Basalt Encyclopedia Article

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Contents

Basalt

Basalt is a **mafic** volcanic **rock** consisting primarily of **plagioclase feldspar** and pyroxene **minerals**. Common accessory minerals can include other pyroxenes, **olivine**, **quartz**, and nepheline. Basalt is the volcanic equivalent of the plutonic rock gabbro, and as such has a low silica content (48%–52%). Like other volcanic rocks, basalt cools quickly after it erupts and therefore generally contains less than 50% visible **crystals** floating in a matrix of **glass** or microscopic crystals. Pillow basalt, consisting of lobes of **lava** emplaced and solidified on top of each other, is the result of undersea eruptions such as those along divergent oceanic plate boundaries. Basalt is also known to occur on the **moon**.

Because of its low silica content, which translates into a high **melting** point and low viscosity, basaltic lava erupts at a higher **temperature** (2,012–2,192°F; 1,100–1,250°C) and flows more easily across low slopes that do more **silicic** lava types. Under some conditions, basaltic lava can flow more than 12.5 miles (20 km) from the point of eruption. The low viscosity of molten basalt also means that dissolved volcanic gasses can escape relatively easily as the **magma** travels to the surface and confining pressure is reduced. Thus, basalt eruptions tend to be quiet and effusive (as typified by Hawaiian volcanoes) as compared to the explosive eruptions often associated with more viscous and silica-rich lava (as typified by Mount St. Helens). Lava fountains can, however, reach heights of several hundred meters during basaltic eruptions.

Lava flows that solidify with a smooth or ropy surface are often described using the Hawaiian term *pahoehoe*, whereas those which solidify with a jagged or blocky surface are described by the Hawaiian term *aa*. The former is pronounced "pa-hoy-hoy" and the latter is pronounced "ah-ah."

Another characteristic of many basalt flows is the presence of polygonal columnar joints, which are understood to form by contraction of the lava as it cools. The result is a system of nearly vertical joints that form a polygonal pattern when viewed from above and break the rock into slender prismatic columns.

See Also

Divergent Plate Boundary; Extrusive Cooling; Joint and Jointing; Rate Factors in Geologic Processes; Rifting and Rift Valleys; Sea-Floor Spreading