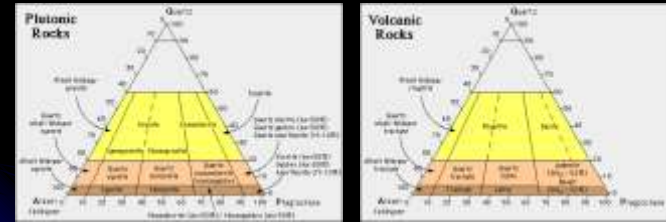
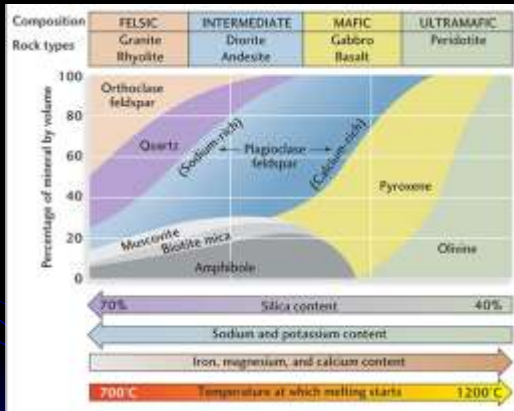


Minerals and Igneous Rocks

Classification of Igneous Rocks

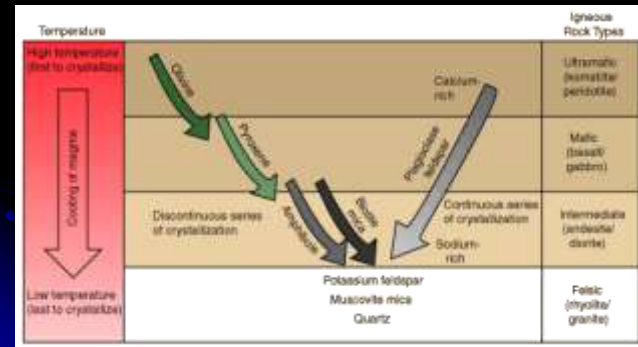


Streckeisen classification is based on only three minerals: Quartz, Plagioclase, Potassium Feldspar

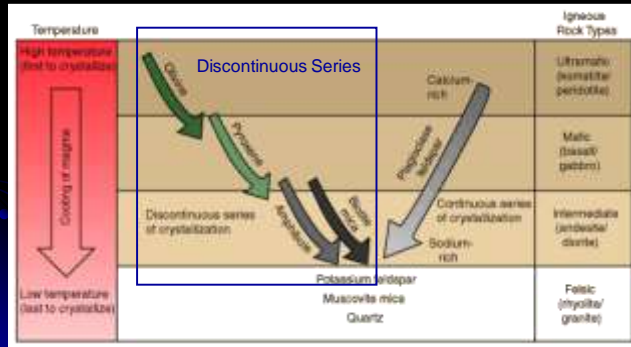


Other minerals are important for the full description of igneous rocks: Olivine, Pyroxene, Hornblende, Biotite and Muscovite

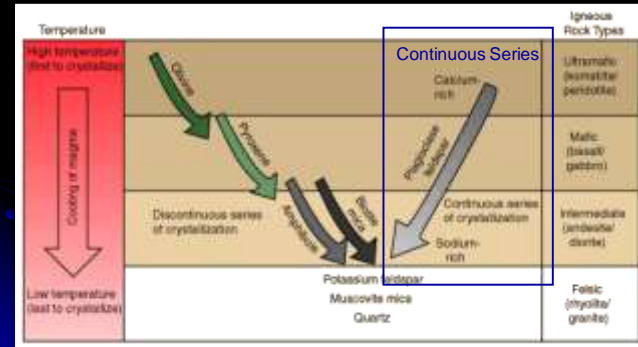
Bowen's Reaction Series



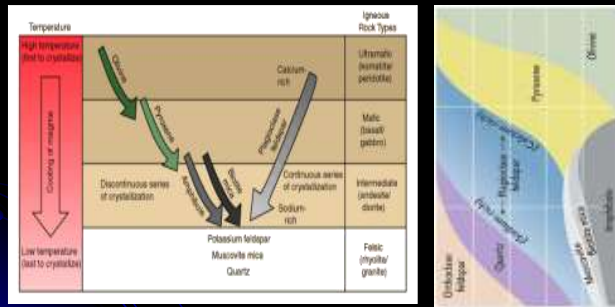
Bowen's Reaction Series



Bowen's Reaction Series



Bowen's Reaction Series and Classification



Dunite



Ultramafic Rock

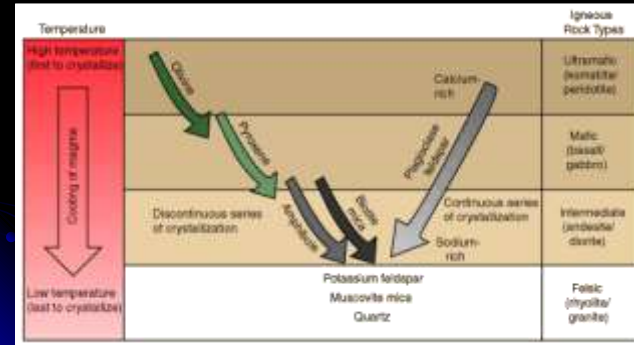
Cumulate... Olivine sinks to bottom of magma chamber because it is denser than the magma

Olivine Gabbro and Basalt



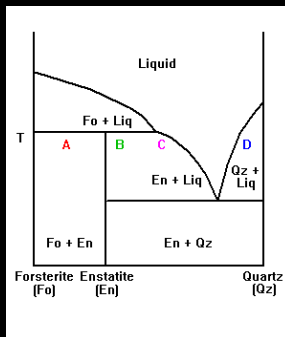
What if olivine is not able to settle (not enough time, currents keep mixing)?
 What is other minerals would you expect to find with the olivine?

Bowen's Reaction Series



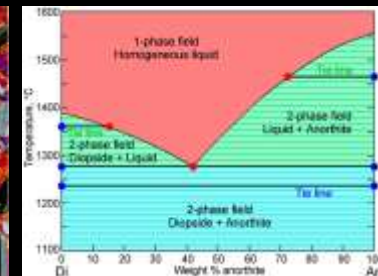
What would be the next mineral to form? What rock would it make?

Corona Gabbro



Why are all of the olivines (green) surrounded by a rim of pyroxene (brown)?

Augite Gabbro



How did this gabbro form?

Olivine Gabbro and Basalt

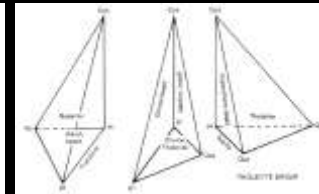
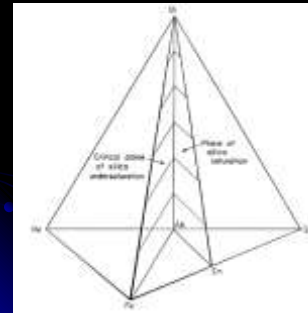


What minerals would you not expect to find in a gabbro?

Hornblende? Quartz? Staurolite?

Why?

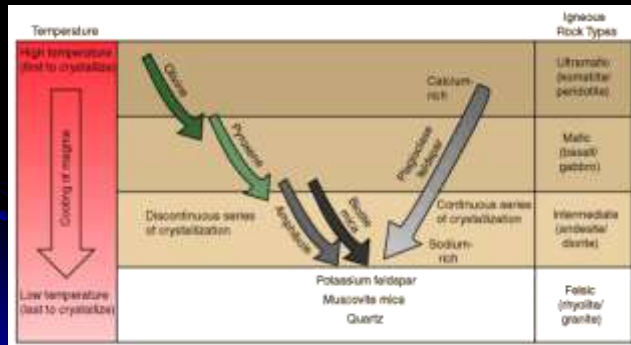
Minerals in Basalt and Gabbro



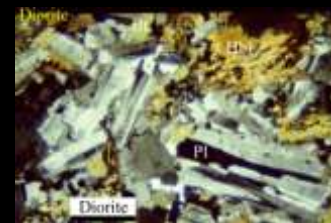
Quartz and olivine cannot exist in the same rock ... They would react to form orthopyroxene.

This is the basis for classification of mafic igneous rocks

Bowen's Reaction Series



Diorite



Intrusive rock composed of plagioclase, hornblende, and sometimes biotite

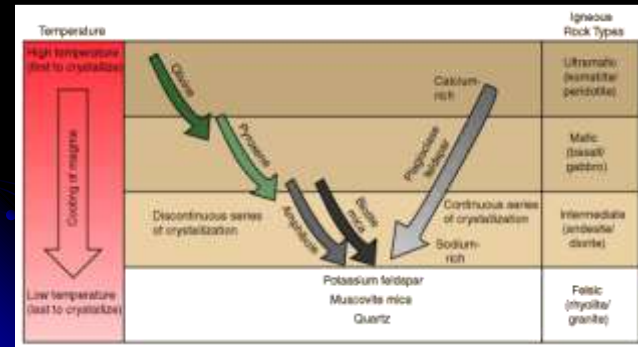
Andesite



Andesite is the volcanic equivalent of a diorite. It is a rock composed of plagioclase, hornblende, and sometimes biotite

What composition would the plagioclase be?

Bowen's Reaction Series



Granite



Granite is a rock composed of plagioclase, potassium feldspar, quartz, and muscovite and/or biotite

What composition would the plagioclase be?

Rhyolite



Rhyolite is the volcanic equivalent of granite

What minerals other than quartz and feldspar might you expect to find?

What minerals would you not expect to find?