Light in Minerals II
Light in Minerals

- Polarization: Vibration directions
- The Petrographic Microscope
- Measuring Index of Refraction
- Pleochroism
- Birefringence: Optical anisotropy
- The Indicatrix:
- Uniaxial Minerals
- Biaxial Minerals
Petrographic Microscope
**Becke Line Method**

- As you increase the working distance, the white line moves to the medium of higher index.
- If dispersion curves cross, liquid has higher slope and yellow moves in and blue moves out.
$I_{\text{grain}} > I_{\text{oil}}$
$I_{\text{grain}} > I_{\text{oil}}$
$I_{\text{grain}} < I_{\text{oil}}$
\[ I_{\text{grain}} = I_{\text{oil}} \]
Dispersion

- The index of refraction (velocity) varies with wavelength.
Optical Anisotropy

• Pleochroism:
  – Different absorption for light *vibrating* in different directions.
  – Mineral grains change color on rotation in plane-polarized light.

• Birefringence:
  – Different velocities (index or refraction) for light *vibrating* in different directions.
  – Mineral grains change color on rotation between crossed polarizers
Pleochroism

- Pleochroism is different absorption spectra for light vibrating in different directions.
- Pleochroism is observed in non-cubic Fe-bearing minerals.
Pleochroism:
Tourmaline in PPL
Birefringence