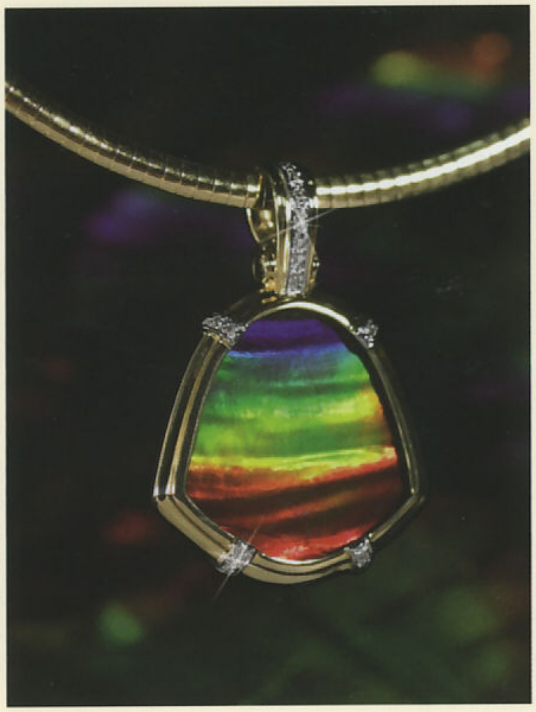
Exotic Gems

Volume 1



How to Identify and Buy

Tanzanite, Ammolite, Rhodochrosite, Zultanite, Sunstone, Moonstone & Other Feldspars

Includes Metaphysical Lore
And Gem Evaluation & Care

Renée Newman GG

6

Zultanite (Color-Change Diaspore)

If you're looking for a truly exotic gem, consider zultanite. It's mined in a remote mountain area of western Turkey at an elevation of over 4000 feet (1219 meters). The nearest major city, Izmir, is three hours away. Zultanite's colors are strikingly different from other gems. It can change from pastel golden green in daylight or fluorescent light to a sparkling light gold under traditional light bulbs and to a muted purplish pink under candlelight or low wattage lighting. The larger the zultanite, the easier it is to see the multiple colors, which are natural—not the result of treatment.

Fig. 6.4 Left: Zultanite color in incandescent low-wattage light or candlelight; right: zultanite in daylight. *Gemstones and photo from Zultanite Gems LLC.*

Zultanite is a variety of the mineral diaspore, and the name was introduced in 2005. That year Murat Akgun, a Turkish jeweler, acquired the rights to mine the world's only commercial source of color-change diaspore. In order to distinguish it from the other non-gem quality diaspore, Akgun then gave it the name zultanite in honor of the Sultans who once ruled the Ottoman (Turkish) Empire.

Similar to the way that tanzanite was established as the gem blue variety of the mineral zoisite, zultanite is a variety of diaspore. However, appraisers price zultanite in the same way they price brand-name stones because zultanite is marketed by a single company—Zultanite Gems LLC. Akgun would like zultanite to be officially considered a general variety name in order to distinguish it from diaspore of other occurrences, which is not of gem quality.

Fig. 2.49 Color change in zultanite—pastel yellowish green in daylight to pale pink in low wattage incandescent light and candlelight. *Zultanites and photo from Zultanite Gems LLC.*

- **Color change:** sometimes called the alexandrite effect, it's a change of color that occurs when the light source is altered. For example, zultanite can change from pastel yellowish green in daylight equivalent lighting to a light gold under traditional light bulbs and to a muted purplish pink under candlelight or low wattage light bulbs. (Fig. 2.49)
- **Labradorescence:** a flash of color(s) in labradorite or spectrolite seen at certain viewing angles. It's caused by the interference of light through the layered structure of the labradorite. (Figs. 2.44 & 2.46)
- **Iridescence**: a play of lustrous changing colors caused by the interference of light. The GIA (Gemological Institute of America) uses it to refer to the color phenomena of gems such as ammolite, fire agate, and rainbow agate (figs. 2.43, 2.44, 2.46). The colors must have a shifting quality rather than a static, fixed position like you'll see in banded agate or watermelon tourmaline (color zoning).

  "Iridescence" has different meanings to different trade members. Some feel that a gem must show all colors of the rainbow to be classified as iridescent; others require at least three colors, and still others would classify a solid red ammolite as iridescent as long as the quality of the color changes when the stone is moved. Many people extend the meaning of "iridescence" to describe the phenomena of gems such as opals and labradorite.

  In general, the sharper and more obvious the phenomena, the more valuable the stone, all other factors being equal. However, don't expect the phenomena of natural stones to be as distinct as those on man-made stones. For example, the sharper and more noticeable a star, the more valuable the stone, unless it's a synthetic star. Natural stars are not as perfect as those on man-made stones.

Fig. 6.1 Entrance to zultanite mine in Turkey. *Photo from Zultanite Gems LLC.*

Fig. 6.2 Close-up view of zultanite embedded in rock. *Photo from Zultanite Gems LLC.*

Fig. 6.3 Zultanite crystal. *Photo from Zultanite Gems, LLC.*

Fig. 6.5 Briolette zultanites cut by Rudi Wobito. *Earrings and photo from Zultanite Gems, LLC.*

A Word from a Master Cutter

by Rudi Wobito

In general, most zultanite rough is heavily included and not good enough to be cut into faceted gems. While the return of rough on a gem mineral is generally between 20 to 35%, zultanite yield runs less than 3%. The cutting process for this gem is difficult. Zultanite favors long diamond-type facets, as well as bowtie and radiant cuts.

When making a preform, the stone must be ground parallel to the cleavage plane to prevent it from falling apart. The grinding is a slow and meticulous process. When the preform is finished, the facets are cut and polished.

Accentuating the gemstone's inherent colors tests the skill of even master cutters who must be careful to correctly orient each crystal to maximize its color-changing properties.

Fig. 6.6 Zultanite ring. *Photo from Zultanite Gems, LLC.*

Fig. 6.7 Zultanite ring. *Photo from Zultanite Gems, LLC.*

Zultanite Gems LLC is a strong proponent of using environmentally safe mining techniques and fair trade practices. In an October 2009 article about zultanite mining, *Rapaport* colored-stone editor Diana Jarrett says "What is noteworthy at these mines is the extent to which the system provides support for the workers. The miners eat three daily meals prepared on-site by the resident cook, courtesy of the company. They also have free transportation to and from the mines if they live off-site, but they can live free in the base camp's company-provided housing if they prefer." This is in addition to their salary and bonuses.

The mineral diaspore was discovered in Mramorskoi, Kossoibrod, Ural Mountains, Russia in 1801. However, according to Robert Webster's *Gems*, it wasn't until 1977 in Turkey that the transparent gem variety was found.

The name "diaspore," comes from the Greek word *diaspeirein,* meaning to disperse or scatter. Even though commercial quantities of gem grade diaspore are only mined in Turkey, diaspore crystals have also been found in Hungary, Chester, Massachusetts, Pennsylvania's Chester County and at least a dozen other localities around the world.

I first saw what was to become known as zultanite mounted in jewelry in the 1990's at a jewelry store in New Orleans. I was immediately attracted to its distinctive appearance and color change effect and wondered why it was not more readily available. I've since learned that it's a rare gemstone that was primarily known as a collector's gem when it was introduced to the market in 1994 by a company named Eur-Asia (*Colored Stone*, March / April 2006). After the company stopped promoting the material, Murat Akgun of Zultanite Gems, LLC met one of the former partners of Eur-Asia and became interested in acquiring the rights from the Turkish government to mine the deposit; as mentioned above, he achieved this in 2005. The first cut stones from the new mining venture appeared at the Tucson gem show in 2006.

As with any gem material, zultanite comes in a range of qualities. The distinctness of the color change, the quality of the cut, color and size are key price factors. Designer cuts typically sell at a premium. The more saturated the color, the higher the price. As for clarity, now that Zultanite Gems, LLC is the sole source of newly mined transparent zultanite, the company has chosen to market only eye-clean stones in order to enhance its image as a high-quality gemstone.

Some of the transparent diaspore on the market is from rough that was mined before 2005 and is being called diaspore or color-change diaspore. One example is the 16.22-carat specimen in figure 6.36 from the I. M. Chait Gallery / Auctioneers in Beverly Hills. Stones of this size and high quality are extremely rare.

How a Master Cutter Cuts a Zultanite

Photos and Captions by Stephen Kotlowski of Uniquely K Custom Gems

The oval zultanite won third place at the AGTA Spectrum Awards 2009 in the "Phenomenal Gemstones" category.

Fig. 6.8 New zultanite crystals. The weight of the crystals is 1,306 cts, 714 cts, and 280 cts.

Fig. 6.9 Semi-polished crystals to view interior.

Fig. 6.10 1306-carat crystal semi polished to view interior.

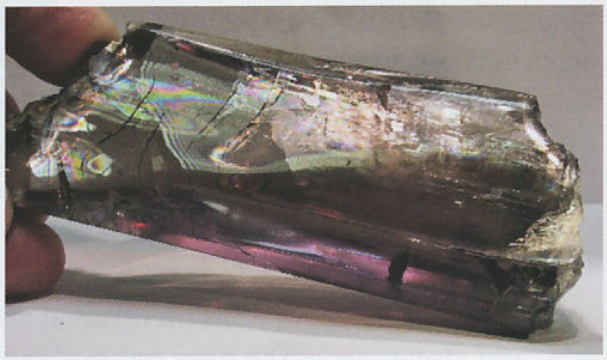


Fig. 6.11 1306-carat crystal showing cleavage problems on one side.

Fig. 6.12 Side view of separated cleavage on large crystal.

Fig. 6.13 Cleavage separated from main section.

How a Master Cutter Cuts a Zultanite (continued)

Photos and Captions by Stephen Kotlowski

Fig. 6.14 Saw cut outlined to remove bad parts.

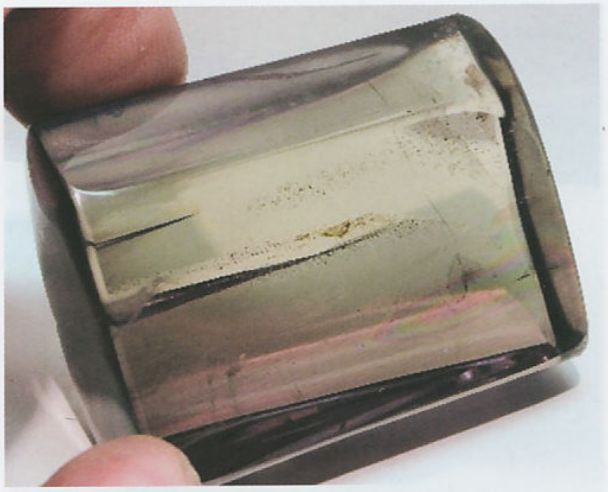


Fig. 6.15 Semi-polished removed section.

Fig. 6.16 Cleavage parting in interior at big end.

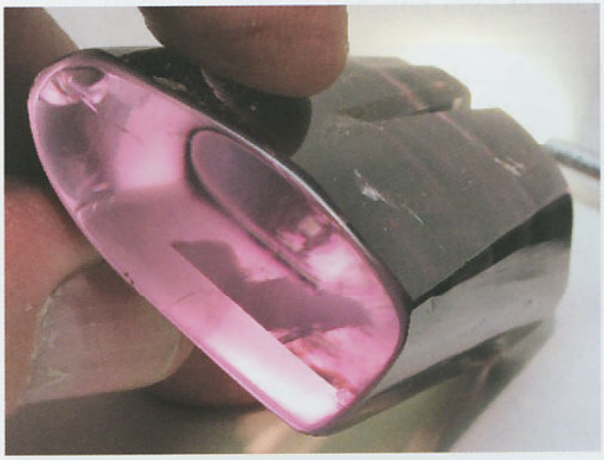


Fig. 6.17 Cleavage parting in interior at small end.

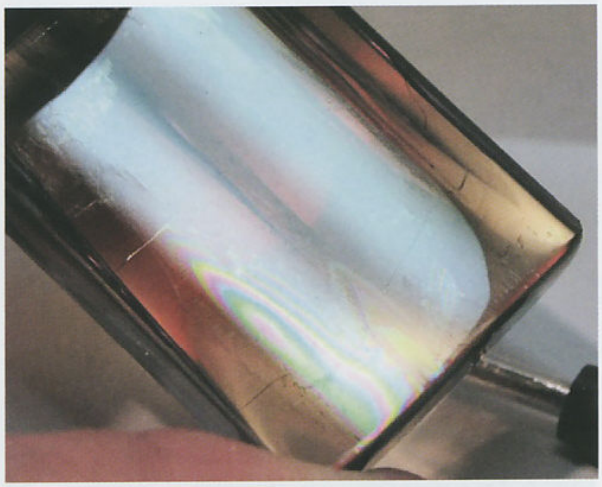


Fig. 6.18 Cleavage partings showing through main section.

Fig. 6.19 Outlined section for sawing. Center section to become 375-ct pear shape preform. Bottom section to become 53.95-ct stone.

How a Master Cutter Cuts a Zultanite (continued)

Photos and Captions by Stephen Kotlowski

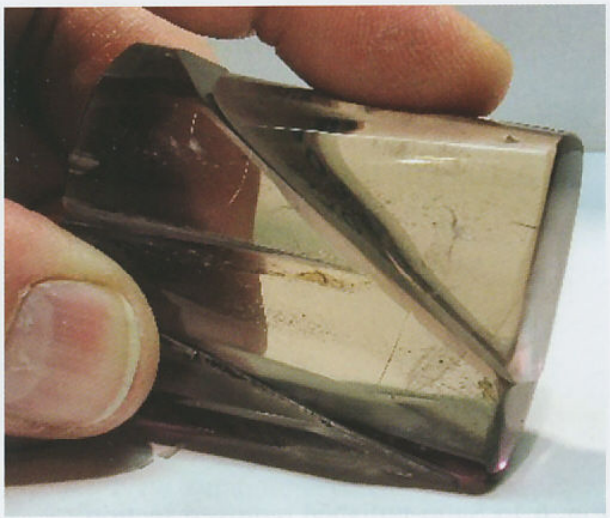


Fig. 6.20 Sawn-out section of main block from 1306 ct semi-polished crystal.

Fig. 6.21 Carat weight of sawn-out sections: 375 cts, 120 cts, 56.60 cts, 25 cts, 23.50 cts.

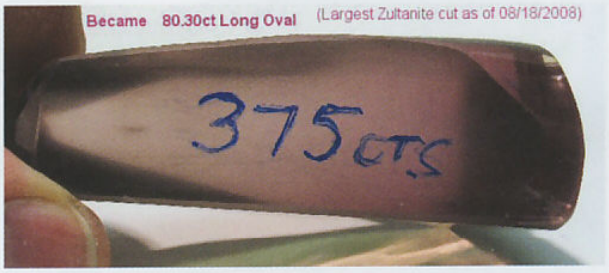


Fig. 6.22 375-ct preform from 1306-ct rough will become an 80.30-ct oval—the largest cut eye-clean zultanite as of November 2009.

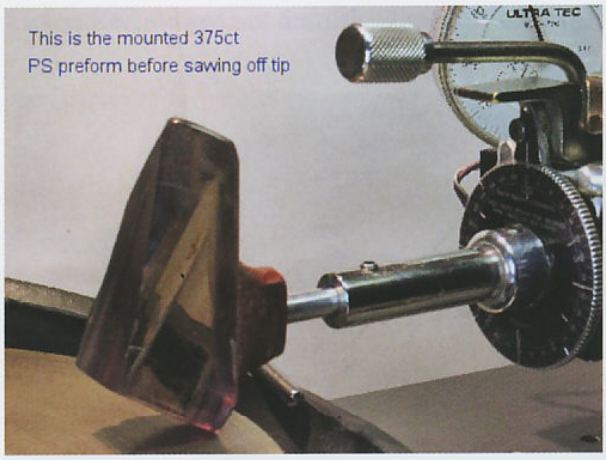


Fig. 6.23 Starting to facet 375-ct section. This is the mounted 375-ct pear shape preform before sawing off tip.

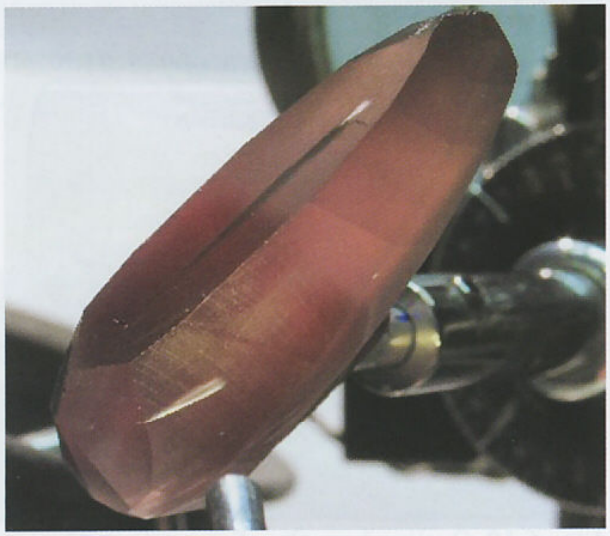


Fig. 6.24 375-ct pear shape showing problems that will need to be removed.

Fig. 6.25 Long oval showing inclusions to be removed.

How a Master Cutter Cuts a Zultanite (continued)

Photos and Captions by Stephen Kotlowski

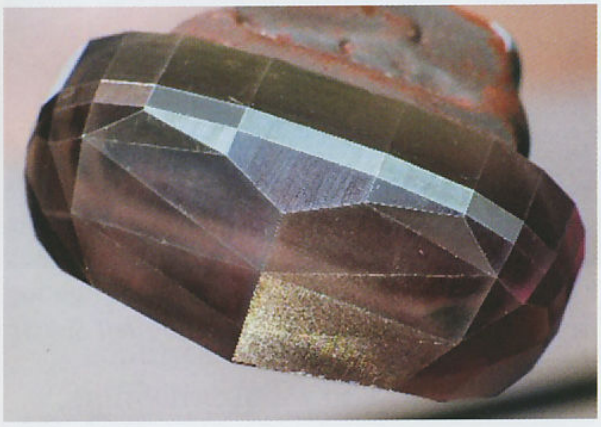


Fig. 6.26 Fully faceted pavilion on long oval.

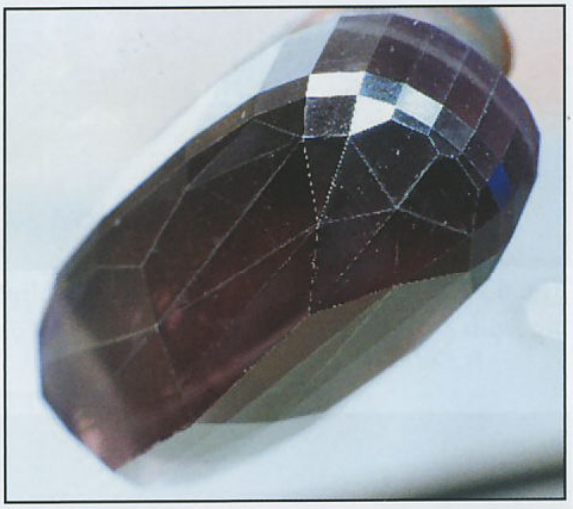


Fig. 6.27 Fully faceted pavilion on long oval 3_4 view.

Fig. 6.28 Polished fully faceted pavilion on long oval.

Fig. 6.29 Completed faceting of crown on oval.

Fig. 6.30 Completed oval zultanite in daylight 80.30 cts. *Photo by Robert and Orasa Weldon.*

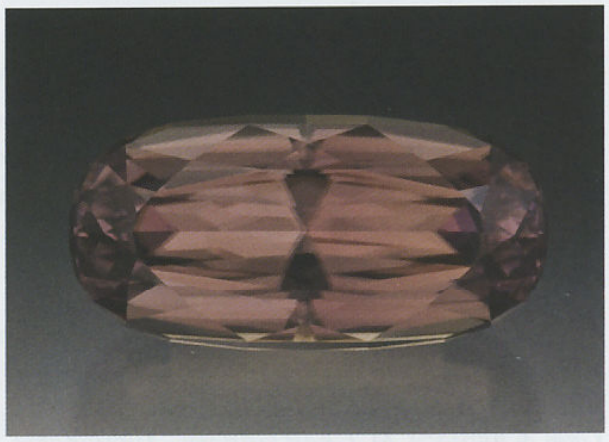


Fig. 6.31 Completed oval zultanite in incandescent light. *Photo by Robert and Orasa Weldon.*

Fig. 6.32 Zultanites in daylight equivalent lighting from Zultanite Gems LLC. *Photo: Jeff Scovil.*

Fig. 6.33 Zultanites under incandescent lighting from Zultanite Gems LLC. *Photo by Jeff Scovil.*

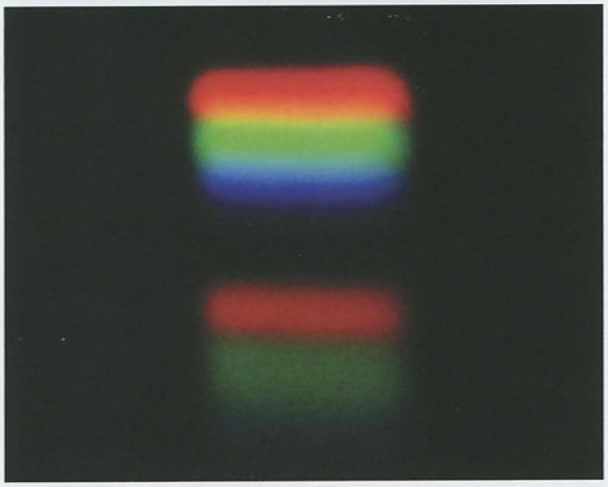


Fig. 6.34 Doubled images seen when the table facet of a zultanite is held close to the eye while viewing a light source. *"Visual Optics" identification method and photo by Alan Hodgkinson.*

Fig. 6.35 Flashes of color and multiple colors may be seen in zultanites when moved or viewed from different angles. *Photo: Alan Hodgkinson.*

Fig. 6.36 A 16.22-carat color-change diaspore. *Gem & photo: I. M. Chait Gallery / Auctioneers.*

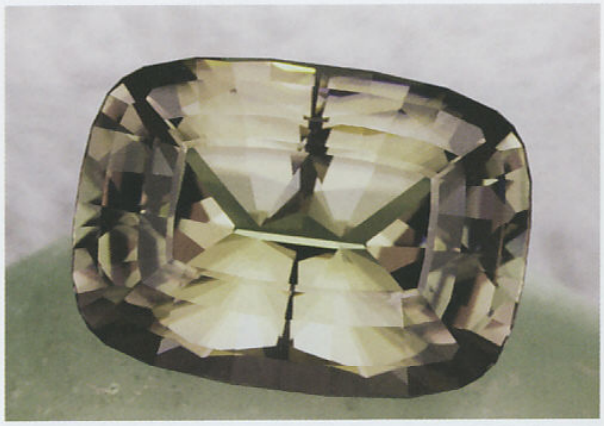


Fig. 6.37 A 41.12 ct zultanite named "Sultan's Cushion." Stone from Zultanite Gems, LLC; photo by John Parrish.

Gemological Properties of Zultanite (Color-Change Diaspore)

Chemically, diaspore is AlO(OH) (aluminum oxide hydroxide) and may contain traces of manganese, chromium, iron, and/or titanium. The Winter 1994 issue *of Gems & Gemology* suggests that chromium may be responsible for the color-change behavior, as it is in alexandrite.

Zultanite might be confused with peridot because of the strong doubling of the back facets. However, zultanite's daylight color is a much lighter green, and it has a higher refractive index: 1.70–1.75. In addition, it has different pleochroic colors and exhibits a color change. Zultanite's hardness is similar to that of tanzanite: 6.5–7.0.

A man made color-change glass stone called Zandrite™ is occasionally confused with zultanite and alexandrite. It's singly refractive and has a refractive index of 1.532 and a specific gravity of 1.64.

A summary of the physical and optical properties of zultanite is found in the following table.

RI: 1.700–1.750	**Birefringence**: 0.048	**SG**: 3.3–3.5; Turkish material: 3.39
Hardness: 6.5–7	**Dispersion**: 0.022	**Treatments**: Normally none
Luster: Vitreous	**Crystal System:** Orthorhombic, **Optic Character:** Biaxial +	
Cleavage: Perfect in one direction making it a challenge to cut; **Fracture**: Conchoidal		
Pleochroism: Moderate to strong— violet-blue/pale yellowish green/rose to dark red.		
Spectrum: Not diagnostic: Turkish stones show broad bands at 4710, 4630, 4540 and a sharp line at 7010, similar in position to those of green sapphire		
UV Fluorescence: Inert to long-wave radiation; weak yellow fluorescence to short-wave UV. Turkish stones fluoresce green in SW.		
Stability to heat: May crack or cleave. Avoid steamers and the heat of a jeweler's torch.		
Care tips: Avoid ultrasonics, steamers, heat, sudden changes of temperature, acids and rough handling. Warm, soapy water is safe.		

Most of the technical data in the above table was based on *Gems* by Robert Webster, *Color Encyclopedia of Gemstones* (1987) by Joel Arem, www.mindat.org, and the Winter 1994 issue of *Gems & Gemology, pp 273-4. The 0.022 dispersion measure is from personal communication with Alan Hodgkinson.*

As the table indicates, be just as careful with zultanite as you are with the other gems discussed in this book. Take off rings and bracelets when doing housework, gardening and engaging in sports activities. With proper care, your zultanites will have lasting beauty.