

EAS 332 Metamorphic Petrology

Lab 6: Mafic Rocks – Barrovian Sequence

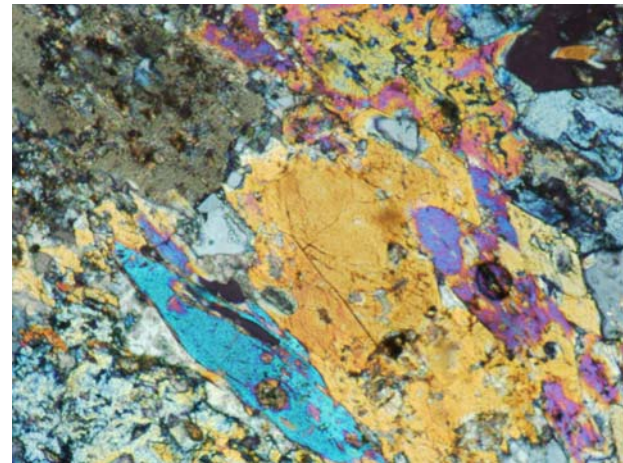
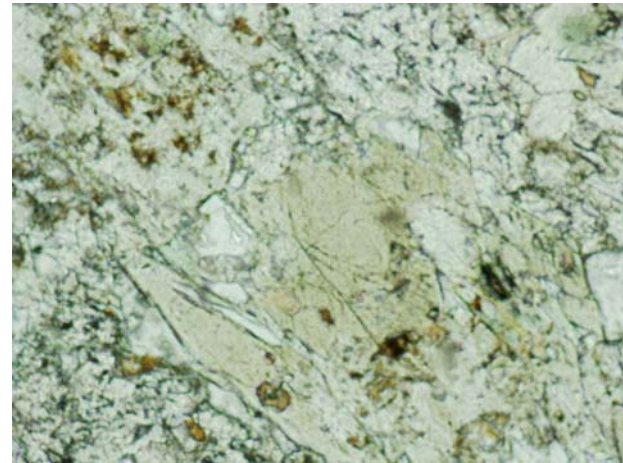
Purpose: Examine mafic bulk composition metamorphic rocks through the Barrovian sequence of metamorphism (Greenschist to Granulite Facies)

Mafic Rocks

- Protolith – most commonly mafic to intermediate composition igneous rocks
- Moderate Al, high Fe, Mg and Ca
- Will not see Al_2SiO_5 polymorphs or Staurolite
- Will see more amphiboles and cpx
- Most metamorphic facies names come from mafic bulk composition metamorphosed rocks
- At low metamorphic grade, igneous textures can be preserved. These textures are removed by new mineral crystallization
- Typical minerals include chlorite, epidote, calcite, actinolite, hornblende, clinopyroxene, orthopyroxene, plagioclase, garnet

Actinolite

- Columnar, acicular or bladed habit (fibrous)
- Basal section typical diamond shape (amphibole)
- Amphibole cleavage ($\sim 60^\circ / 120^\circ$)
- Weakly coloured (pale green) in ppl
- Pleochroic
- Moderate to high relief
- Upper 1st to mid 2nd order interference
- Simple and lamellar twins
- Biaxial (-)



Greenschist → Amphibolite Facies Transition

- Marked by the appearance/disappearance and changing compositions of minerals
- At low grade Plagioclase composition is nearly pure Albite (Ab). At Greenschist – Amphibolite transition, plagioclase composition jumps to An₂₀ (Anorthite)
- Amphibole phase changes from Actinolite to Hornblende

Determining the Composition of Plagioclase: Becke Line Test

- Focus on grain boundary on medium power
- Slightly defocus by lowering the stage slowly
- The Becke Line moves into the medium of higher refractive index.
- If the line moves into Plagioclase, then $An_{>20}$

Your Assignment (what to hand in)

- List major minerals and metamorphic facies for each sample
- Answer questions associated with each sample
- Do rock description on....