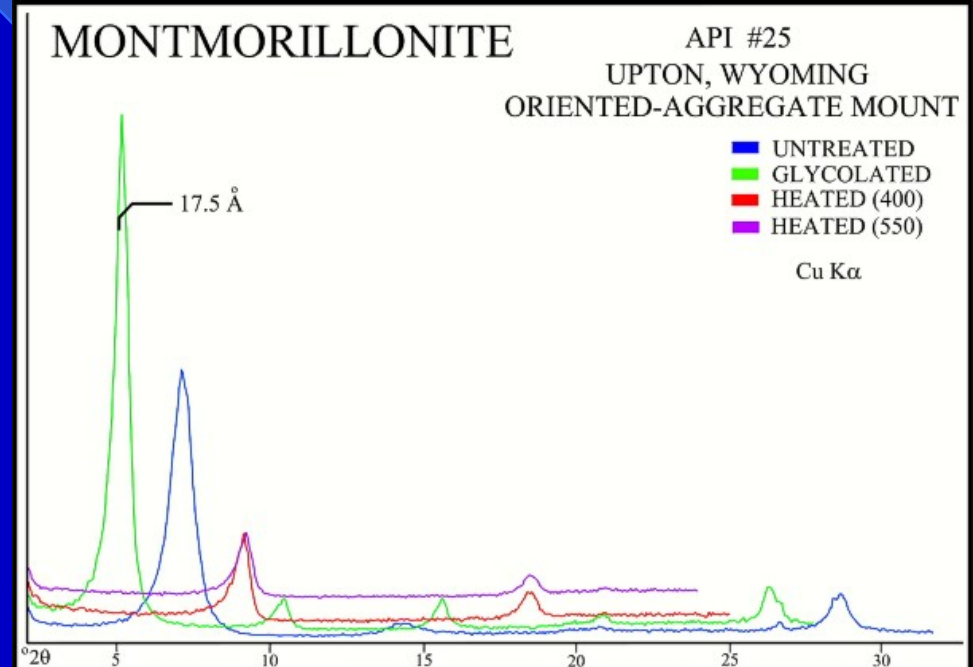
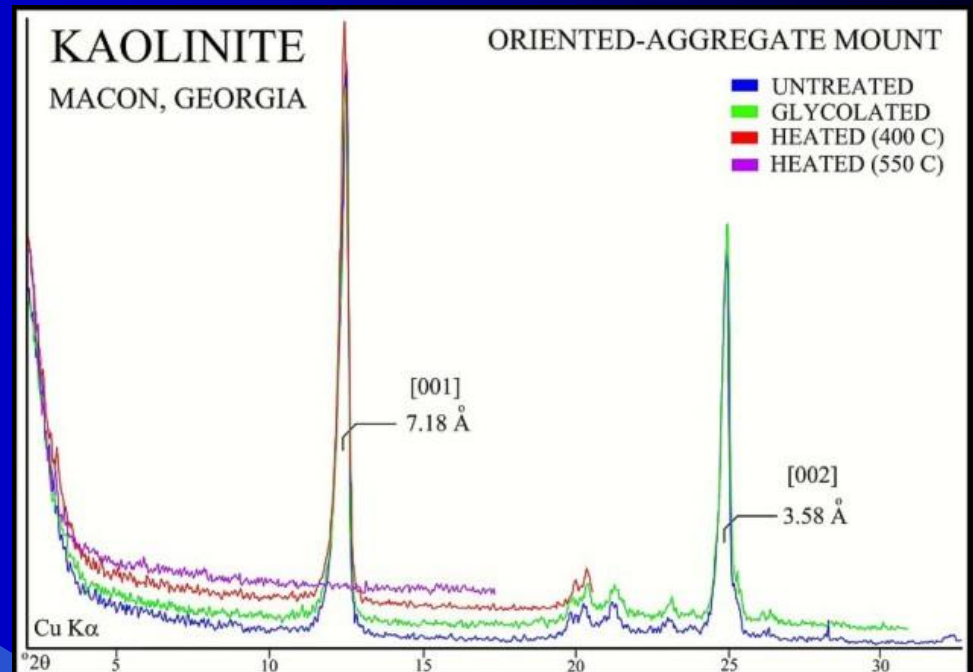


## 2:1 layer clays (e.g. Montmorillonite)

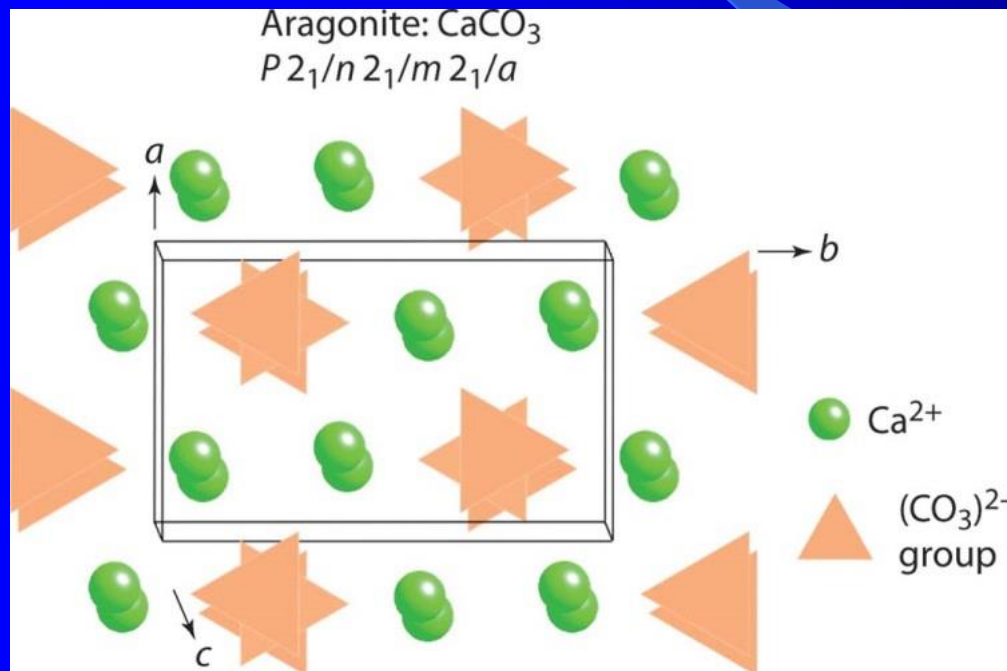
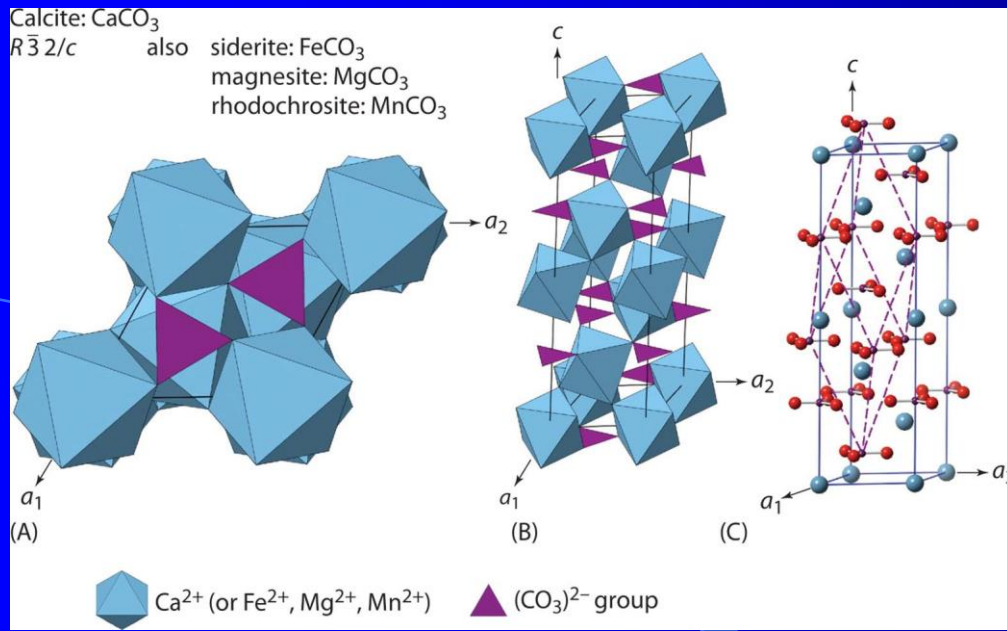
The general term for this group is smectites and they are expandable (swelling) clays



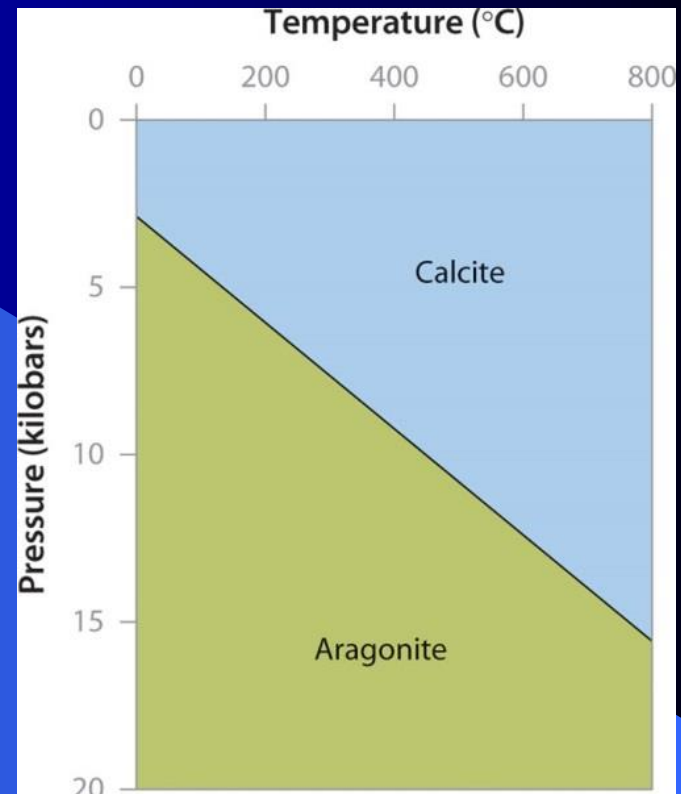
It is difficult to distinguish between clay minerals either in hand specimen or in thin section (there are 220 varieties). The method of choice is X-ray diffraction (XRD).





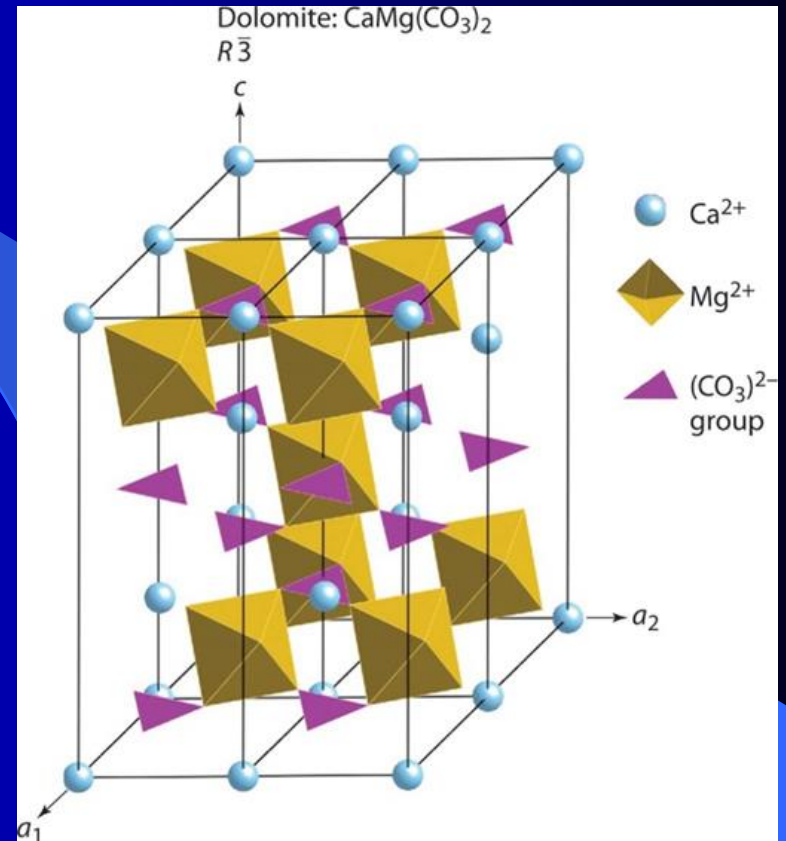
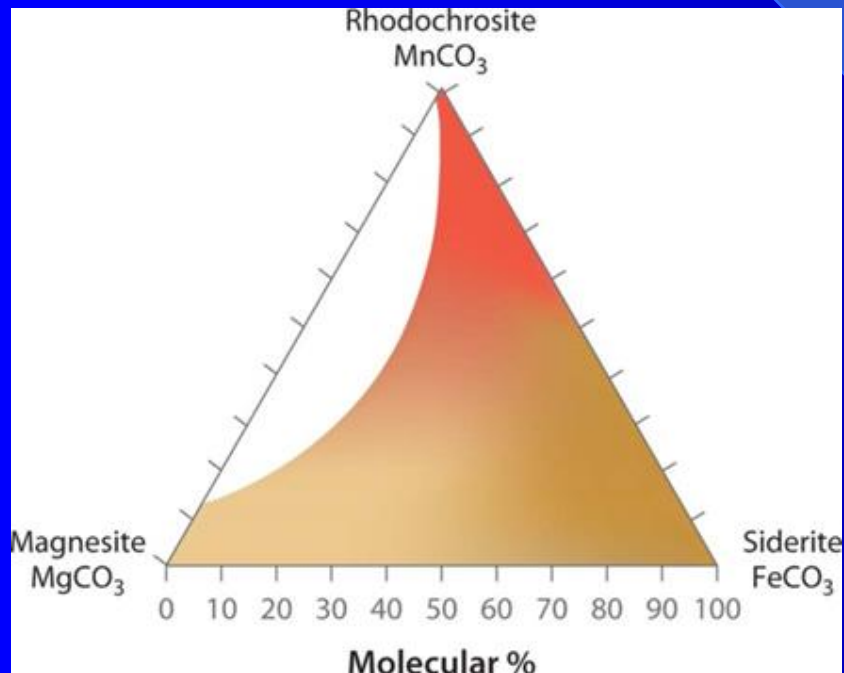
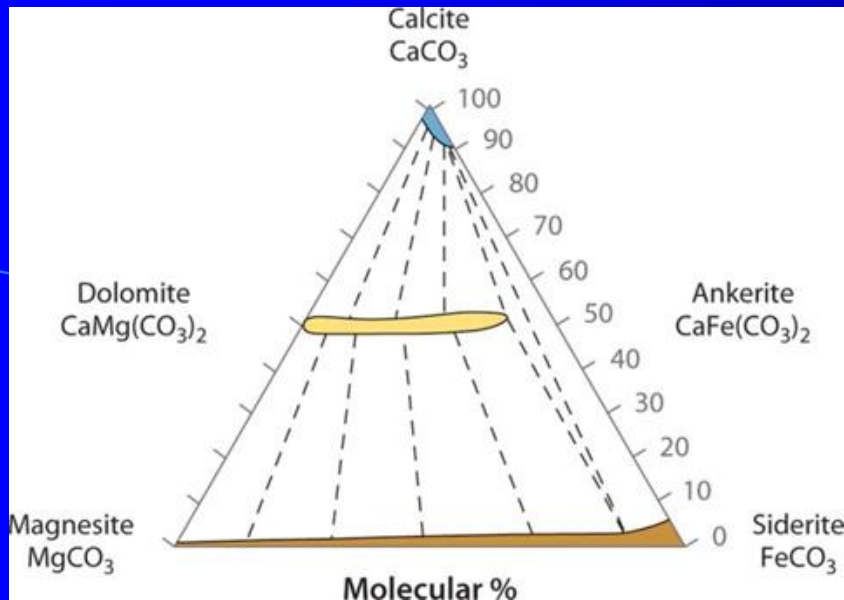


## Carbonate minerals – $\text{CaCO}_3$ polymorphs - aragonite and calcite

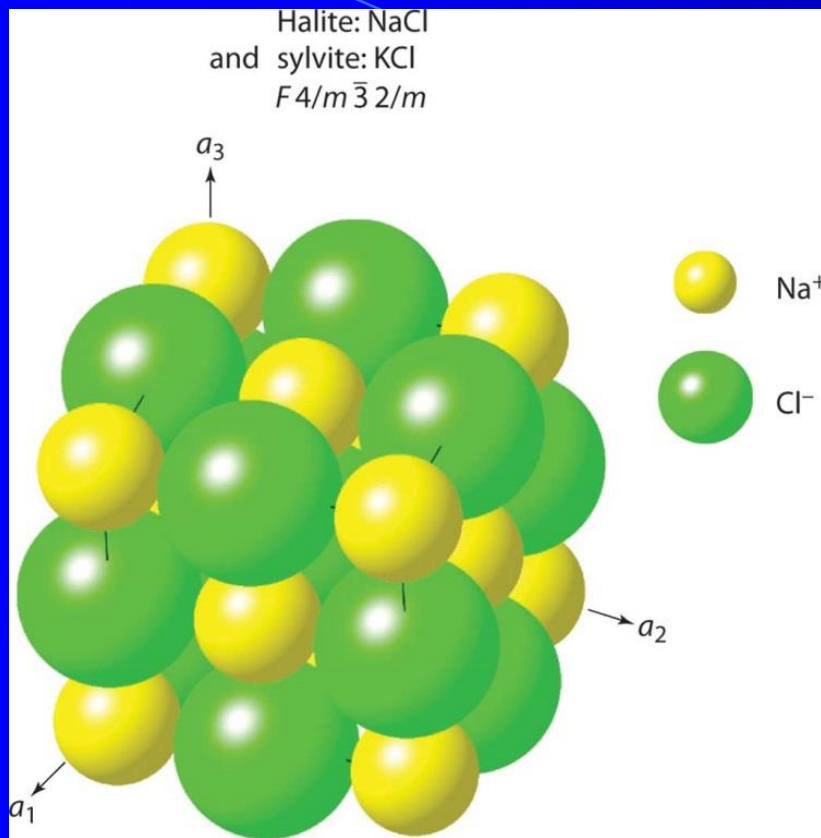




## Carbonate minerals and solid solution series



# Evaporite Minerals – Halite and Sylvite



Halite



Sylvite

# Gypsum (monoclinic) and Anhydrite (orthorhombic)

