CHAPTER 5

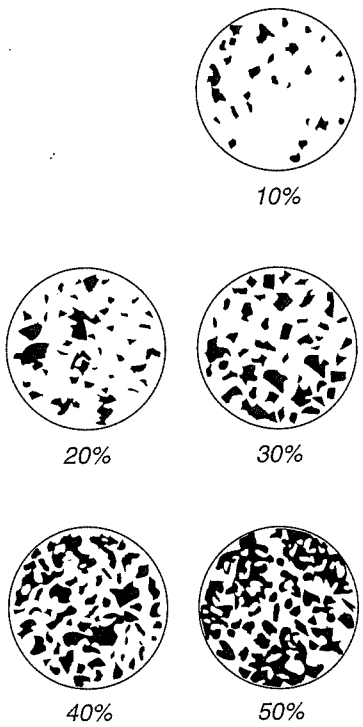
LAB ACTIVITY

Studying Rocks in Thin Sections

Have you ever tried to look through a rock? In addition to looking at hand-held rock samples, sometimes geologists need to see through the rock in order to study it. They do this by making thin sections. Thin sections are slices of rock so thin that light actually passes through them! Thin sections are analyzed by using microscopes. The magnified view in the microscope makes it possible to see minerals that are not large enough to view in the hand-held sample and to more easily identify the larger minerals that can be seen.

In this lab, you will look at some diagrams of rock thin sections. You will study minerals that are found in the rocks as well as identify the rocks containing the minerals.

5.22 Chart to aid in visual estimations.



Lab Skills and Objectives

- To **observe** and **interpret** several diagrams of rock thin sections
- To **classify** and **identify** the minerals and rocks represented by the diagrams

Materials

- metric ruler

Procedure

1. Look at Rock A in Figure 5.23. Use the key to determine the name of each mineral. List the names of the minerals found in Rock A.
2. Use the chart in Figure 5.22 to estimate the percent of each mineral present in Rock A. For example, does the amount of quartz in Rock A look as if it occupies 10% of the diagram? 20%? 40%? 50%? Repeat your estimate for each of the minerals in Rock A. Record the percents. Your values should total 100%. Repeat steps 1 and 2 for Rock B.
3. Using the metric ruler, measure the diameter of the circular diagram for Rock C. Record your measurement.
4. Look at the mineral grains in Rock C. Measure the width in any direction across five different mineral grains. Record your data. Calculate an average width for the grains.
5. Answer the questions in *Analysis and Conclusions.*

Analysis and Conclusions

1. Grain or crystal size can provide clues to rock types. Typically, sedimentary grains are rounded and found in a cement matrix. Igneous grains fit together in a jigsaw puzzle fashion. Metamorphic grains exhibit linear patterns and foliation. (Foliation is a parallel arrangement of minerals such as alternating layers of dark and light minerals) Look at rocks A to D. Which of the rocks shown is sedimentary? Metamorphic? Igneous?

2. Determine the actual size of an average grain of Rock C. The actual diameter of the rock sample shown in each diagram is 0.5 centimeters. Use your average grain diameter data and the magnified diameter you recorded. Show your work.
3. Using your answer to question 2, determine the name of the average grain size in Rock C. The diameter of clay-sized grains ranges from 0.00001 to 0.0004 cm, silt 0.0004 to 0.006 cm, sand 0.006 to 0.2 cm, and pebbles 0.2 to 6.4 cm. Which kind of sedimentary rock is Rock C? Explain your answer.
4. In Rock A, which two minerals did you estimate make up over 50% of the rock? Which minerals make up the remainder of the rock?
5. In Rock B, which two minerals did you estimate make up over 50% of the rock? Which minerals make up the remainder of the rock?
6. Turn to the graph on page 61. Which rock in the graph most nearly matches the mineral composition of Rock A? Which rock most nearly matches the mineral composition of Rock B? Explain your answers.
7. Igneous rocks are commonly grouped into mafic rocks and felsic rocks based on their chemical composition. Mafic rocks are dark in color because they contain a number of dark minerals such as amphibole, pyroxene, olivine, biotite, as well as plagioclase feldspar. Felsic rocks are light in color and contain minerals such as quartz and orthoclase feldspar as well as some dark minerals such as biotite and amphibole. Based on these definitions, which rock, A or B, is mafic? Which rock is felsic? Explain your answer.
8. Compare the diagrams for Rock C and Rock D. Look at each rock's texture (i.e. size, shape, orientation and contact points with other crystals). How does the texture differ in the two rock samples?
9. Look at the diagram of Rock E. Is it sedimentary, metamorphic, or igneous? Explain your answer.

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