Metamorphic Rocks – Geol 113

Goals: To learn how to use metamorphic texture and composition to identify metamorphic rocks.

Before Lab: Read pp 133-145 in your laboratory manual and review all diagrams in Laboratory 7.

Materials: 1 box of unidentified rock samples in large green box, 1 box of Wards metamorphic rock samples, magnifying devices.

Procedure: Your main job today is to use metamorphic texture and mineral composition to identify metamorphic rocks. Your lab manual contains extensive information about texture and composition as well as an metamorphic rock identification procedure (pp. 141-143).

Next lab meeting, we will have a metamorphic rock identification quiz for which you will demonstrate your metamorphic rock-identifying prowess. For the quiz, you will be given metamorphic rock specimens to identify. Some types of metamorphic rocks may appear more than once on the quiz (just as they do in real life) and I will not use the same specimens on the quiz that you examined in class. I may also ask you to identify minerals in the metamorphic rock specimens. Metamorphic rock and mineral names *must* be spelled correctly on the quiz for full credit.

You may use one 8.5x11 inch sheet of paper with notes on one side during the quiz. You may not paste things (e.g., layers of post-it notes) to the paper, but are limited to the plane of the surface of the paper itself. The only other restriction is the size of the sheet. You may write, print, draw or whatever else you like on your sheet of paper.

Metamorphic rocks that may appear on the quiz: slate, schist, gneiss, marble, quartzite, anthracite.

Common Minerals in Metamorphic Rocks

Mineral	Formula	Commonly found in:
Clay minerals		slate, phyllite
Biotite	$K(Mg,Fe)_3[AlSi_3O_{10}(OH,F)_2]$	slate, phyllite, schist
Muscovite	$KAl_2(Si_3Al)O_{10}(OH)_2$	slate, phyllite, schist
Garnet	$X_3Z_2(SiO_4)_3$ **	schist
Graphite	C	schist, gneiss
Hornblende	$Ca_2[Mg_4(Al,Fe)]Si_7AlO_{22}(OH)_2$	amphibolite, gneiss
Other amphiboles	(actinolite, tremolite)	amphibolite
K-Feldspar	$KAlSi_3O_8$	gneiss
Plagioclase feldspar	$NaAlSi_3O_8$ (albite) - $CaAl_2Si_2O_8$ (anorthite)	gneiss
Quartz	SiO_2	quartzite, gneiss
Talc	$Mg_3Si_4O_{10}(OH)_2$	soapstone
Calcite	$CaCO_3$	marble

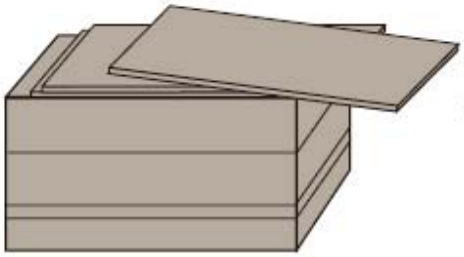
** X, Z are metal ions

Common Foliated Metamorphic Rocks

Mudstone

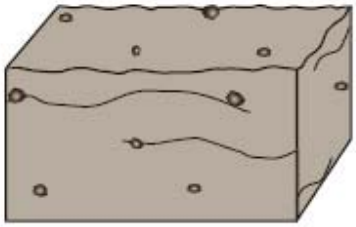
Protolith
unaltered sedimentary rock

Slate



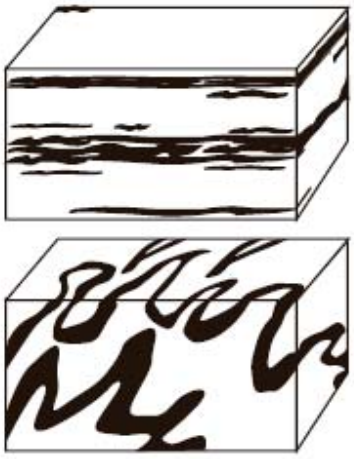
Low grade metamophism
slaty cleavage
- Alignment of flat minerals

Schist



Medium grade metamophism
schistosity
- Alignment of flat minerals
- Growth of new minerals

Gneiss



High grade metamophism
gneissic banding
- Alignment of flat minerals
- Growth of new minerals
- Segregation into dark and light mineral bands