

### 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)



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