

Igneous Textures

Igneous textures are used by geologists in determining the mode of origin igneous rocks and are used in rock classification. There are six main types of textures; **phaneritic, aphanitic, porphyritic, glassy, pyroclastic and pegmatitic.**

Aphanitic (*a* = not, *phaner* = visible) rocks in contrast to phaneritic rocks, typically form from lava which crystallize rapidly on or near Earth's surface. Because extrusive rocks make contact with the atmosphere they cool quickly, so the minerals do not have time to form large crystals. The individual crystals in an aphanitic igneous rock are not distinguishable to the naked eye. Examples of aphanitic igneous rock include basalt, andesite and rhyolite.

Glassy or vitreous textures occur during some volcanic eruptions when the lava is quenched so rapidly that crystallization cannot occur. The result is a natural amorphous glass with few or no crystals. Examples include obsidian and pumice.

Pegmatitic texture occurs during magma cooling when some minerals may grow so large that they become massive (the size ranges from a few centimetres to several metres). This is typical of pegmatites.

Phaneritic (*phaner* = visible) textures are typical of intrusive igneous rocks, these rocks crystallized slowly below Earth's surface. As magma cools slowly the minerals have time to grow and form large crystals. The minerals in a phaneritic igneous rock are sufficiently large to see each individual crystal with the naked eye. Examples of phaneritic igneous rocks are gabbro, diorite and granite.

Porphyritic textures develop when conditions during cooling of a magma change relatively quickly. The earlier formed minerals will have formed slowly and remain as large crystals, whereas, sudden cooling causes the rapid crystallization of the remainder of the melt into a fine grained (aphanitic) matrix. The result is an aphanitic rock with some larger crystals (phenocrysts) imbedded within its matrix. Porphyritic texture also occurs when magma crystallizes below a volcano but is erupted before completing crystallization thus forcing the remaining lava to crystallize more rapidly with much smaller crystals.

Pyroclastic (*pyro* = igneous, *clastic* = fragment) textures occur when explosive eruptions blast the lava into the air resulting in fragmental, typically glassy material which fall as volcanic ash, lapilli and volcanic bombs.

The time that the magma is allowed to cool will then determine whether the rock will be pegmatite (produced by extremely slow cooling producing very large crystals), phaneritic (produced by slow cooling that produces visible crystals), aphanitic (intermediate cooling times that produce microscopic crystals), or glassy in texture (a product of rapid cooling without **crystal** formation). When magmas experience differential cooling conditions, they produce porphyritic rock, a mixture of crystal sizes and exhibit either a phaneritic or aphanitic groundmass.

Color/TEXTURE Identification Key for Igneous Rocks

