

Some of the samples used in Mineralogy Lab are museum specimens. Please do not destroy them. You can do just about anything you want to the grungy ones, but be nice to the pretty specimens as they are irreplaceable.

Name_____

Examination of the Quartz, Feldspathoids, Feldspar, Zeolite Group and other Framework Silicates

(This group contains most of the most common light colored minerals and some of their relatives.)

1. Box of Rocks

We have put out five trays of minerals. They contain

1. quartz
2. feldspars
3. feldspathoids
4. zeolites
5. some misc. framework silicates

First, examine all of the mineral specimens varieties and record their physical properties, chemical composition, habit, occurrence, and use in your lab notebook.

Then, answer the following questions for each group (tray).

A) What chemical similarities/differences do the minerals of the group (tray) have?

B) What physical similarities/differences do the minerals of the group have?

C) Why are there several varieties of minerals in each group? (e.g., What are the differences between the different members of the group?)

D) Under what conditions and in what sorts of environments do the minerals of the group form. What typical kinds of rocks contain them?

2. Definitions

Below are some terms that are relevant to this week's lab. Define the terms.

twinning (*often most easily seen in thin section*) -

zoning (*most easily seen in thin section*)-

undulatory extinction (*seen in thin section*)-

anhedral-

subhedral-

euhedral-

sodic-

calcic-

sialic-

mafic-

3. Minerals in thin section.

#30 (olivine gabbro)

This section is composed chiefly of zebra-striped (known as polysynthetic twinning, and observed in XP) plagioclase feldspar. It contains lesser amounts of olivine - which you saw last week.

The zebra stripes – seen in XP light – are diagnostic of plagioclase. Distinguishing between the different varieties of plagioclase is difficult and will not be pursued here. Thus, identifying any zebra-striped feldspar mineral (in thin section) as plagioclase is acceptable. Are the plagioclase crystals larger or smaller than the olivine present in this section?

Are the plagioclase crystals anhedral, subhedral, or euhedral? What about the olivine?

Look at the rock texture - did the olivine grow first and then the plagioclase filled in around it, or was it the other way around?

It is difficult to pick out the olivine from the plagioclase in hand specimen. (Much of the plagioclase has a dark color in hand specimen.) But, there is a trick. If you pick up the sample and tilt it so light reflects off of grains, you will see some that parallel stripes on them. Those are plagioclase grains and the stripes are the twinning. Try it. This is about the only way to distinguish plagioclase from some other types of feldspars in many rocks.

#1 (granite)

This thin section is comprised predominantly of
euhedral plagioclase
anhedral quartz
anhedral alkali feldspar (microcline)
a mafic mineral

Use XP light to see twinning. Much of the plagioclase has zebra striped twinning (called "albite" twinning). The microcline displays the classic "cross-hatched" twinning, distinguishing it from plagioclase. Sometimes this twinning is called microcline twinning.

Look at photos in the thin section book to be sure you can tell the twinning of plagioclase from that of the microcline. Sketch a picture of the twinning of both types of feldspar in this rock.

The anhedral quartz has about the same color (clear in PP) and interference colors (in XP) as the feldspars. But, it displays no twins. And it displays undulatory extinction. What is *undulatory extinction*? Describe it.

Locate a microcline grain and note the secondary minerals growing within these crystals. What is the dominant secondary mineral?

There is one mafic mineral in this thin section. It has various shades of brown (seen in PP). What is it?

Look closely at the hand specimen. You should be able to pick out three distinct minerals. One dark and having some grains with high reflectivity. One milky white. And the other a glassy sort of gray color. How do you think these three match up with the four you saw in thin section?

#26 (dacite)

The hand specimen shows large subhedral to euhedral light colored minerals in a darker material called matrix. What do the terms *phenocryst* and *matrix* mean?

This thin section reveals that the many phenocrysts are mostly strongly zoned plagioclase. Find some plagioclase and describe the zoning. Make a sketch showing the zoning.

What about the stuff that surrounds the plagioclase? Describe it.

Compare the plagioclase in this section to the plagioclase found in section #30. Compare the overall grains sizes found in the rocks. What differences/similarities do you see? What can you conclude about the cooling history of this rock?