

Igneous Rocks

Igneous - phaneritic or aphanitic

texture \	color >	light colored pink, white, gray green, lavender	medium to dark colored purple, greenish	dark gray to black	dark green to black
	minerals>	15 - 30% K- feldspar 10 - 40% quartz 0-33% Na plag. 8-15% amphibole and biotite	55-70% plagioclase feldspar 15-40% biot. & amphibole	25-70% Ca plagioclase 25-75% dark mafic minerals (pyroxene, amphibole, olivine)	0-5% plag. 65-100% olivine 0-25% pyroxene 0-10% ore minerals (magnetite, ilmenite, chromite)
composition		felsic sialic	intermediate	mafic	ultramafic
fine = aphanitic	extrusive volcanic	Rhyolite	Andesite	Basalt	Komatiite
coarse = phaneritic	intrusive plutonic	Granite	Diorite	Gabbro	Peridotite
environment		subduction zones	subduction zones	mid-ocean ridges, hot spots	mid-ocean ridges, mantle

descriptive terms used with above names:

- ... porphyritic = crystals 2 to 3 times size of matrix, and >10% of rock is crystals.
- ... porphyritic phaneritic = smaller crystals surrounds larger crystals (phenocrysts).
- ... porphyritic aphanitic = massive, structureless ground mass surrounds crystals (phenocrysts).
- ... vesicular = holes from gas bubbles escaping lava, making cinder-like or clinker-like appearance.

Igneous - glassy

texture	composition	characteristics	name
glassy	? not applicable	massive, black glass	Obsidian
glassy	? not applicable	frothy, grey glass of subparallel glass fibers with many squashed air bubbles - may float	Pumice
glassy	? not applicable	grey glass, rounded spherical structures	Perlite

Igneous - pyroclastic (fragmental)

texture	composition	characteristics	name
pyroclastic	volcanic ash, pumice fragments, some rock fragments or glass	light colored volcanic ash, sometimes with glass and pumice fragments	tuff
pyroclastic	volcanic ash, pumice fragments, some rock fragments or glass	fine grained or gritty, light in weight if not compacted; light color	ash fall tuff
pyroclastic	volcanic ash, pumice fragments, some rock fragments or glass	particles or grains are fused or welded, with flow lines	ash flow tuff
pyroclastic	round pebbles and bombs that were blown out of a volcanic vent, with ash	volcanic fragments larger than 2 centimeters (about 1 inch in diameter)	agglomerate
pyroclastic	volcanic bombs, pebbles, ash, pumice fragments, some rock fragments, or glass	sharp, angular volcanic fragments larger than 2 centimeters (1 inch diameter) mixed with others	volcanic breccia

Sedimentary Rocks

Clastic Sedimentary Rocks

particles	size	minerals	character	general size	rock name
gravel	> 2 mm	rock fragments, quartz, feldspar	pebbles	coarse	Conglomerate
sharp gravel	> 2 mm	rock fragments, quartz, feldspar	angular	coarse	Breccia
coarse gravel to fine clay	> 2 mm	any rock type	poorly sorted, nonstratified, angular	fine to coarse	Tillite
sand	2- 1/16 mm	quartz, feldspar	granular	sandy	Sandstone
silt	1/16-1/256	clay, quartz	gritty	gritty, fine grained	Siltstone
clay	<1/256 mm	clay	platy massive	smooth, very fine grained	Shale, Claystone
silt & clay	< 1/16 mm	clay, quartz	massive	smooth, very fine grained	Mudstone

Non-Clastic Sedimentary Rocks

mineral	chemical form	characteristics	rock name
calcite	CaCO ₃	fizzes in HCl acid	Limestone
calcite	CaCO ₃	medium to coarse grained, fizzes in acid	Crystalline Limestone
calcite	CaCO ₃	microcrystalline, conchoidal fracture, fizzes in acid	Micrite
calcite	CaCO ₃	aggregates of small round spheres, fizzes in acid	Oolitic Limestone
calcite	CaCO ₃	fossils and fossil fragments loosely cemented, fizzes in acid	Coquina
calcite	CaCO ₃	fossils in calcareous matrix, fizzes in acid	Fossiliferous Limestone
calcite	CaCO ₃	shells of microscopic organisms and clay, soft, fizzes in acid	Chalk
calcite	CaCO ₃	banded calcite - cave deposits, fizzes in acid	Travertine
halite	NaCl	tastes salty, fine to coarse crystalline	Salt
gypsum	CaSO ₄ ·2H ₂ O	fine to coarse crystalline, softer than fingernail, white, grainy	Gypsum
microscopic quartz chalcedony	SiO ₂	cryptocrystalline, dense, conchoidal fracture, dull, very hard (scratches glass)	Chert
dolomite	CaMg(CO ₃) ₂	fizzes in acid only if scratched first	Dolomite
carbon	C	brownish plant material - soft, porous, fibrous	Peat
carbon	C	black, vitreous, crumbly	Coal

Metamorphic Rocks

Foliated (banded) Metamorphic Rocks

characteristics	minerals	rock name
very thin layers, like blackboards very fine-grained smooth, flat surfaces, from slaty cleavage separate grains not visible dense, brittle, clinking sound	mica quartz clay (microscopic)	Slate
very, very thin, irregular layers of mica usually pale gray green satin sheen to rock rather than individual flakes fine to medium-grained uneven surfaces grains visible	mica quartz other minerals	Phyllite
thin, irregular layers of mica & platy minerals usually pale gray green medium-grained uneven surfaces grains visible	mica (muscovite, biotite) chlorite, talc; hornblende quartz, garnet; feldspar	Schist
thin, irregular layers of mica & platy minerals	bluish; mica, quartz	Blueschist
thin, irregular layers of mica & platy minerals	greenish color; mica, quartz, serpentine	Greenschist
thick bands, wavy, semi-continuous layers of white quartz, feldspar, and mica medium to coarse-grained banded, coarsely crystalline large, crystalline grains	feldspar quartz; mica or hornblende or garnet	Gneiss

Non-foliated Metamorphic Rocks

characteristics	former rock	rock name
very hard, smooth stretched and welded cobbles and pebbles = fractures through grains, not around them as in . . rougher conglomerate composed of rock fragments, quartz, chert	Conglomerate	Metaconglomerate
very hard, smooth welded sand grains - fractures through grains, not around them as in rougher sandstone composed mostly of quartz	Sandstone	Quartzite
fizzes in dilute acid medium to coarse grained sugary to crystalline composed of calcite (CaCO ₃)	Limestone	Marble
very hard, flint-like fracture smooth, very fine-grained dark colored to black very dense, compact	Claystone, Slate, Mudstone, Shale	Hornfels
black to brown dense, highly altered plant remains Carbon, opaque, noncrystalline	peat	Coal



