

# Classifying Metamorphic Rocks

This system comes from the IUGS Subcommittee on the Systematics of Metamorphic Rocks (SCMR). While it retains many aspects of the traditional classification system, there are some new rules, especially as concerns the terms schist, gneiss and granofels. (Full information at <http://www.bgs.ac.uk/SCMR/>)

Note that these are root names, not extended names. To find the correct root name, you should go through the following list, choosing the first category that fits your rock.

## Protolith name

- If the rock's texture and mineralogy clearly indicate the protolith, then you should name it as a meta-[protolith].
- Metamorphic rock names are almost never used as protoliths (e.g., no meta-eclogite allowed)
- The hyphen is often omitted, especially before a consonant.
- Examples: *metagabbro*, *meta-arkose*, *meta-quartz diorite*.

## Mineral name

- If the rock is composed of more than 75% one mineral (by volume) then you should name it as a [mineral]ite.
- Examples: *garnetite*, *biotitite*.

## Specific name

- If the mineralogy and texture matches a specific name in the attached list, then that is the root name.
- Relict or retrograde minerals should be ignored in choosing a root name.
- This is preferred over the systematic (textural) name (e.g., *marble* is better than *calcite granofels*).

## Systematic (Textural) Name

If none of the above names applies, then you must use one of the three texture-based systematic root names.

- *Granofels*: Displays no schistosity, either because no inequant grains are present or because the inequant grains are randomly oriented.
- *Schist*: Displays a well-developed schistosity such that the rock will split on a scale < 1 centimeter.
- *Gneiss*: Displays a poorly-developed schistosity or a well-developed schistosity that is present in spaced zones so that the rock will split on a scale > 1 centimeter.

# Naming Metamorphic Rocks

Once a root name is selected, then it may be prefixed by one or more modifiers to provide more information to the reader.

## Mineral prefixes

- First choose a general rock name using the guide above.
- Prefix this name with those minerals not implied by the root name. Minor minerals (<5%) are optional as prefixes and should be added with "-bearing" (e.g., "*rutile-bearing serpentinite*")
  - If you wish to specify the composition of a mineral that is implied by the root name, you may (e.g., "*oligoclase amphibolite*")
- Those minerals that convey information about the conditions of metamorphism must be included.
- Mineral prefixes should increase in abundance as you read the name. The syntax for these uses hyphens and ±, so a garnet - biotite - plagioclase ± muscovite schist unit would have a more biotite than garnet and more plagioclase than biotite, and muscovite would occur sporadically in the outcrop.

## Textural prefixes

- Optionally, add textural prefixes (e.g., a *schistose garnet amphibolite*).

## List of Common Specific Names

This list represents the most common specific rock names, but it is not meant to be comprehensive; there are others as well. Mineral abbreviations are given in: Kretz (1983) Symbols for Rock-forming minerals, American Mineralogist v. 68 p. 277-279.

Rock Name	Mineralogy	Texture & Notes
<i>Amphibolite</i>	Hbl + Pl ± Qtz ± Bt ± Ms ± Grt	Schistose or granofelsic. If granofelsic, may be impossible to distinguish from diorite.
<i>Blueschist</i>	Glc + Ab ± Lws ± Ep	Often schistose, but may be granofelsic.
<i>Calc-silicate rock</i>	Variable, but often: Grs, Ep, Di, Vsv, Tlc, Wo, Tr, Cal, Dol (<5% carbonates)	Generally granofelsic, but often layered.
<i>Carbonate-silicate rock</i>	Variable, but often: Grs, Ep, Di, Vsv, Tlc, Wo, Tr, Cal, Dol (5-50% carbonates)	Generally granofelsic, but often layered.
<i>Cataclasite</i>	Any	A fault rock, schistosity poorly developed or absent, with angular crystals and rock fragments.
<i>Eclogite</i>	Grt + omphacite (Na-cpx) ± Ky ± Rut ± Qtz	May be schistose or granofelsic.
<i>Granulite</i>	Variable, with mostly OH-free minerals: Fsp ± Opx ± Cpx ± Crd ± Sil	May be schistose or granofelsic. Very high grade rock.
<i>Greenschist</i>	Ab + Chl + Ep + Act ± Qtz	Schistose, generally foliated. Visible minerals are not required, nor is it required to fit the definition of <i>schist</i> below.
<i>Greenstone</i>	Ab + Chl + Ep + Act ± Qtz	Granofelsic, generally fine-grained.
<i>Hornfels</i>	Variable, and generally too fine-grained to see in hand specimen	Granofelsic on the microscopic scale. Fine-grained, hard, homogeneous, breaking along curved fractures.
<i>Marble</i>	Dominated by carbonates (> 50%), but may also have: Qtz, Grs, Ep, Di, Vsv, Tlc, Wo, Tr, others	Usually granofelsic but may be layered, or have foliation defined by stretched carbonate grains or aligned inequant minerals, if present.
<i>Migmatite</i>	Typically a combination of mica schist minerals and granitoid minerals.	Separate, irregularly distributed domains of mica schist rock and granitic rock.
<i>Mylonite</i>	Any	A sheared rock, with plastically deformed mineral grains defining a foliation
<i>Phyllite</i>	Ms (or other white mica) + Chl / Bt ± Fsp ± Qtz	Foliated, with fine-grained matrix coarse enough to provide a "sheen" to the rock.
<i>Quartzite</i>	Qtz (> 75%) ± Bt ± Ms ± Grt ± Als	Granofelsic unless inequant minerals present.
<i>Serpentinite</i>	Srp (>50%) ± Mag/Chr	Often schistose and generally fine grained
<i>Skarn (=Tactite)</i>	Variable, but often: Grs, Ep, Di, Vsv, Tlc, Wo, Tr, Cal, Dol	Hydrothermal rock, so generally layered; often coarse with euhedral crystals.
<i>Slate</i>	Too fine to discern in hand specimen, but may have pyrite porphyroblasts.	Fine grained to cryptocrystalline, with slate cleavage. Dull surface ( <i>cf.</i> phyllite)
<i>Soapstone</i>	Tlc ± Srp ± Mag	Generally schistose

## Mineral Abbreviations

A subset of those given in Kretz (1983), with a few additions.

Ab - Albite	Act - Actinolite	Als - Aluminum Silicate	Bt - Biotite	Cal - Calcite
Chl - Chlorite	Chr - Chromite	Cpx - Clinopyroxene	Crd - Cordierite	Di - Diopside
Dol - Dolomite	Ep - Epidote	Fsp - Feldspar	Glc - Glaucophane	Grs - Grossular
Grt - Garnet	Hbl - Hornblende	Ky - Kyanite	Lws - Lawsonite	Mag - Magnetite
Ms - Muscovite	Opx - Orthopyroxene	Pl - Plagioclase	Qtz - Quartz	Rut - Rutile
Srp - Serpentine	Sil - Sillimanite	Tlc - Talc	Tr - Tremolite	Vsv - Vesuvianite
Wo - Wollastonite				