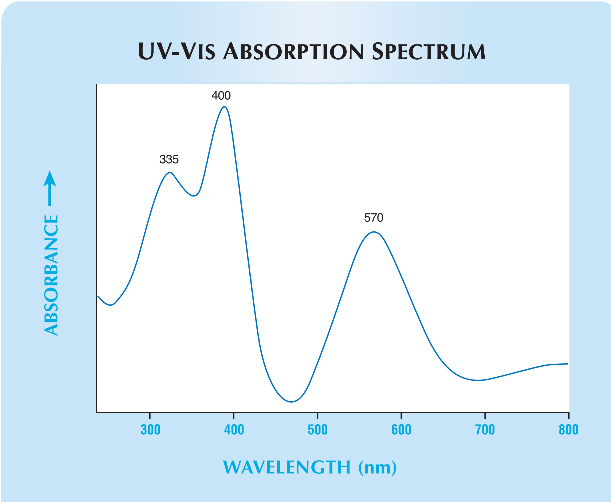

Figure 13. The UV-Vis absorption spectrum of the color-change fluorite shows absorption bands centered at ~400 and ~570 nm. The transmission windows in the blue-green and red regions, and a local absorption maximum in the yellow region, are consistent with that of other true color-change stones.

The R.I. (1.430) and hydrostatic S.G. (3.18) were consistent with fluorite, including an irradiated color-change fluorite reported in the Summer 2002 Gem News International section (p. 186). Magnification revealed prominent wavy color banding that was related to fine planar zones of minute pinpoint inclusions. Damage to one point of the stone (again, see figure 12) revealed the distinct cleavage present in fluorite, as did some minor surface-reaching cleavage fractures.

With a handheld spectroscope, the fluorite showed an absorption band in the yellow-orange area of the spectrum and some absorption in the violet region. This could be seen more clearly in the UV-Vis spectrum (figure 13), with absorption bands centered at ~400 and ~570 nm. Consistent with other true color-change stones, the spectrum showed transmission windows in the blue-green and red regions and a local absorption maximum in the yellow region. As expected given the spectral features, the fluorite appeared very strong red through the Chelsea color filter. Although fluorite commonly fluoresces to UV radiation, this sample was inert, as was the irradiated color-change fluorite in the Summer 2002 GNI entry. However, the inert behavior of the present color-change fluorite does not necessarily indicate that it has been irradiated, since fluorite does not always show fluorescence.

The Summer 2002 GNI entry mentioned that no fade testing was performed on the irradiated color-change fluorite described. Similarly, we did not perform fade testing on the present fluorite. Although fade testing could reveal the presence of unstable color centers that were created by exposure to radiation, it could not confirm whether this exposure occurred naturally or artificially.

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Herderite from Pakistan. Herderite–hydroxyl-herderite [$CaBePO_4(F,OH)$] has been known from granitic pegmatites in Pakistan's Northern Areas for several years. Well-formed crystal specimens of herderite from this region are sought after by mineral collectors, but the material is rarely transparent enough to be faceted. In June 2006, Farooq Hashmi (Intimate Gems, Jamaica, New York) loaned GIA some rough and cut examples of "lime" green herderite that he obtained during the past two years in the mineral market of Peshawar, Pakistan. The material was represented as coming from the Shigar Valley, as well as from the more general localities of Skardu and Gilgit, which are common gem and mineral trading areas in northern Pakistan. The most likely source of the gem herderite is the Kandahar mine, Baha, Braldu Valley (about 35 km north of Skardu), according to Dudley Blauwet (Dudley Blauwet Gems, Louisville, Colorado), who has extensive experience traveling to the gem and mineral localities of northern Pakistan. Mr. Blauwet also indicated that he recently obtained cuttable herderite from two additional locations in the Shigar Valley area: near Chhappu in the Braldu Valley, and at a new mine near Doko in the Basha Valley.

Figure 14. These cut stones (2.06 and 5.52 ct) and crystal (14 g) of herderite are from northern Pakistan. Courtesy of Farooq Hashmi; photo by C. D. Mengason.

The two faceted herderites (2.06 and 5.52 ct; figure 14) were characterized by one of us (EPQ) for this report; the properties of the smaller stone are listed first, as appropriate: color—light green and medium-light green; pleochroism—both stones showed weak-to-moderate green and yellowish green (a third color was not observed); diaphaneity—transparent; R.I.—1.587–1.616 and

1.586–1.616; birefringence—0.029 and 0.030; hydrostatic S.G.—3.02 and 3.04; Chelsea filter reaction—none; fluorescence—weak-to-moderate blue and moderate-to-strong blue to long-wave UV radiation, weak violet and moderate violet to short-wave UV radiation; and a weak 585 nm absorption feature was observed with the desk-model spectroscope for both stones. Microscopic examination of both samples revealed moderate-to-strong doubling and numerous partially healed fractures with negative crystals, some of which contained both a liquid and a gas. EDXRF spectroscopy of the larger stone showed major amounts of Ca, P, and Sr, and minor Cr, Mn, Y, and Pb. The instrument cannot detect Be or F.

The properties of these Pakistani samples are comparable to those previously reported for herderite (e.g., Spring 2004 Lab Notes, pp. 61–62), although their refractive indices were somewhat higher. Based on the work of P. B. Leavens et al. ("Compositional and refractive index variations of the herderite–hydroxyl-herderite series," *American Mineralogist*, Vol. 63, No. 9–10, 1978, pp. 913–917), the R.I. values of the Pakistani herderite indicate that the composition is near the midpoint between the OH- and F-dominant end-members. Such a composition was also inferred from an R.I. value (n_β = 1.610) of a herderite from the Shigar Valley area by A. H. Kazmi et al. ("Gem pegmatites of the Shingus-Dusso area, Gilgit, Pakistan," *Mineralogical Record*, Vol. 16, No. 5, 1985, pp. 393–411). Although we have referred to the material as *herderite* in this entry for simplicity, the correct mineralogical designation is herderite–hydroxyl-herderite.

BML

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Jeremejevite from Myanmar and Sri Lanka. Jeremejevite is a rare gem that is mainly known from Namibia (Cape Cross and the Erongo Mountains) and the Pamir Mountains of Tajikistan (see K. Scarratt et al., "Jeremejevite: A gemological update," Fall 2001 *Gems & Gemology*, pp. 206–211; Fall 2002 GNI, pp. 264–265). More recently, a near-colorless 7.88 ct jeremejevite was documented from an additional locality, Madagascar (Winter 2004 GNI, pp. 340–341). With only a few sources of this rare gem known for many years, it is surprising that two more localities for gem-quality jeremejevite have just been reported: Myanmar (Burma) and Sri Lanka (figure 15).

Figure 15. These jeremejevites are from Sri Lanka (left, 5.26 ct) and Myanmar (right, 1.34 ct). Courtesy of Dudley Blauwet; photo by C. D. Mengason.

The Burmese jeremejevite was recently documented by H. Kyi and K. Thu ("A new deposit of jeremejevite from the Mogok Stone Tract, Myanmar," *Australian Gemmologist*, Vol. 22, No. 9, 2006, pp. 402–405), who pictured a 4.35 ct light yellow faceted stone and indicated that gemmy crystals can reach 4.0 × 1.3 cm. They reported that the jeremejevite ranges from colorless to light yellow and was mined from alluvial deposits and associated pegmatite dikes. Their samples came from a pegmatite on Loi-Sau mountain, which is located 19 km northeast of Mogok, near Pan-tara village; some pink tourmaline and quartz crystals were also produced from this mine (K. Thu, pers. comm., 2006). According to Bill Larson (Pala International, Fallbrook, California), who regularly travels to Myanmar, most of the jeremejevite was produced 1–2½ years ago. Well-formed crystals have been found, with terminations that show varying development of pyramidal and basal forms (figure 16).

Figure 16. Jeremejevite crystals from Myanmar are prismatic and commonly of gem quality. The crystal on the left is 21.6 × 5.4 mm. Courtesy of Bill Larson; photo by Wimon Manorotkul.