Optical Properties of Common Sedimentary Minerals

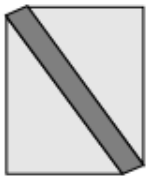
Calcite
Color in PPL: Colorless
Cleavage: Well-defined
Relief: Moderate negative to high positive relief; changes with rotation
Color in XPL (Birefringence): High (looks like washed out pastels, almost white)
Interference Figure: Uniaxial negative with numerous isochromes
Distinguishing Features: Cleavage, extreme birefringence, change in relief with slide rotation
Occurrence: Calcite is very common and occurs in many different rocks. Very commonly, calcite is a cement in sedimentary rocks. Calcite can also be found in fossils. Occasionally calcite may occur as clasts in a sedimentary rock. Less commonly, calcite is found in metamorphic rocks (marble, others). Calcite is rarely found in igneous rocks.

Quartz
Color in PPL: Colorless
Cleavage: None, conchoidal fracture.
Relief: Low positive
Color in XPL (Birefringence): Very low (colorless)
Interference Figure: Usually uniaxial positive
Distinguishing Features: Lack of cleavage, low relief, low birefringence, possible undulatory extinction (a "sweeping" extinction)
Occurrence: Quartz is a very common mineral. It may be found in all rock types. It may also be a cement in sedimentary rocks.

Feldspar
Color in PPL: Colorless
Cleavage: Well-defined
Relief: Low positive or negative
Color in XPL (Birefringence): Very low (colorless)
Interference Figure: Biaxial positive or negative
Distinguishing Features: Very commonly has **twinning** (see below), cleavage, low relief, alteration (in XPL, there may small, brightly colored minerals inside feldspar grains)
Occurrence: Feldspar occurs commonly in igneous, metamorphic, and sedimentary rocks.

Image: http://www.tulane.edu/~sanelson/eens211/biaxial.htm

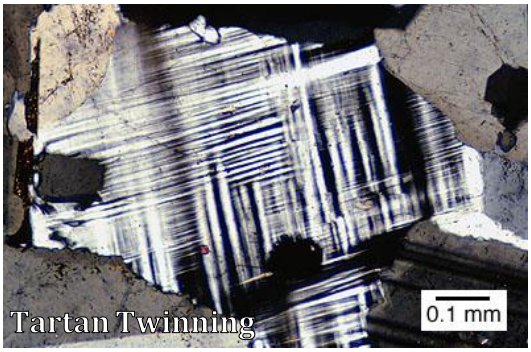
Albite Twinning



Cyclical Twinning

Simple Twinning

Image: http://leggeo.unc.edu/Petunia/IgMetAtlas/minerals/microcline.X.html



Tartan Twinning

*Mineral properties from *Introduction to Mineralogy* by William D. Nesse