

## Pyrite and Other Sulphides for Jewellery Use, from Peru

Pyrite has been used in jewellery for a long time, most commonly as small faceted stones sold as 'marcasite'. The source of much of this pyrite is the Huanzala mine in west-central Peru, which has probably yielded thousands of tonnes of specimens and rough material. Recently, a completely new type of pyrite for jewellery use emerged from another Peruvian deposit: the Quiruvilca mine in northern Peru. The as-mined specimens typically consist of flat druses of pyrite crystals with a pentagonal-dodecahedral form. The individual crystals are usually between 5 and 20 mm. For jewellery use, the druses are polished on the bottom and then cut as ovals or free-form pieces up to ~4 cm long (Figure 5). Together with pyrite, several additional sulphides from Quiruvilca have been prepared in the same way (Figure 6), although they are quite rare. These include black sphalerite, lead-grey tetrahedrite, silvery arsenopyrite and even very rare hutchinsonite as shiny black prisms on sphalerite.

Of course, pyrite is not an ideal jewellery stone because it is quite heavy. It also should not be washed with water because it is susceptible to corrosion; brushing or wiping off the surface or cleaning with alcohol is safer. Nevertheless, according to dealers in Lima, several thousands of pieces already have been sold to dealers in the USA and elsewhere. With proper care, the pieces can make an interesting addition to one-of-a-kind jewellery.

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Figure 5: These four pieces of pyrite from the Quiruvilca mine in Peru (up to 4.3 cm long) have been fashioned for use in jewellery. Photo by J. Hyršl.



Figure 6: Additional sulphides from the Quiruvilca mine besides pyrite have been similarly fashioned for mounting in jewellery. Shown here are pieces ranging up to 2.8 cm long that consist mostly of (clockwise from the upper left) sphalerite, hutchinsonite, tetrahedrite and arsenopyrite. Photo by J. Hyršl.

## Purple Spinel from Badakhshan, Afghanistan

The Badakhshan area of Afghanistan adjacent to Tajikistan is famous for its production of large pink to red spinels (Hughes, 1994). Recently, a new find of attractive purple spinel occurred in Badakhshan. According to rough stone dealer Sir-Faraz Ahmad (Farooq) Hashmi (Intimate Gems, Glen Cove, New York, USA), the material was initially thought by some dealers to be amethyst. The first parcel that Hashmi learned about (through videos sent by his supplier) weighed ~1 kg and contained clean pieces weighing more than 50 g. Some of the spinel occurred in crystals with well-developed octahe-

dral form, indicative of a primary deposit. Gem dealer Dudley Blauwet first learned about this new spinel in early November 2016, and in late March 2017 he obtained a 56 g parcel at the gem and mineral market in Peshawar, Pakistan. From this he had three larger gems faceted in Sri Lanka that were characterized for this report, and subsequently his cutting factory produced 46 smaller stones weighing up to 2.99 ct from 41.7 g of rough. Another rough parcel made its way to the market in Bangkok, Thailand, in early 2017 and reportedly yielded stones weighing up to 5–9 ct, with one exceptional gem of

Figure 7: These purple spinels (4.01–6.71 ct) are reportedly from Badakhshan, Afghanistan. Photo by D. Bakker.



15+ ct. Blauwet was told by his suppliers that the spinel came from the Parawara mine near the lapis deposits at Lajuar Madan in the Kokcha Valley. This is consistent with information on mindat.org (see [www.mindat.org/loc-256247.html](http://www.mindat.org/loc-256247.html)).

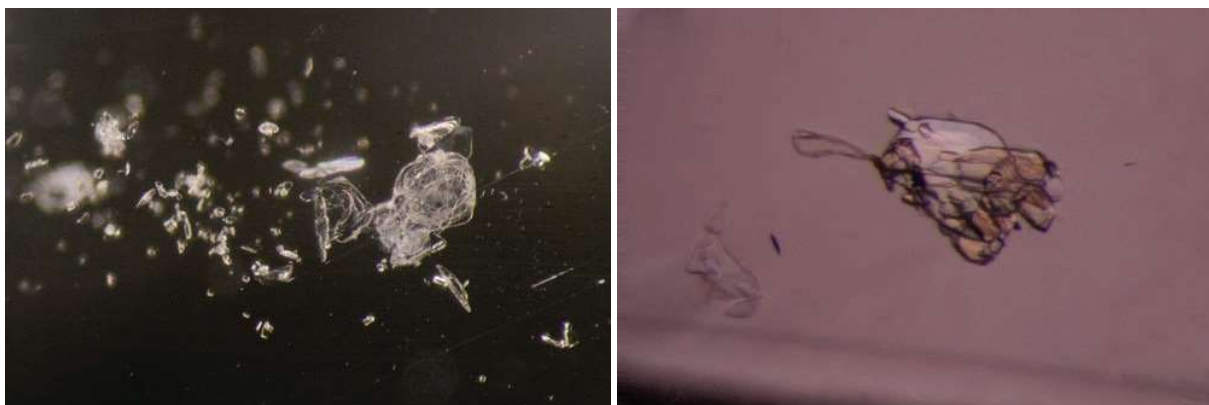
Blauwet loaned some rough and cut samples to this author for characterization. The faceted gems weighed 4.01, 5.01 and 6.71 ct (Figure 7), and the rough stone was 0.76 g. The samples all exhibited a strong purple colour with a hint of blue, and none showed any noticeable colour change between daylight and incandescent light. The RI and SG values of all four pieces were characteristic of those for natural spinel. All were inert to long- and short-wave UV radiation, and they did not change colour under the Chelsea filter. The broken piece of rough showed three distinct octahedral faces that were etched and slightly abraded. Microscopic examination revealed inclusions that resembled clus-

ters and booklets of colourless mica (Figure 8); they were seen in one of the cut stones and in the rough sample. Similar mica inclusions also have been documented in pink spinel from Mahenge in the Morogoro region of Tanzania (Gübelin and Koivula, 2005, p. 682).

This new production of purple spinel from Badakhshan, Afghanistan, is a welcome addition to the gem trade, and hopefully more of this material will become available in the future. However, according to Hashmi the mine is located in a politically unstable area, and digging activities ceased in mid-2017. Blauwet also reported that, with few exceptions, since April 2017 only heavily included and/or small-sized rough material has been available in the market. It is unclear whether there will be additional production of high-quality spinel from this deposit.

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Figure 8: Inclusions with the appearance of mica are observed in the 5.01 ct purple spinel from Afghanistan, as shown here with darkfield lighting (left) and oblique fibre-optic illumination (right). Photomicrographs by E. Boehm; magnified 40×.



## References

Gübelin E.J. and Koivula J.I., 2005. *Photoatlas of Inclusions in Gemstones*, Vol. 2. Opinio Publishers, Basel, Switzerland, 829 pp.

Hughes R.W., 1994. The rubies and spinels of Afghanistan – a brief history. *Journal of Gemmology*, **24**(4), 256–267, <http://dx.doi.org/10.15506/jog.1994.24.4.256>.

## Windmill-cut Topaz from Namibia

Klein Spitzkoppe in west-central Namibia is a source of colourless or ‘silver’ topaz, as well as rare pale blue and pale yellow topaz (e.g. Cairncross et al., 1998). The crystals are typically mined by local Damara women and offered for sale to tourists and mineral collectors. During the 12–13 October 2017 Namibian Coloured Gemstone & Jewellery Showcase in Windhoek, Namibia, this author encountered an innovative faceting style that was developed specifically for colourless topaz from Klein Spitzkoppe. Called the *Windmill Cut*, it was displayed by Mike Thygesen (Desert Gems/Bead World, Swakopmund, Namibia). Although Thygesen initially developed this faceting style in the mid-1990s, this was the first time it has been actively promoted, with several hundred stones available in sizes ranging from 6 to 22 mm in diameter.

The Windmill cut is a variation of a single-cut round brilliant. The windmill-like appearance is created by alternating pavilion facets that have a matte finish, which provide a contrasting appearance with the adjacent highly polished pavilion

facets (Figure 9). When viewed through the table, a pleasing spoke-like appearance is visible. By using a minimal number of crown and pavilion facets, the pattern is easy to see and is not broken up by multiple reflections. The effect is best seen in larger stones (i.e. those that are at least 6 mm in diameter). According to Thygesen, it is important to cut the topaz according to its critical angle because of the loss of some light return from the matte facets.

The goal of the Windmill cut is to benefit the local Damara women who mine the topaz by creating demand for the gem material. All of the Windmill-cut topaz is faceted from rough material that is purchased directly from these women, and the faceted stones are sold loose or mounted into creative windmill-themed jewellery designs.

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## Reference

Cairncross B., Campbell I.C. and Huizenga J.M., 1998. Topaz, aquamarine, and other beryls from Klein Spitzkoppe, Namibia. *Gems & Gemology*, **34**(2), 114–125, <http://dx.doi.org/10.5741/gems.34.2.114>.

Figure 9: Windmill-cut topaz displays a spoke-like pattern created by alternating pavilion facets that have a matte finish, as shown in these top and oblique views of a 24.80 ct stone. Photos by Adam Smaruj, Windhoek.

