

Intrusive and Extrusive Igneous Rocks

Igneous Rocks

- The rate that magma cools determines whether an igneous rock is intrusive or extrusive.
 - The cooling rate is reflected in the rock's texture.
- Igneous rocks make up most of the rocks on Earth.
 - Most igneous rocks are buried below the surface and covered with sedimentary rock, or buried beneath the ocean water.

Study Tip

Have you ever wondered how scientists come up with so much information just by looking at a rock? Rock textures can reveal a lot about the rock's history.

Intrusive Igneous Rocks

- **Intrusive Igneous Rock:** Igneous rocks that form inside the Earth from slowly cooling magma.
- **Pluton:** Igneous intrusive rock body that has cooled in the crust.
- When magma cools within the Earth, the cooling proceeds slowly.
 - Slow cooling allows time for large crystals to form.
 - Intrusive igneous rocks have visible crystals.



California's Sierra Nevada is intrusive igneous rock exposed at Earth's surface.

Extrusive Igneous Rocks

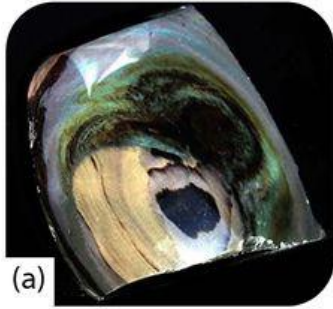
- **Extrusive Igneous Rock:** Igneous rocks that form after lava cools above the surface.
 - These rocks usually form from a volcano (called **volcanic rocks**.)
 - Cool much more rapidly than intrusive rocks.
 - There is little time for crystals to form, so extrusive igneous rocks have tiny crystals.



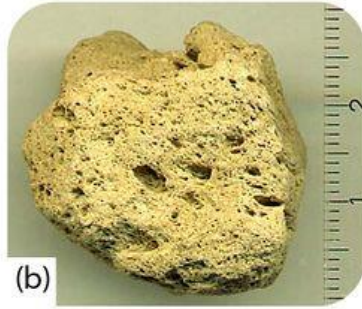
Extrusive igneous rocks have tiny crystals.

Rock Textures

- **Porphyritic:** Igneous rock texture in which visible crystals are found in a matrix of tiny crystals.
- **Vesicular:** Igneous rock texture with holes that indicate the presence of gas bubbles in the magma.



Obsidian is lava that cools so rapidly crystals do not form, creating natural glass.



Pumice contains holes where gas bubbles were trapped in the molten lava, creating vesicular texture. The holes make pumice so light that it can float on water.



The most common extrusive igneous rock is basalt because it makes up most of the seafloor, These are examples of basalt below the South Pacific Ocean.

Different cooling rate and gas content resulted in these different textures.

Concept Check

- What is the difference between intrusive and extrusive?
- What kinds of textures can rocks have?