

hydrogen chloride (HCl), hydrogen fluoride (HF), and helium (He)

Those are some of the volcanic materials. They are the pyroclastic flows and materials, igneous rocks, and volcanic gases ejected during/ after volcanic eruption.

The pyroclastic materials pertain to fragmented (clastic) rock materials formed by a volcanic explosion or ejection from a volcanic vent. Igneous rocks are formed after the eruption, they are the magma trapped beneath the surface that cools and solidifies into coarse-grained materials. Extrusive igneous rocks, on the other hand, are lavas that were ejected from the volcano and lowed out through fractures onto Earth's surface. And the volcanic gases are the gases released by the volcanoes after/during/before eruption.



#### Image sources:

Andesite: <http://www.pitt.edu/~cejones/GeolImages/2IgneousRocks/IgneousCompositions/5Andesite.html>  
Basalt: <http://www.sandatlas.org/basalt/>  
Dacite: [https://flexiblelearning.auckland.ac.nz/rocks\\_minerals/rocks/dacite.html](https://flexiblelearning.auckland.ac.nz/rocks_minerals/rocks/dacite.html)  
Diorite: <http://www.sandatlas.org/diorite/>  
Gabbro: <http://geology.com/rocks/gabbro.shtml>  
Granodiorite: <http://www.comparerocks.com/en/granodiorite-rock/model-40-0>  
Obsidian: <http://geology.com/rocks/obsidian.shtml>  
Pegmatite: <http://earthphysicsteaching.homestead.com/Pegmatite.html>  
Peridotite: <http://geology.com/rocks/peridotite.shtml>  
  
Plutonic: [http://www.123rf.com/photo\\_7233631\\_granite-a-coarse-grainde-plutonic-igneous-rock.html](http://www.123rf.com/photo_7233631_granite-a-coarse-grainde-plutonic-igneous-rock.html)  
Pyroxenite: <http://www2.fiu.edu/~seng/pages/Fig.%208.11a%20Garnet-Pyroxenite%20Hand%20Specimen.htm>  
Scoria: <http://geology.com/rocks/scoria.shtml>  
Rhyolite: <http://earthphysicsteaching.homestead.com/Rhyolite.html>  
Tuff: <http://keywordsuggest.org/gallery/673704.html>  
Volcanic gases: <http://naturalselection.0catch.com/Files/ancientice.html>  
Volcano: <http://indianapublicmedia.org/amomentofscience/underwater-volcanoes-stifled-water/>



## Volcanic Materials

*Materials associated with volcanic processes*

9-Violet

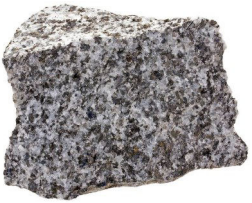
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- Andesite—fine-grained, brown, or grayish volcanic rock that is intermediate in composition between rhyolite and basalt, dominantly composed of plagioclase feldspar.



- Basalt—dark-colored mafic rock, commonly extrusive; it makes up most the world's oceanic crust.

- Dacite—extrusive igneous rock with an aphanitic to porphyritic texture and is intermediate in composition between andesite and rhyolite.



- Diorite—plutonic, crystalline intrusive igneous rock intermediate in composition between granite and gabbro; having a salt and pepper-like appearance.

- Gabbro—dark-colored, dense, coarse-grained intrusive igneous rock composed of one feldspar and dark materials excluding quartz. It is created when molten magma is trapped beneath the surface of Earth and cools



slowly into holocrystalline mass.

- Granodiorite—it is among the most abundant intrusive igneous rocks on Earth. It is coarse-grained



plutonic igneous containing quartz and plagioclase.

- Obsidian—dark (usually black), glass-like volcanic rock formed by the rapid solidification of lava without crystallization; obsidian breaks with a conchoidal fracture like glass.



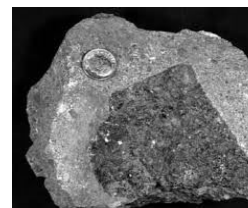
- Pegmatite—coarsely crystalline granite or other igneous rock with crystals several centimeters in length, and sometimes containing rare minerals rich in rare elements such as uranium, tungsten, beryllium, and tantalum; fluids (water, CO<sub>2</sub>, etc.) dissolved in the magma.

- Peridotite—a dense, dark-colored rock considered to be the main constituent of Earth's mantle.



- Plutonic—rock formed at considerable depth by crystallization of magma and/or by chemical alteration.

- Pyroxenite—dark gray or greenish, granular intrusive igneous rock; a dominant rock type found in intrusive



igneous rocks associated with oceanic crust.



- Scoria—volcanic rock with a light, frothy consistency due to the high volume of gas bubbles trapped in the rock as it cools as lava is ejected from a volcano, true pumice will float on water.

- Rhyolite—pale, fine-grained volcanic (extrusive igneous) rock of granitic composition, and is identified by its grayish color and sharp edges.



- Tuff—volcanic rock that contains an abundance of visible fragments of volcanic rock that have been crushed or welded together by the heat released during an explosive volcanic eruption.

Volcanic gases—volcanoes emit gases during eruptions; these gases are called

volcanic gases.

List of gases typically released into the atmosphere from volcanic systems are:

water vapor (H<sub>2</sub>O), carbon dioxide (CO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), hydrogen sulfide (H<sub>2</sub>S), hydrogen (H<sub>2</sub>), carbon monoxide (CO),

