Obsidian

Compiled by Ray Wilson
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What is Obsidian?
Obsidian is an igneous rock that forms when molten rock material cools so rapidly that atoms are unable to arrange themselves into a crystalline structure. The result is a volcanic glass with a smooth uniform texture that breaks with a conchoidal fracture.

Where Does Obsidian Form?
Obsidian is usually an extrusive rock - one that solidifies above Earth's surface. However, it can form in a variety of cooling environments:

- along the edges of a lava flow (extrusive)
- around the edges of a sill or a dike (intrusive)
- where lava contacts water (extrusive)
- where lava cools while airborne (extrusive)
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What Color is Obsidian?
Black is the most common colour of obsidian. However, it can also be brown or green. Rarely, obsidian can be blue, red, orange or yellow. The colours are thought to be caused mainly by trace elements or inclusions.
Occasionally two colours of obsidian will be swirled together in a single specimen. The most common colour combination is black and brown obsidian swirled together - that's called "mahogany obsidian
As a "glass", obsidian is chemically unstable. With the passage of time, some obsidian begins to crystallize. This process does not happen at a uniform rate throughout the rock. Instead it begins at various locations within the rock. At these locations the crystallization process forms radial clusters of white or gray cristobalite crystals within the obsidian. When cut and polished these specimens are referred to as "snowflake obsidian"
Rarely, obsidian has an iridescent or metallic "sheen" caused by light reflecting from minute inclusions of mineral crystals, rock debris or gas. These coloured specimens are known as "rainbow obsidian", "golden obsidian" or "silver obsidian", depending upon the colour of the sheen or iridescence. These specimens are very desirable for the manufacture of jewellery.

What is the Composition of Obsidian?
Most obsidians have a composition similar to rhyolite and granite. Granites and rhyolites can form from the same magma as obsidian and are often geographically associated with the obsidian.
Rarely volcanic glasses are found with a composition similar to basalt and gabbro. These glassy rocks are named "tachylite".

Occurrence of Obsidian
Obsidian is found in many locations worldwide. It is confined to areas of geologically recent volcanic activity. Obsidian older than a few million years is rare because the glassy rock is rapidly destroyed or altered by weathering, heat or other processes.

Significant deposits of obsidian are found in Argentina, Canada, Chile, Ecuador, Greece, Guatemala, Hungary, Iceland, Indonesia, Italy, Japan, Kenya, Mexico, New Zealand, Peru, Russia, United States, and many other locations.
In the United States it is not found east of the Mississippi River as there is no geologically recent volcanic activity there. In the western US it is found at many locations in Arizona, California, Idaho, Nevada, New Mexico, Oregon, Washington, and Wyoming. Most obsidian used in the jewellery trade is produced in the United States.

Uses of Obsidian as a Cutting Tool
The conchoidal fracture of obsidian causes it to break into pieces with curved surfaces. This type of fracturing can produce rock fragments with very sharp edges. These sharp fragments may have prompted the first use of obsidian by people.
The first use of obsidian by people probably occurred when a sharp piece of obsdian was used as a cutting tool. People then discovered how to skillfully break the obsidian to produce cutting tools in a variety of shapes. Obsidian was used to make knives, arrow heads, spear points, scrapers and many other weapons and tools.
Once these discoveries were made, obsidian quickly became the raw material of preference for producing almost any sharp object. The easy-to-recognize rock became one of the first targets of organized "mining". It is probably a safe bet that all natural obsidian outcrops that are known today were discovered and utilized by ancient people.

Stone Age Manufacturing and Trade
The manufacture of obsidian tools by humans dates back to the Stone Age. At some locations, tons of obsidian flakes reveal the presence of ancient "factories." Some of these sites have enough waste debris to suggest that many people laboured there for decades producing a variety of obsidian objects. Making arrowheads, spear points, knife blades and scrapers from obsidian might have been the world's first "manufacturing industry".

Obsidian in Modern Surgery
Although using a rock as a cutting tool might sound like "stone age equipment", obsidian continues to play an important role in modern surgery. Obsidian can be used to produce a cutting edge that is thinner and sharper than the best surgical steel. Today, thin blades of obsidian are placed in surgical scalpels used for some of the most precise surgery. In controlled studies, the performance of obsidian blades was equal to or superior to the performance of surgical steel.

Uses of Obsidian in Jewellery
Obsidian is a popular jewellery stone. It is often cut into beads and cabochons or used to manufacture tumbled stones. Opaque obsidian is sometimes faceted and polished into highly reflective beads. Some transparent specimens are faceted to produce interesting gems.
The use of obsidian in jewellery can be limited by its durability. It has a hardness of about 5.5 which makes it easy to scratch. It also lacks toughness and is easily broken or chipped upon impact. These durability concerns make obsidian an inappropriate stone for rings and bracelets. It is best suited for use in low-impact pieces such as earrings, brooches and pendants.

Obsidian is also used in making opal doublets and opal triplets. Thin slices or chips of opal are glued to a thin slice of obsidian to make a composite stone. The black obsidian provides an inexpensive and colour-contrasting background that makes opal's colourful fire much more obvious. It also adds mass and stability to the opal that facilitates cutting it into a gem.

Working with Obsidian

Obsidian is a natural glass and may have razor-sharp edges that can easily cut skin and flesh. Handle with care. Do not grind dry since long-term exposure to finely ground powder may lead to silicosis.