

Rocks : Notes-10

What is a rock ? A rock is a solid mixture of minerals.

Example : The rock granite is composed of the minerals; quartz, feldspar and biotite (or other dark minerals).

The three main types of rocks are: igneous, sedimentary and metamorphic.

Igneous Rocks

Igneous rocks are those that solidify from hot liquid rock (magma). Most igneous rocks are composed of quartz, feldspar, and the four dark minerals (ferromagnesian silicates); olivine, biotite, hornblende and augite. The ferromagnesian silicates have a high specific gravity.

The nonferromagnesian silicates (muscovite, feldspar, and quartz) have a low specific gravity, and are light colored.

If the rock has 10% - 40% quartz, it is likely to be granite or rhyolite. These are light colored igneous rocks.

If the rock has less than 10% quartz, it is likely to be diorite or andesite.

If the rock has no quartz, then it will be composed of mostly the dark minerals, and will be black in color. The rock will be then be gabbro or basalt.

The rock that forms will have large crystals or small crystals. Large crystals form when magma cools slowly. Small crystals form when the magma cools quickly. Crystals that are formed under these conditions are usually hard.

The information above is contained in the table below. Quartz = SiO_2 .

<u>Crystal size</u>	<u>10-40% SiO_2</u>	<u>< 10% SiO_2</u>	<u>no SiO_2</u>
<u>small</u>	rhyolite	andesite	basalt
<u>large</u>	granite	diorite	gabbro

Obsidian is an igneous rock that is similar to granite in composition, but has very small crystals. It is glassy in appearance. Pumice is a rock similar to rhyolite but it has gas bubbles trapped in it. It will float on water. An important igneous rock is peridotite. It is composed mostly of olivine. Most of the Earth's mantle is composed of this rock.

Sedimentary Rocks

Sedimentary rocks are those that are formed from broken up rock (sediment) that has hardened. The broken up rock is said to have been weathered. Weathering is the erosion of rock by water, wind or ice. Sand comes from weathered granite. It can harden into sandstone. Small pebbles can harden into a rock called conglomerate. Clay comes from weathered feldspars. Clay will harden to form shale. Rocks harden when buried for long periods of time under other rock.

Often, sedimentary rocks are layered. These layers are called strata. Layers form when rock has been deposited by wind or water.

Some sedimentary rocks contain halite, gypsum or borax. These formed when minerals precipitated at the bottom of lakes or seas that evaporated. Mineral crystals that form in these rocks are usually soft.

Limestone, dolomite and chalk were formed at the bottom of seas from the skeletons or shells of dead sea animals. The shells were mostly CaCO_3 .

Coal which is mostly carbon, was formed from dead plants. It is often found between sandstones and shales.

Metamorphic Rocks

Metamorphic rocks are those that were igneous or sedimentary rocks, but have changed form due to heat and pressure. This may occur at a depth under rock of several kilometers. Heat and pressure can cause the formation of rocks that can't form near the surface. Metamorphic rocks often seem to be deformed.

Gneiss (pronounced "nice"), is formed from granite. Shale becomes slate and slate becomes schist. Sandstone becomes quartzite. Limestone becomes marble.