

Igneous Rocks

Magma - Found at depths of 10-200km below surface; solidifies to form **intrusive** igneous rocks

Lava - Magma that has reached the surface; solidifies to form **extrusive** igneous rocks

Igneous Rock Textures (grains)

Crystalline - Aphanitic - Fine grained (few crystals visible); relatively rapid cooling rate

Crystalline - Phaneritic - Coarse grained texture ; relatively slow rate of cooling; interlocking crystals; **pegmatites**

Porphyritic - Well formed crystals (phenocrysts); fine grained **matrix** (**groundmass**); initial stage of slow cooling, later stage of rapid cooling

Glassy Texture - Rapid cooling (quenched); conchoidal fracture; no apparent crystals (volcanic glass); felsic

Vesicular Texture - Trapped gases in cooling **vesicles**

Pyroclastic - Explosive erupted debris ;mixture of rock, glassy fragments, and ash

Pegmatites - Igneous rocks with very coarse texture

Matrix/Groundmass - finer-grained, often microscopic, crystals in which larger crystals, called phenocrysts, are embedded.

Vesicles - the small holes left behind after lava cools and the gases release

Igneous Rock Types

With cooling, magma becomes more felsic

Mafic

silica content around 50%

high concentration of Fe, Mg, Ca

high temp. of magma (1000-1200C)

major minerals: olivine, pyroxene, Ca plagioclase

Felsic

silica content: 65-77%

high concentration of Al, Na, K

lower temp. magmas (<850C)

Igneous Rocks - Intrusive vs Extrusive

Intrusive/Plutonic

form from the cooling of melted rock (magma)

cool below the earth's surface

slow cooling of magma - large crystals (minerals)

form from the cooling of melted rock (magma)

Extrusive/Volcanic

form from the cooling of melted rock (lava)

cool above the earth's surface

fast cooling of magma - small crystals, glassy, or **pyroclastic**

form from the cooling of melted rock (lava)

Pyroclastic - made of volcanic materials (eg, pumice)



By roobear

cheatography.com/roobear/

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