



Arizona Rocks 6

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I wanted to add more about obsidian, briefly covered in Arizona Rocks 2. Obsidian forms when silica rich magma cools very fast, so fast those crystals can't form. This could happen if the volcanic eruption is under water or ice. Millions of years ago there was more obsidian in Arizona, but it is unstable and over time it changes from glass to form perlite. A technique for dating artifacts made from obsidian uses this hydration rate.

The best-known Arizona occurrence of obsidian is the Apache tears location near Superior. The obsidian formed from a volcanic eruption there about 15 million years ago. Since then, the hydration process has changed most of the obsidian to perlite and only small round remnants of the obsidian are left, the Apache tears. The perlite is being mined there for a light weight aggregate material.

A website, Sources of Archaeological Obsidian in the Greater American Southwest (www.swxrflab.net/swobsrscs.htm) has an interactive map of the obsidian locations in the southwest. The map has nine locations in Arizona and a couple on the New Mexico - Arizona border, and many others in the surrounding states. There are also a couple of additional Arizona locations in the text. You click on the location on the map and a detailed description of each of the locations comes up. There is township, range, and section data given for each locality, a fairly detailed description of what was found there and in some cases photographs and maps. There is a lot of chemical data for the obsidian as the goal was to identify the sources of obsidian used by prehistoric people. The obsidian from each of the various localities has a unique chemical composition. For example 220 samples of obsidian were analyzed from Pueblo Grande in Phoenix.

Four were from the Sand Tanks location, 67 were from the Saucedo Mountains locality and so forth. Obsidian was important to the native people and collected and exchanged all over the southwest.



Obsidian, Apache tears from Superior, AZ



Obsidian in perlite from Superior, AZ (the whole specimen was originally obsidian, but has changed to perlite by hydration).

Pure obsidian is usually dark in appearance, though the color varies depending on the presence of impurities. Iron and magnesium typically give the obsidian a dark brown to black color. Very few samples are nearly colorless. In some stones, the inclusion of small, white, radially clustered crystals of cristobalite in the black glass produce a blotchy or snowflake pattern (snowflake obsidian). It may contain patterns of gas bubbles remaining from the lava flow, aligned along layers created as the molten rock was flowing before being cooled. These bubbles can produce interesting effects such as a golden sheen (sheen obsidian) or an iridescent, rainbow-like sheen (rainbow obsidian).