

Igneous Rocks

In Latin, "ignis" means FIRE!
Igneous rocks form when magma and lava from deep within Earth cool and solidify.



2 Types of Igneous Rocks

Igneous rock types are determined by where and how magma cools and solidifies.

Extrusive (volcanic rock)

Magma that **Exits** the Earth through volcanoes and cools on Earth's surface is called **lava**. Lava cools quickly to form **Extrusive** igneous rocks (**EIR**) that have fairly small mineral crystals that we usually can't see with our eyes. Geologists call this "fine-grained" texture. Lava can sometimes cool so quickly that it forms volcanic glass. Examples of EIR are: **obsidian** (glass), **rhyolite**, and **basalt**, which forms the ocean floor and is the most common EIR.

Intrusive (plutonic rock)

When magma cools slowly **Inside** the Earth, it forms **Intrusive** igneous rocks (**IIR**). It can take thousands to millions of years for IIR to cool and solidify so the minerals have a lot of time to grow into large crystals and we can see them with our eyes. Geologists call this "coarse-grained" texture. Examples of IIR are: **diorite**, **diabase**, and **granite**, which makes up nearly 60%-80% of all continental crust.



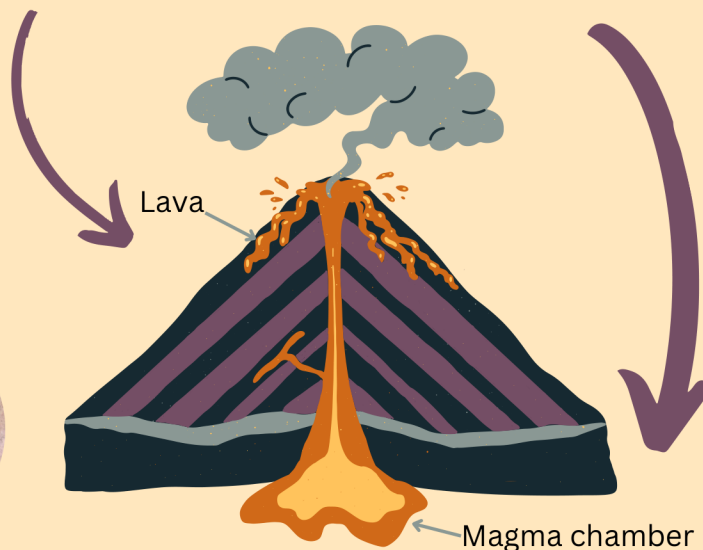
Obsidian



Rhyolite



Basalt



Diabase



Diorite



Granite

Some Like it Hot!
Magma can be as hot as
2,300 degrees Fahrenheit!

Gas bubbles that get trapped in lava as it's ejected from volcanoes create lots of holes. This type of EIR is called **vesicular**. Pumice is a great example.



Pegmatites are IIR that have excessively large mineral crystals. These large crystals form during the final stages of magma cooling from pockets of leftover, ion-rich water.

did you know?

Two completely different igneous rocks can form from the same magma, depending on how quickly the magma cools.

Granite (intrusive) and rhyolite (extrusive) can form from the same magma, giving them the same **composition**, but because they cool at different rates, they become two very different rocks.

Turf & Surf Igneous Rocks

Continental Crust vs. Ocean Crust

Igneous rocks are a major part of Earth's crust - nearly 75% of all continental rocks are igneous. But continental crust igneous rocks are very different from oceanic crust igneous rocks.



Continental crust rocks

- Less dense, lighter
- Lots of intrusive rocks like granite
- Igneous rocks contain light colored minerals like quartz and feldspar

Oceanic crust rocks:

- More dense, heavier
- Lots of extrusive rocks like basalt
- Igneous rocks contain dark colored minerals like olivine, pyroxenes, and amphiboles

Continental Crust

Oceanic Crust

