

Metamorphic Rock-Forming Minerals

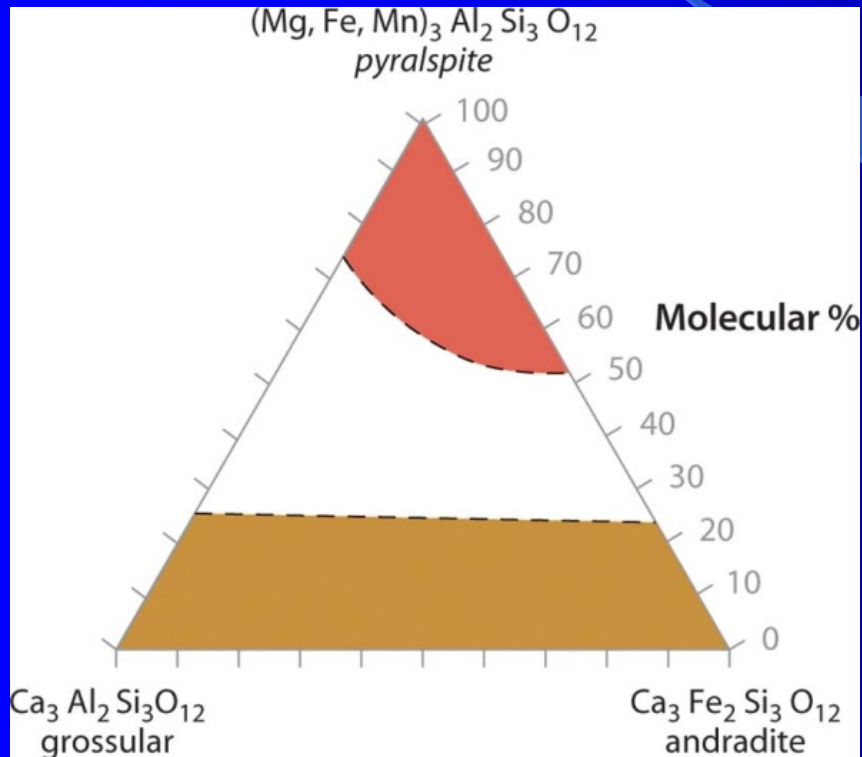
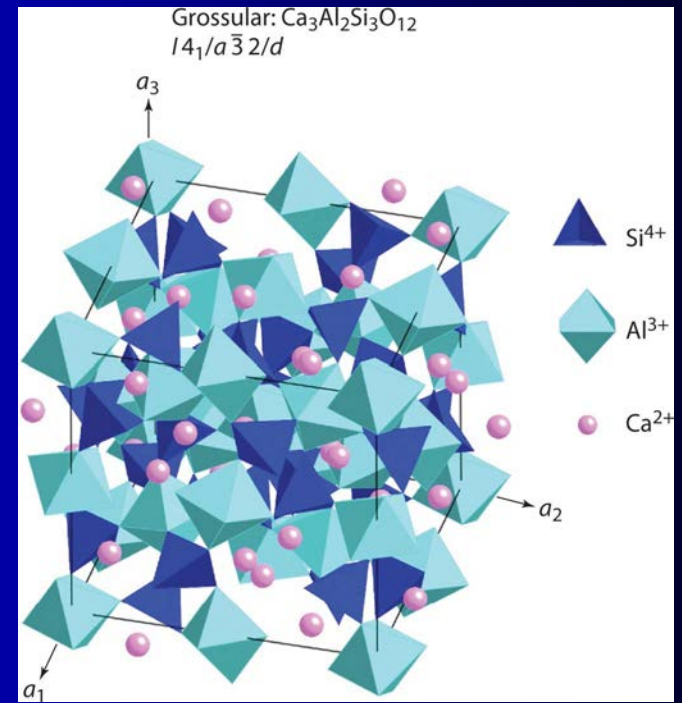


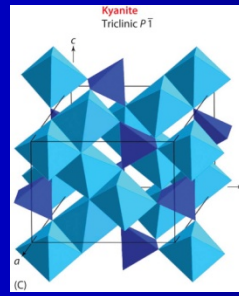
Garnet – pyralspite group

- Pyrope – $\text{Mg}_3\text{Al}_2\text{Si}_3\text{O}_{12}$
- Almandine – $\text{Fe}_3\text{Al}_2\text{Si}_3\text{O}_{12}$
- Spessartine – $\text{Mn}_3\text{Al}_2\text{Si}_3\text{O}_{12}$

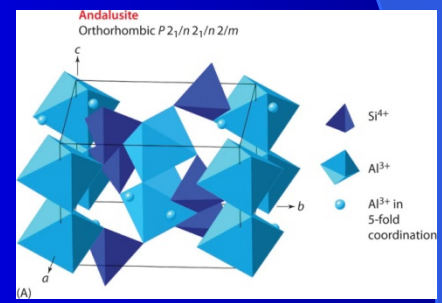
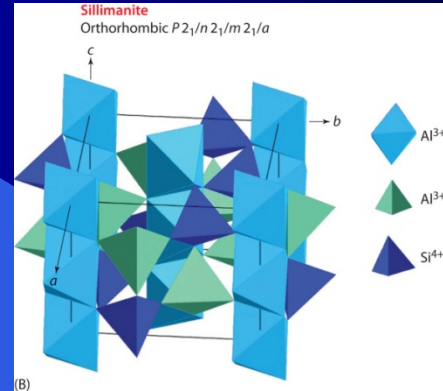
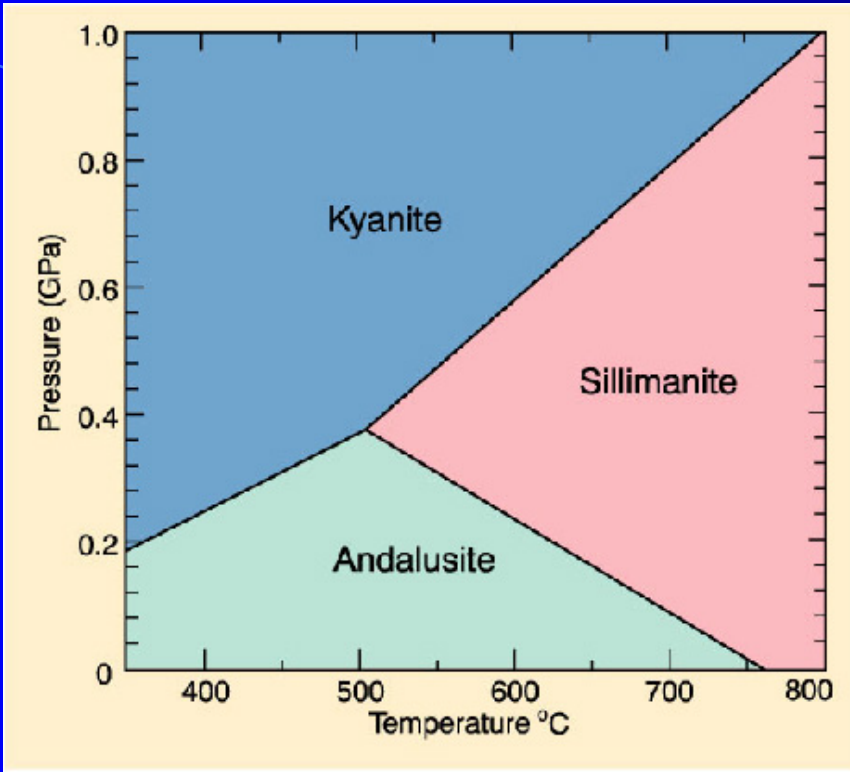
Garnet – ugrandite group

- Grossular – $\text{Ca}_3\text{Al}_2\text{Si}_3\text{O}_{12}$
- Andradite – $\text{Ca}_3\text{Fe}_2\text{Si}__3\text{O}_{12}$
- Uvarovite – $\text{Ca}_3\text{Cr}_2\text{Si}_3\text{O}_{12}$

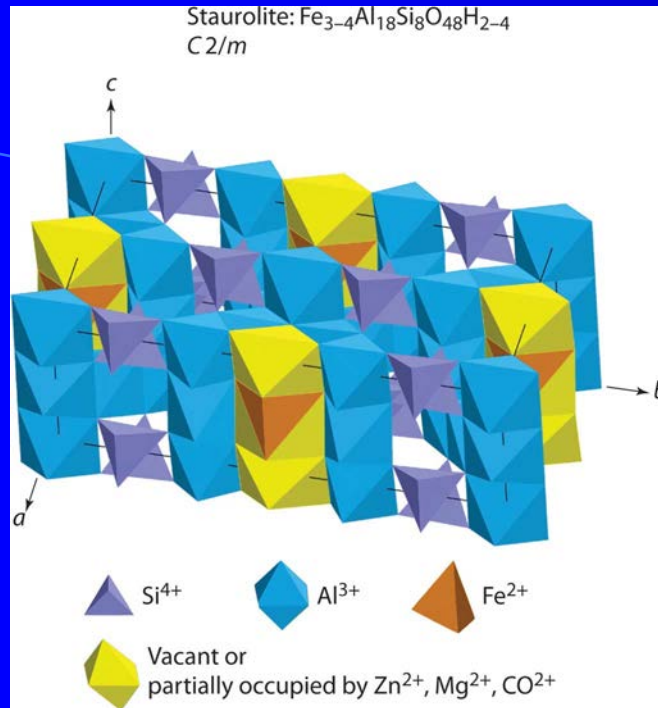




Al_2SiO_5 Polymorphs



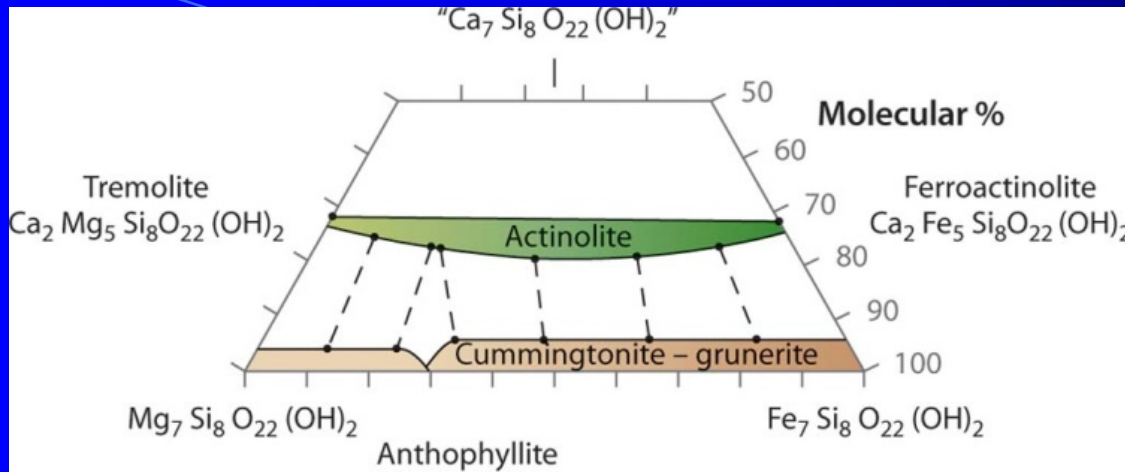
Staurolite ($\text{Fe}_{3-4}\text{Al}_{18}\text{Si}_8\text{O}_{48}\text{H}_{2-4}$)



Pyroxene – Diopside ($\text{CaMgSi}_2\text{O}_6$)



Amphiboles



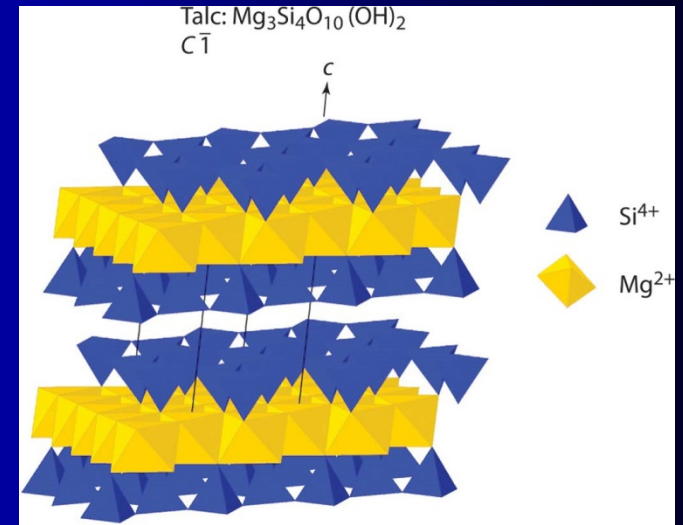
Glaucophane – high pressure low temperature mineral typical of Blueschist facies rocks.



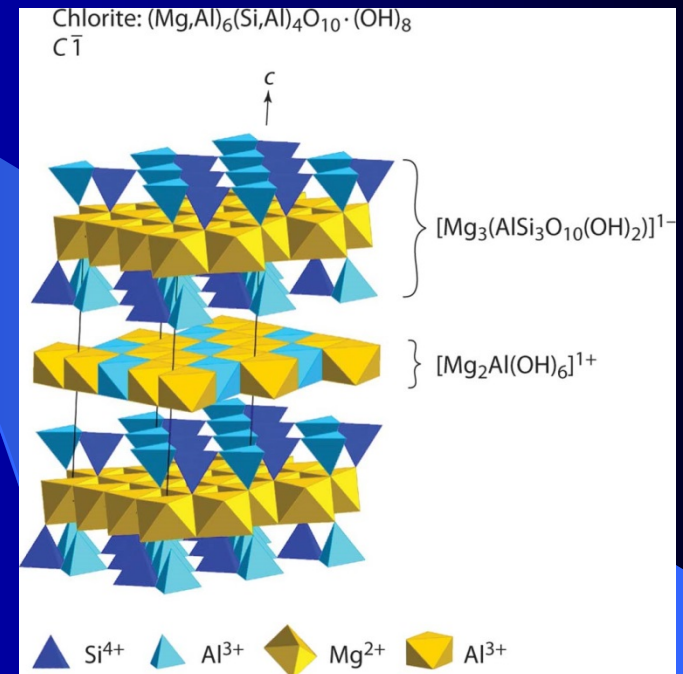
Wollastonite – found in contact metamorphic zones associated with impure limestones.



Talc – forms in Mg-rich rocks through the alteration of magnesium silicates



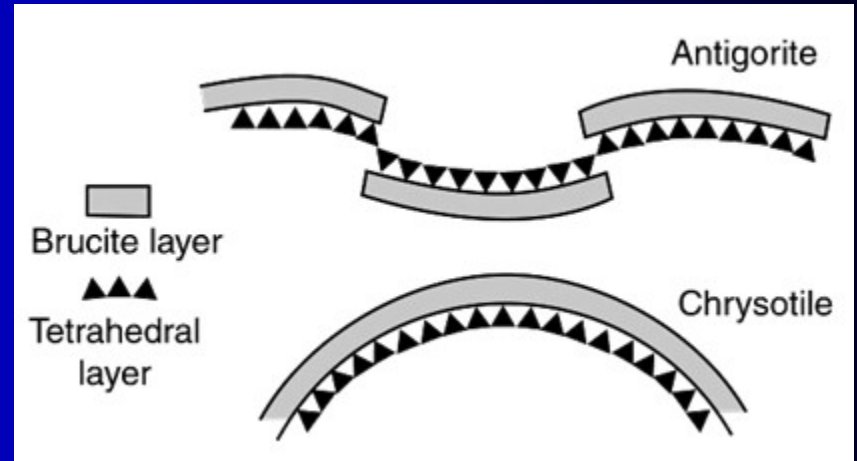
Chlorite – common mineral in greenschist facies rocks.



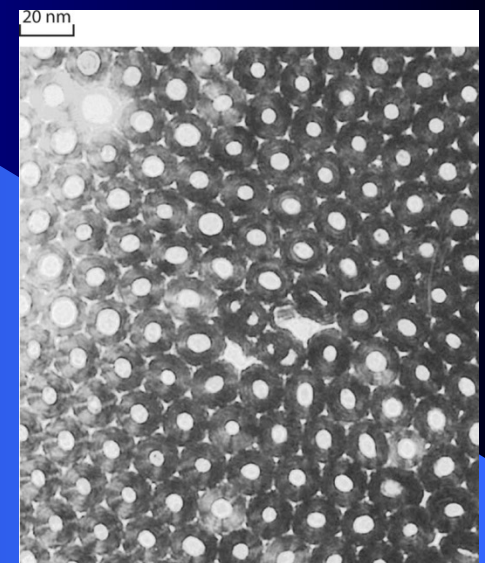
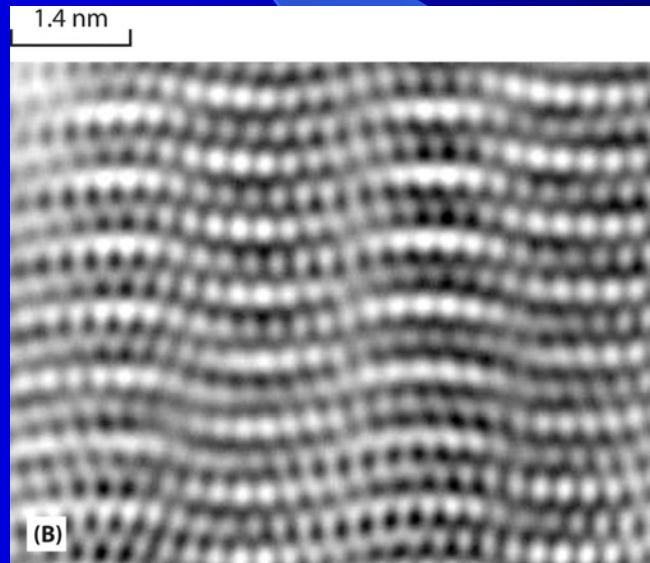
Serpentine minerals – antigorite, chrysotile, and lizardite

All are polymorphs of $Mg_3Si_2O_5(OH)_2$

Antigorite



Chrysotile



Epidote



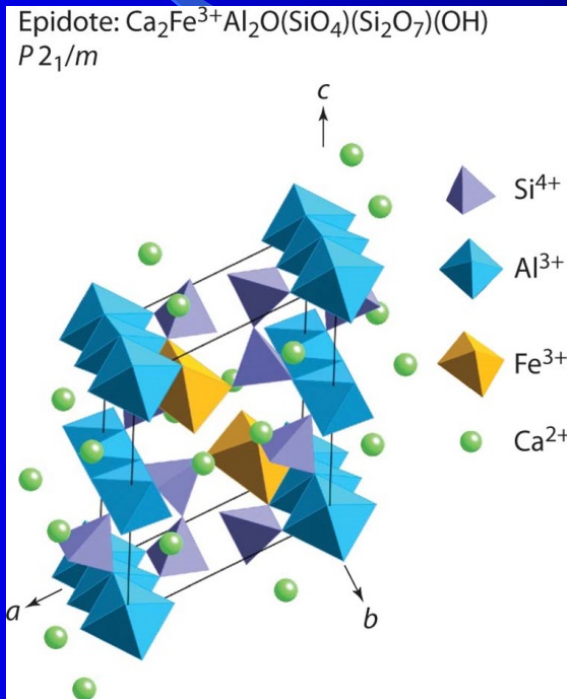
Clinozoisite



Fe^{3+} - Al substitution



Sorosilicate



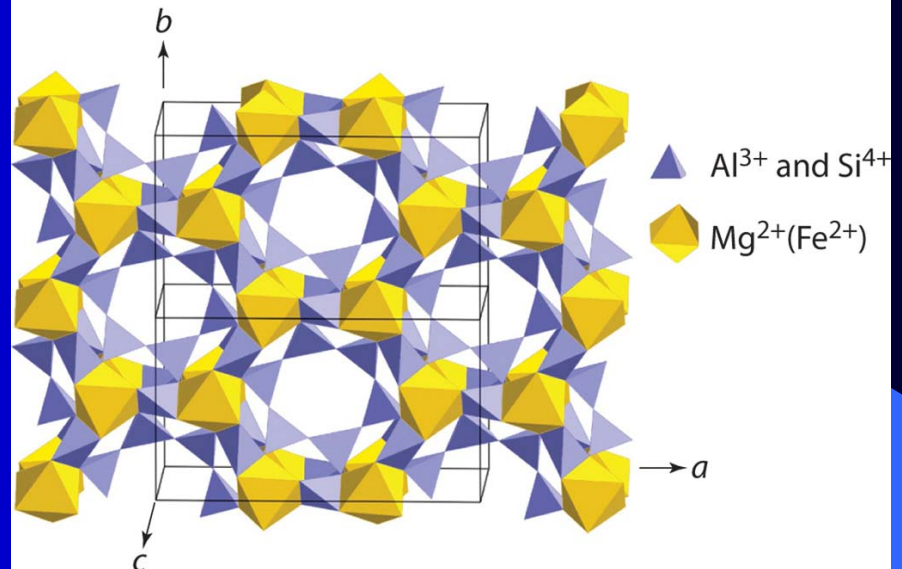
Cordierite

Cyclosilicate

Formed at low pressures and high T. Often found in contact metamorphic rocks.



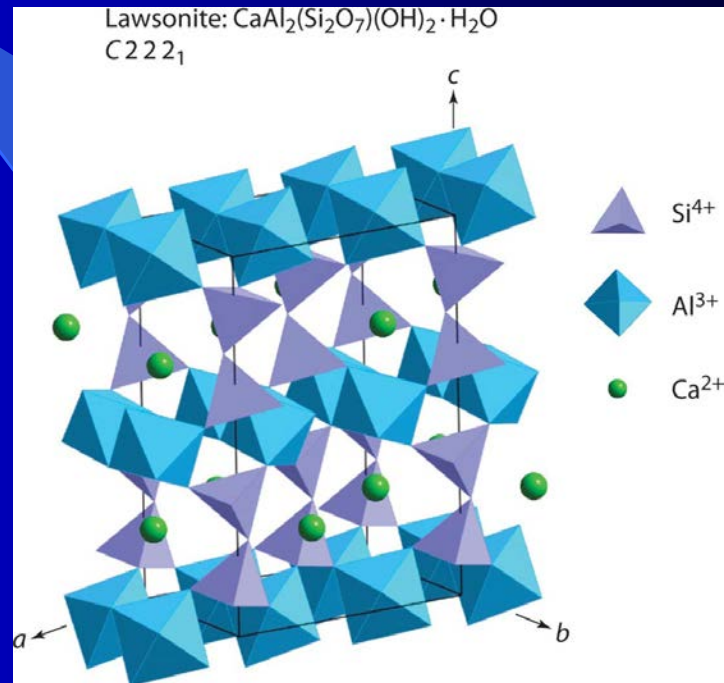
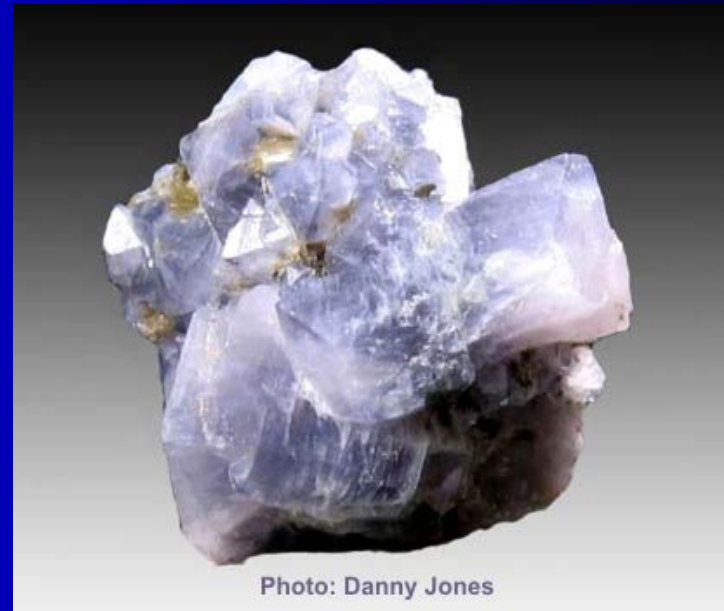
Cordierite: $(\text{Mg,Fe})_2\text{Al}_4\text{Si}_5\text{O}_{18} \cdot n\text{H}_2\text{O}$
 $C2/c2/c2/m$



Lawsonite

Orthorhombic

Common mineral in high-pressure low-temperature metamorphosed basalts. Typical of blueschist facies.



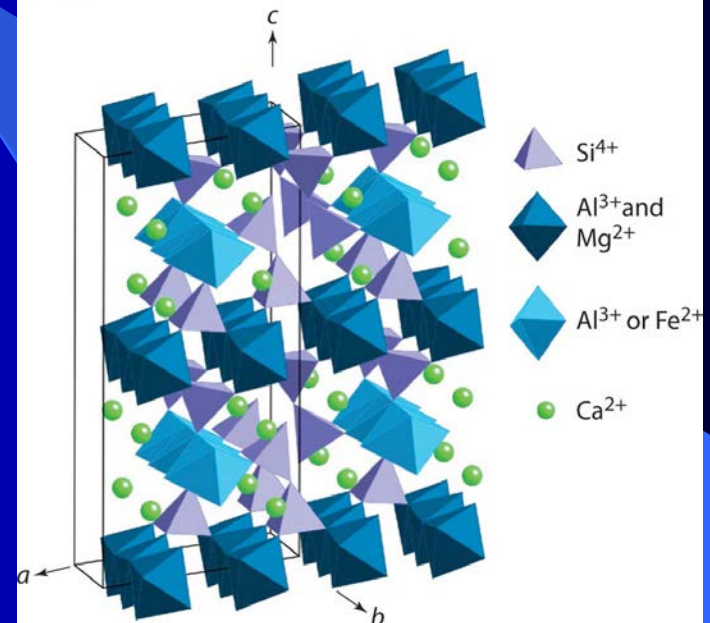
Pumpellyite

Monoclinic

Common constituent of glaucophane schists and as a result of low-grade metamorphism of amygdaloidal basalts.

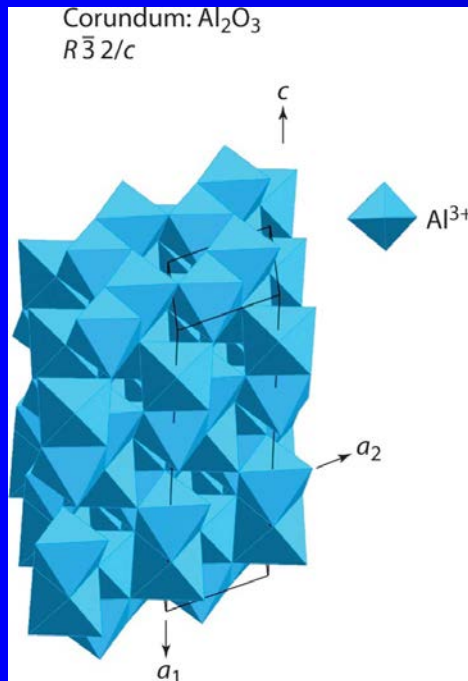


Pumpellyite: $\text{Ca}_2\text{MgAl}_2(\text{SiO}_4)(\text{Si}_2\text{O}_7)(\text{OH})_2 \cdot \text{H}_2\text{O}$
 $A2/m$



Corundum

Extremely high-grade contact metamorphism of aluminous (pelitic) rocks.



Chabazite

Result of low temperature hydrothermal alteration and/or metamorphism in the zeolite facies.

Other zeolite minerals – are **analcime**, **clinoptilolite**, **heulandite**, **natrolite**, **phillipsite**, and **stilbite**.

