

Metamorphic Rocks (Chapter 5)

Metamorphic Rocks: Crystalline rocks that form from other rocks due to increases in temperature and pressure.

Two Main Categories of Metamorphism:

Regional Metamorphism: Covers large areas of ground (100-1000's km²)

Contact Metamorphism: Caused by heat of an intruding magmatic body to surrounding rocks (scale of only few km²)

What happens during metamorphic events?

- 1) Recrystallization of minerals into larger minerals
- 2) Development of new minerals (some old disappear)
- 3) Deformation and reorientation of minerals (old and new)

(Hint: the metamorphic rock's parent is called its protolith, this will help you a lot in determining what happened during metamorphism)

Analyzing all of these factors can help us determine the metamorphic grade (intensity) of the rock ☺

High grade metamorphic rocks are the most intensely metamorphosed (created under highest temp/pressure)

Characteristics: Coarsely crystalline (lots of recrystallization!)
Contains minerals stable at higher temp/pressures

Low grade metamorphic rocks are the least intensely metamorphosed (created under lower temp/pressure)

Characteristics: Finely crystalline (exact grain size depends on grain size prior to metamorphism)
Contains minerals stable at lower temp/pressures

Textures of Metamorphic Rocks (easier to remember than Igneous textures ☺)

Foliated: arrangement of mineral crystals into parallel or nearly parallel planes

Nonfoliated: minerals not aligned into parallel planes

Subtextures for foliated metamorphic rocks:

Slaty: foliation made of platy (flat, such as muscovite and biotite) minerals too small to be seen without a microscope (like slate flooring)

Phyllitic: made of platy minerals ranging in size from just visible with a hand lens to just barely visible to the unaided eye. These can be distinguished from slaty rocks by a shiny or glossy luster

Schistose: foliation large enough to be seen with the unaided eye. Platy minerals predominate but other minerals, such as quartz can be present

Gneissic: coarse foliation with parallel bands or layers. Can alternate layers of platy minerals and layers of blockier minerals, such as quartz and feldspar.

A little bit more about the rocks protolith

See Table 5.2 (handed out in class) to help determine what the parent of the metamorphic rock is. Some can have more than one option and you can't tell which is more likely without more diagnostic studies.