

EXERCISE 7

A STUDY OF IGNEOUS ROCKS

Purpose: 1) To become acquainted with common examples of the two great classes of igneous rocks. 2) To see how the texture of an igneous rock is related to its origin.

Background: Igneous rocks are formed by the cooling of liquid magma from within the earth's crust. Magma that cools below the surface forms intrusive rocks. The slower the cooling, the larger the grains or crystals of individual minerals in the rock. Magma that cools on or above the surface is called lava, and forms extrusive rocks. The rapid cooling of lava creates fine-grained rocks with very tiny crystals, or glassy rocks with no visible crystals at all. To summarize, then, different rates of cooling produce rocks of different grain size or texture.

So much for texture. But geologists have also found that the igneous rocks fall into two great chemical families. One family is acidic in composition and its members are generally light in color, like granite. The other family is basic in composition, and its members are generally dark in color, like gabbro. Both families show all the variations in texture described in the preceding paragraph.

Materials • 1) Specimens of granite, felsite, pumice, obsidian, gabbro, basalt, scoria 2) hand lens 3) beaker or glass tumbler 4) water 5) set of minerals (quartz, orthoclase, plagioclase, biotite, Muscovite, and hornblende) for comparison with rocks.

Problem 1: How Can the Common Acidic Igneous Rocks Be Recognized?

a) Pick out the three acidic rocks. (See Background.) How did you identify the acidic? _____

Name them: _____

b) Which of these has the coarsest texture? _____ How many different minerals can you see in it? _____

With the aid of the hand lens, describe and identify three minerals in this rock:

1) _____

2) _____

3) _____

c) Examine your specimen of felsite. Felsite is similar to granite in mineral composition, but is finer in texture. What explains this? _____

_____ Which minerals, if any, can you see in felsite with your

hand lens?---

d) Pumice is a "frothy glass" formed by very rapid cooling of acidic lava. Can any individual minerals be identified in it? How do you explain the formation of the cavities in pumice when it cooled from its "parent" lava?

e) See whether your pumice floats in water. Does it?
f) Examine obsidian. Note its glassy texture, translucent edges, and shell-like fracture. Despite its dark color, obsidian is usually an acidic rock.

Problem 2: How Can the Common Basic Igneous Rocks be Recognized?

a) Pick out the three basic rocks. What did you use as identification?

Name them.

b) Do the basic rocks seem heavier or lighter than the acidic rocks?

c) Which rock is coarse-grained? How many different minerals can you see in it?

With the aid of the hand lens, try to identify two minerals in this rock:

(Use the comparison set of minerals to help you identify the minerals.)

Why, are they dark minerals?

d) Examine the basalt. Basalt is similar to gabbro in mineral composition, but is finer in texture. What does this tell us about its origin?

Which minerals, if any, can you see in basalt with the hand lens?

Name _____

Class _____

Date _____

e), Scoria is a "frothy glass" formed by very rapid cooling of basic lava. How does it differ from pumice! _____

Does scoria float? _____

problem 3: Complete the Table Below:

Common Igneous Rocks			
Texture	Depth of Origin	Acidic (light-colored)	Basic (dark-colored)
Glassy			
Fine-grained			
Coarse-grained			
		<i>Minerals</i>	<i>Minerals</i>
		1)	1)
		2)	2)
		3)	3)
		4)	