Figure 31. These large faceted samples, submitted as amethyst (even though dark green), aquamarine, and citrine, proved to consist of synthetic quartz. The largest weighs 162 ct. Photo by Evelyne Murer, © Gübelin Gem Lab.

TREATMENTS

Sugar-acid treatment of opal from Wollo, Ethiopia. Several gemological laboratories have recently identified "black" opals from Ethiopia's Wollo Province as smoke treated (e.g., www.stonegrouplabs.com/SmokeTreatmentinWolloOpal.pdf). The effectiveness of the smoke treatment is probably related to the hydrophane character that is commonly shown by Wollo opal. The porosity allows the smoke to penetrate the opal structure deep enough to create a dark bodycolor. Accordingly, one of us (FM) investigated the possibility of treating Wollo opal using a sugar-acid process similar to that used for matrix opal from Andamooka, Australia.

For this experiment, we chose 12 mostly low-grade

Figure 32. This FTIR spectrum of the synthetic citrine is representative of all the synthetic quartz samples. It shows a cutoff at ~3600 cm^{-1} and a small band at 5196 cm^{-1}.

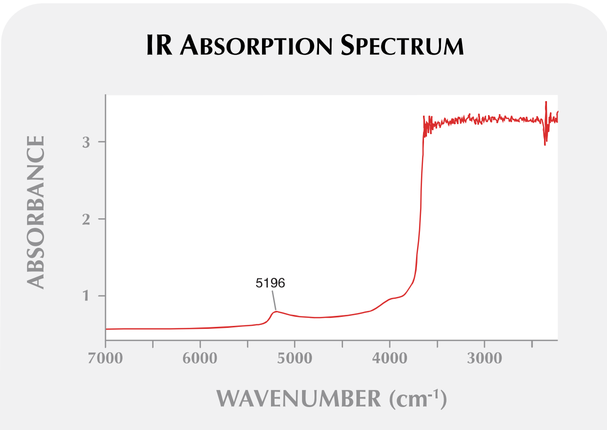

Figure 33. A close-up view of the dark green sample shows a seed plate (defined by arrows) and numerous fine particles. Photomicrograph by Lore Kiefert, © Gübelin Gem Lab; magnified 20×.

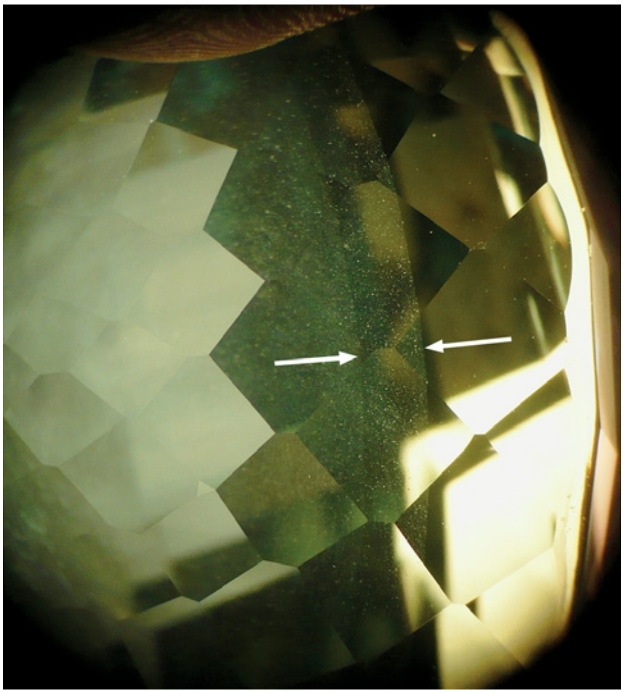

Figure 34. These opals from Wollo, Ethiopia, are shown before (left) and after (right) sugar-acid treatment. Darker bodycolors were produced in samples with a greater hydrophane character. The broken opals (center-right and bottom-left) show the shallow penetration depth of the treatment. The samples measure from 13 × 9 × 7 mm (lower right) to 29 × 16 × 10 mm (upper left). Photos by F. Mazzero.

opals tumbled as irregular pebbles, with a white to yellowish white bodycolor typical for opals from Wollo (figure 34, left). The samples were first heated at 90°C for 2 hours in a solution containing 25% sugar by weight. Next they were heated at 100°C for 3 hours in a 60% solution of hydrochloric acid. All the opals turned a darker color (figure 34, right). Some acquired a homogeneous, opaque, black bodycolor, while others darkened unevenly from grayish brown to gray. The play-of-color became more intense in some samples and less vivid in others. Two of the opals were broken open, revealing that the dark coloration penetrated only a few millimeters into the stones. The samples with the greatest hydrophane character (as indicated by their ability to stick to the tongue) showed the darkest colors after treatment. Conversely, the more transparent and least hydrophane-like opals were least affected by the treatment (e.g., inner portion of the upper-right sample in figure 34). As expected, the hydrophane character appears to have facilitated the penetration of the sugar and acid solutions into the opal.

Even darker coloration in hydrophane opal may be attainable by varying the carbon source and its concentration, the nature of the acid and its concentration, and finally the temperature and duration of heating in both solutions. Such experiments are in progress, and the results will give gemologists a better idea of what to expect for future treatments of this prolific type of opal.

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CONFERENCE REPORTS

32nd International Gemmological Conference. The biennial IGC was held July 13–17, 2011, in Interlaken, Switzerland. More than 70 gemologists from 31 countries gathered to discuss developments in the field. The organizing committee was led by Dr. Michael Krzemnicki, in collaboration with colleagues at the Swiss Gemmological Institute SSEF, the Swiss Gemmological Society, George and Anne Bosshart, and Dr. Henry A. Hänni. The conference featured 12 sessions on topics ranging from colored stones to pearls and diamonds, analytical methods and gem treatments, and special sessions on Canadian gems, rare stones, and organic materials. The 48 talks and 14 interactive poster presentations covered a wide range of topics and regions. The conference proceedings and excursion guides are available at www.igc2011.org; some of the presentations are summarized below.

Dr. Thomas Armbruster (University of Bern, Switzerland) delivered the opening keynote address on gemology's position at the interface of mineralogy and crystallography. Using the beryl group as an example, he demonstrated the similarities and differences in the crystal structures within this group of minerals. **Dr. Karl Schmetzer** (Petershausen, Germany) described chemical zoning in trapiche tourmaline from Zambia, which is characterized by a strong negative correlation between Ca and Na. **Dr. Jürgen Schnellrath** (Centro de Tecnologia Mineral, Rio de Janeiro) discussed unusual fiber distribution patterns in Brazilian cat's-eye quartz. **Dr. Shang-i Liu** (Hong Kong Institute of Gemmology) presented results of a study on Cs- and Li-rich beryl from Madagascar, using electron microprobe, LA-ICP-MS, FTIR, Raman analysis, and electron paramagnetic resonance spectroscopy.

The pearl session included presentations by **Dr. Michael S. Krzemnicki** on formation models for Tokki cultured pearls, which form as attachments to larger beaded cultured pearls; **Nick Sturman** (GIA, Bangkok) on separating natural from cultured Queen conch pearls (*Strombus gigas*); and **Federico Bärlocher** (Farlang, Cernobbio, Italy) on the production and trade of Melo pearls from Myanmar.