

# Rock Classification

## Introduction to Rocks

November 10th, 2009

### SUMMARY

Rocks are collections of minerals. There are several types of rocks and each type forms in a different way. Rocks serve as an important foundation in our world and in our everyday lives.

#### **Rocks are made of minerals**

- Minerals combine to form most rocks. It is important to know that not all rocks are made of minerals.
- A **rock** is a naturally formed solid that is usually made up of one or more types of minerals.
- Remember: a rock is not a mineral!
  - Rocks are composed of different amounts of different minerals. They lack a definite chemical composition.
  - As a result, rocks lack a crystal structure.
- Like minerals, all rocks form through natural processes and are solid.
- While most rocks are made of several minerals, some are made of just one and some contain no minerals at all.
  - Limestone is composed of almost one mineral: calcite. We will find a small amount of another mineral in there, but we often think of it as not being there. It doesn't have the characteristics to be a mineral, so we classify it as a rock. When a rock is made of mostly one mineral, we say it is **monomineralic**.
  - Obsidian is a rock that contains no minerals at all! The lava that forms it cools so quickly, the atoms have no time to arrange into a crystal.
  - Coal is another rock that lacks minerals. It is composed of the remains of ancient plants.

#### **Our world is built of rocks**

- When you look at the surface of earth you see soil, plants, rivers, and oceans. These are what we call **surface features**. They only make up a small percent of the depth of the earth.
- Our earth is divided into four layers:
  - Crust (5-40km thick, avg: 32km) -> has the surface features, solid rock. Only accounts for 0.5% of earth's thickness!
  - Mantel (2900km) -> very hot solid but soft rock (think of it as thick syrup)
  - Outer Core (2550km) -> molten metal
  - Inner core (1,200km) -> solid metal
- Rocks are very common in our crust. It should be no surprise that we use them in our lives! Rocks are the sources of:

- Building materials for houses and skyscrapers
- Metals such as iron, aluminum, and copper
- Statues and other works of art
- Base for pavement for roads and highways
- Aside from having an economic value, rocks also serve as a time machine to the past. Scientists can study rocks and learn how areas have changed through time. We can also study rocks to see what an area may have been many years ago.

### **There are three types of rocks**

- Just as minerals are classified into groups, rocks are too!
- The three types of rocks are classified by how they form.
- Igneous rocks form when molten rock cools and becomes solid.
  - It can form within the earth or on its surface.
- Sedimentary rock forms when pieces of older rock, plants, and other loose material become pressed or cemented together.
  - These pieces are called sediments and they are cemented together with minerals.
  - Sedimentary rocks can also form through evaporation.
- Metamorphic rocks form when heat or pressure cause older rocks to change into new types of rocks.