

EPSC 221: GENERAL GEOLOGY

Lab 4:

Metamorphic Rocks

Metamorphic Rocks—Definitions

“CHANGE IN FORM”

Sedimentary → Metamorphic

OR

Igneous → Metamorphic

PRESSURE and TEMPERATURE

Metamorphic Rocks—Definitions

Identify:

1. Texture

2. Grain Size

3. Mineralogy

Metamorphic Rocks—Texture

- **Texture** is controlled by alignments of mineral grains
- *Foliation*
- *Cleavage*



Marble

*Protolith:
Limestone*

Unfoliated

Metamorphic Rocks—Texture



Slate

Protolith: Pelitic rock

Slatey cleavage

Metamorphic Rocks—Texture



Schist

*Protolith: Pelitic
or igneous rock*

Schistose

Metamorphic Rocks—Texture

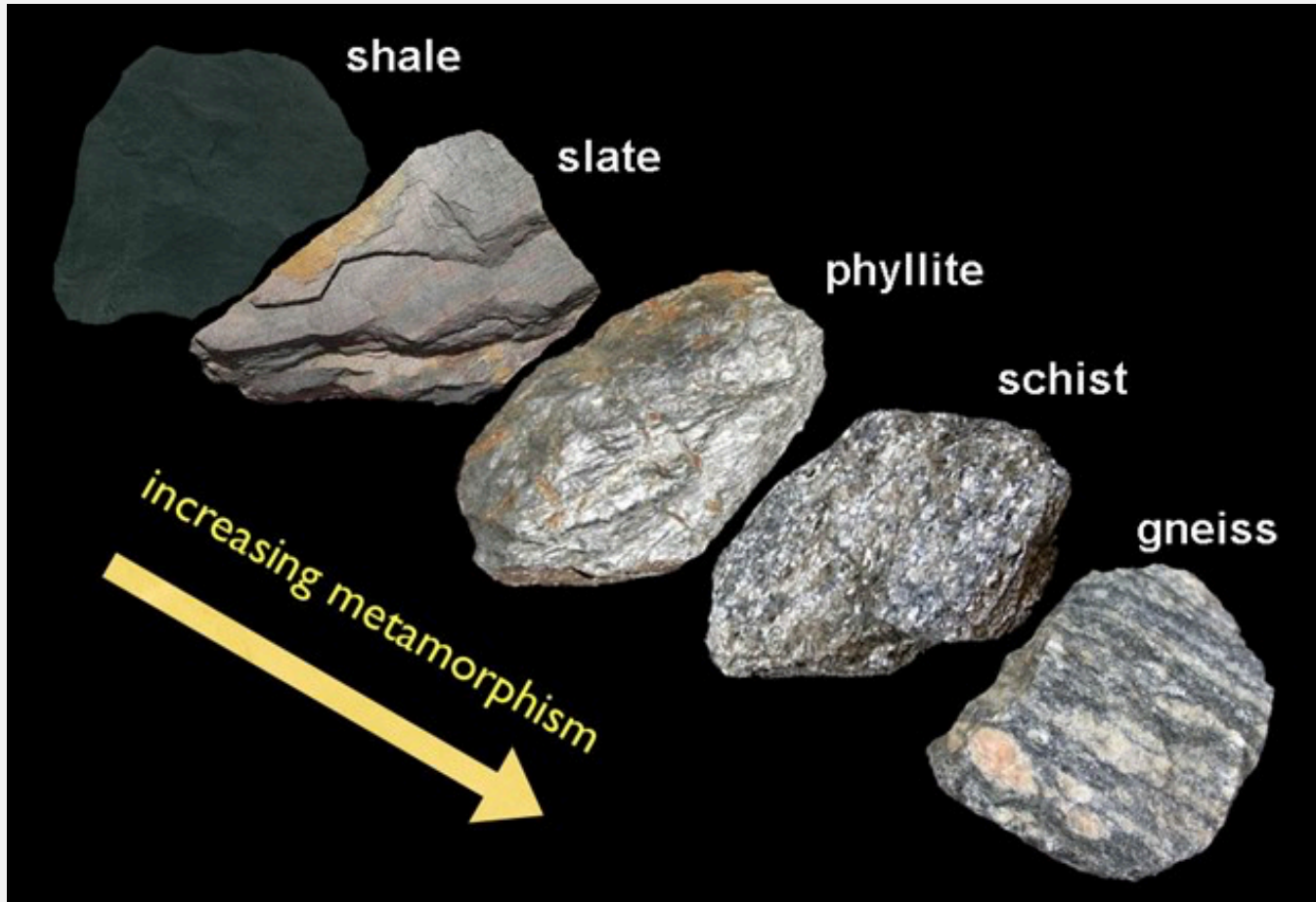


Gneiss

*Protolith: Pelitic or
igneous rock*

Gneissic banding

Metamorphic Rocks—Texture



Metamorphic Rocks—Mineralogy

Important Minerals

Garnet



Chlorite



Quartz

Pyroxene

Calcite

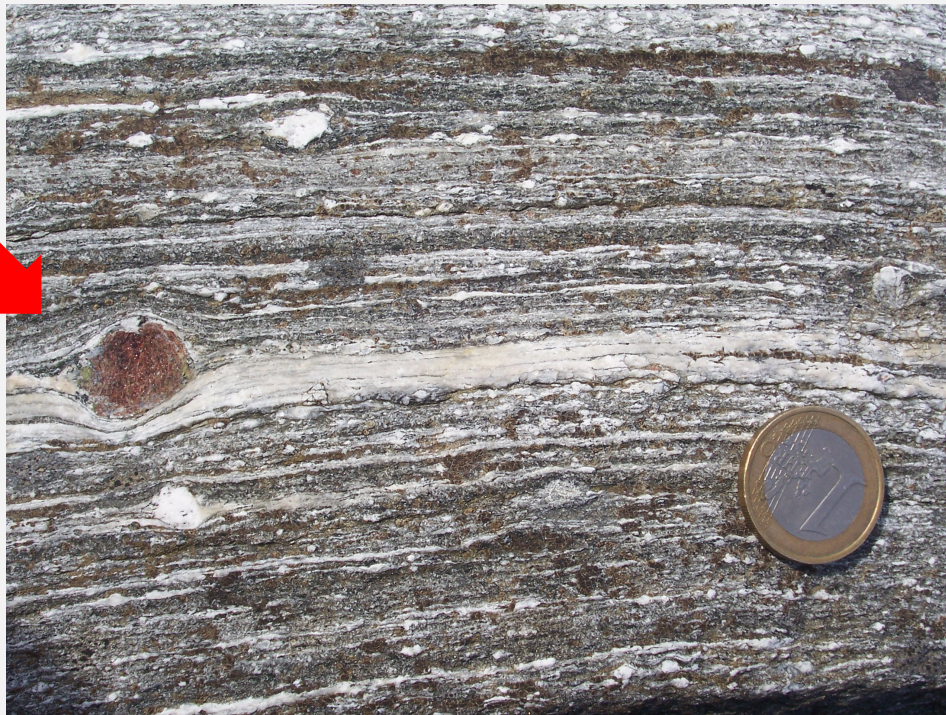
Amphibole

Feldspar

Metamorphic Rocks—Mineralogy

Porphyroblasts

Garnet



Large minerals that grow during metamorphism

Examples:

Garnet

Staurolite

Sillimanite

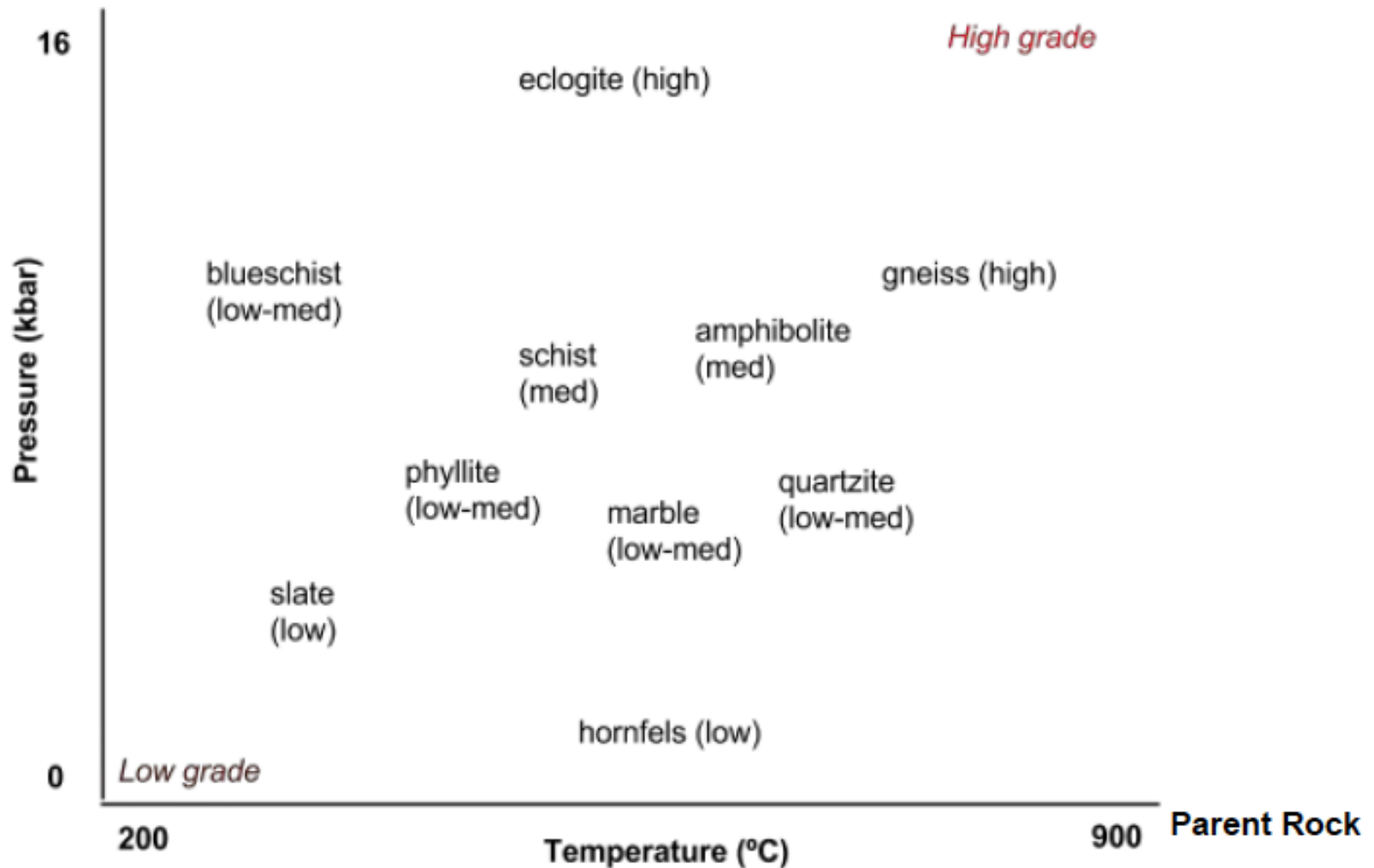
Kyanite

Andalusite

Chloritoid

Metamorphic Grade

Names/Metamorphic Grades

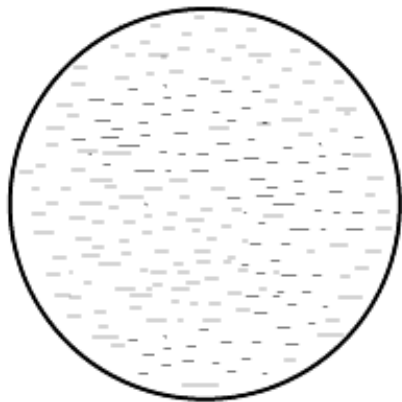


Metamorphic Grade

protolith

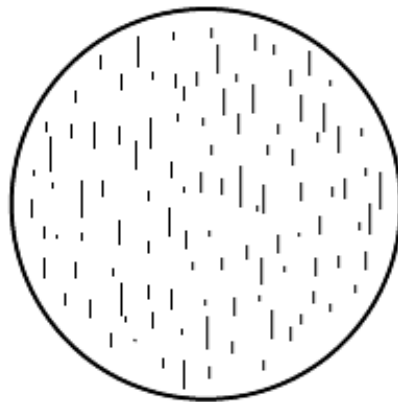
low-grade metamorphism

high-grade metamorphism



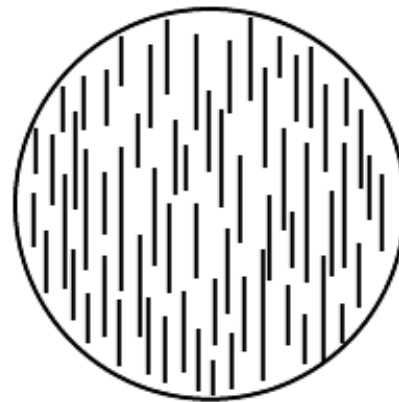
400 X

shale (*sed. rock*)
sub-microscopic clays
bedding plane cleavage



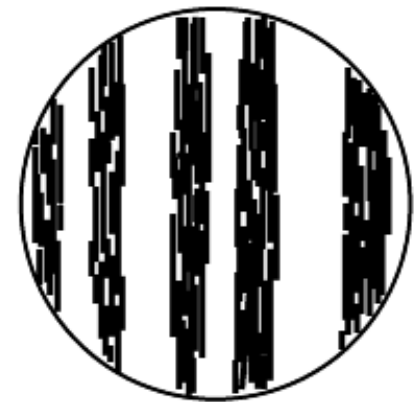
40 X

slate
microscopic micas
slaty cleavage



1X (no mag.)

schist
visible micas
schistosity



1X (no mag.)

gneiss
visible mafic & felsic mins
gneissic banding