

## Learning Series: Birthstones – October

# Opal – The October Birthstone

### Background

Most opal is 50-65 million years old, dating back to the Cretaceous period when dinosaurs roamed the earth. The word *opal* is adapted from the Roman term *opalus*, but the origin of this word is a matter of debate. Most modern references suggest it is adapted from the Sanskrit word *úpala*. One legendary explanation for this gemstone's origin is that it fell from heaven in a flash of fiery lightning.

In reality, opal is an amorphous form of silica that has the same chemical formula as quartz with the addition of 5 to 10 percent water. A mineraloid form, rather than a mineral, it is found near the earth's surface in areas where ancient geothermal hot springs once existed. As the hot springs dried up, layers of the silica, combined with water, were deposited into the cracks and cavities of the bedrock, forming opal. Structurally it consists of tiny spheres with water filling the gaps. These spheres in most opals are irregular in size and inconsistent in concentration. If they are uniform in size and shape, they will diffract light.

There are two distinct types of opal: common and precious. The way the silica particles form determines which type. Common opal (also known as potch) is opaque, rarely translucent and lacks a *play of light*, color or luster. In precious opal, silica particles are packed in regular rows and layers. Moving the stone causes light to diffract, or split, as it grazes the opal surface. This light diffusion shows flashes which are referred to as "fire". Opal's fire was long thought to be the result of iridescence, however, with the advent of scanning electron microscopes, we now know that it is a result of diffraction.

Opals are famous for their "play of colors". The stones flash the colors of the rainbow when moved, due to the interference of light on small cracks and other internal structural differences, but opals also have characteristic colors due to impurities within the stone. The milky, or pearly, appearance of some opals is due to inclusions of tiny gas bubbles. Yellows and reds betray the presence of iron oxides. The spectacular black opals that sometimes flash green, blue and red get their color from magnesium oxides and organic carbon within the stone. Perhaps the most valuable opal pattern is the "harlequin," large angular patches of red, yellow and green resembling the checks on a clown's costume.

Opal grows by filling in cavities, regardless of their shape. Hence, we have many pseudomorphs, i.e., materials with shapes that are unrelated to the chemical content. The most common are opalized wood and seashells. There are many terms you'll hear in association with opal. Among them are: black, semiblack or gray, light, white, crystal, doublet, triplet, black crystal, fire, boulder and matrix. Unlike precious opal, various forms of common opal are widely mined for use as abrasives, insulation media, fillers, and ceramic ingredients.

### Composition, Chemical Formula, Colors, Types and Sources

**Composition** – hydrous silicate dioxide

**Chemical Formula** –  $\text{SiO}_2 + n\text{H}_2\text{O}$

**Colors** – opals are classified according to their body color and the play of color they have. Precious opals interact with light to create flashes of the colors blue, yellow, green, red and orange, plus aqua and purple, occasionally. Not every opals show these colors. The most common is blue flashes, then blue occurring with green, then blue occurring with yellow and green, then those plus orange, with red flashes the most uncommon. The most popular opals are orange and red opals (also known as fire opals). Opal which displays red can show other colors too. The body color of the stone can be milky (white opal), clear (water opal), gray, brown or even black.

**Types** – four basic types of precious opals include: 1) white (or light), 2) girasols (or fire), 3) water, and 4) black.

**Sources** – Australia produces around 97% of the world's opal. Other sources include Brazil, Czechoslovakia, England, Ethiopia, Guatemala, Honduras, Hungary, Indonesia, Ireland, Japan, Mexico, Nevada, Nicaragua, Slovakia, Turkey, and the United States (Idaho and Nevada).

**Note:** An accepted alternate birthstone for October is Pink Tourmaline.

## **Identification**

**Streak** – white

**Hardness** – 5.5 to 6

**Crystal system** – does not apply because opal is amorphous.

**Transparency** – transparent to translucent

**Specific gravity** – 2 to 2.5

**Luster** – vitreous to pearly

**Cleavage** – none

**Fracture** – conchoidal

**Habits** – include massive, cavity-fillings such as in fractures and geodes, nodular, reniform or as a replacement of other minerals and wood.

**Other Characteristics** – most specimens will fluoresce white or pale green, some phosphoresce and all specimens can be very sensitive to impacts and low temperatures.

**Associated rocks** – chert, volcanic rocks and many others.

**Best Field Indicators** – color play and opalescence, low density, fluorescence, fracture filling tendency and lack of cleavage or crystal faces.

## **Folklore, Legend and Healing Properties**

During the mid-14th century when the Black Death was sweeping across Europe, a change in color intensity or luster of an opal was believed to indicate whether its wearer was ill or in good health.

Opals were once said to confer the power of invisibility if wrapped in a fresh bay leaf and held in the hand.

Scandinavian women wear Opal hair bands to ward off the onset of gray in their hair.

A legend of the Australian Aborigines says the creator came down to Earth on a rainbow to bring his message of peace to the world. At the spot where his foot touched the ground, the stones became alive and started sparkling in all the colors of the rainbow.

Opals are said to increase mental capacities such as creative imagination and to protect one from the evil eye. Ground up, they've been used as a magic potion to heal the body, ward off bad dreams, and enhance energy. Black, white and fire opals are apparently used to treat different ailments in the body.

## **Trivia**

Opal is the anniversary gemstone for the 14th and 18th years of marriage.

The world's largest and most valuable gem opal, the "Olympic Australis", was found in August 1956 at an opal field in Coober Pedy. It weighs 17,000 carats, is 11 inches long, 4<sup>3</sup>/<sub>4</sub> inches high and 4<sup>1</sup>/<sub>2</sub> inches wide.

The Halley's Comet Opal is the largest uncut black opal in the world. It weighs 1,982.5 carats and is about the size of a man's fist.

In late 2008, NASA announced that it had discovered opal deposits on Mars.

The four-faced clock on top of the information booth in New York's Grand Central station is made from opal, and both Sotheby's and Christie's have estimated the value to be between \$10 million and \$20 million.

### **Sources:**

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