PHOSPHOPHYLLITE

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The mineral is rare and, because of the value of well-formed specimens combined with a low hardness, brittleness, and cleavage, seldom seen faceted.

Phosphophyllite is a mineral species, hydrated zinc phosphate, with the formula $Zn_2(FeMn)(PO_4)_2$-4H20. It crystallizes in the monoclinic system. The name is from the Greek *phyllon* for leaf, referring to its perfect cleavage with phosphate composition. The type locality is Hagendorf, Bavaria, Germany. Phosphophyllite is strictly a collector's gemstone because of its low hardness. It is fragile, brittle, and extremely difficult to facet due to the easily opened cleavage. In addition, large fine crystals (Figure 1) are rare and too valuable to be used for faceting rough. It is, however, one of the most beautiful of all gems with a delicate bluish-green color.

In Japan, phosphophyllite is also an anime character in the television series "Land of the Lustrous." Set in a world inhabited by "jewel people," Phosphophyllite, or Phos for short, is one of 27 anime characters named after gemstones in the story. Consequently, these 27 gemstones have become highly collectible throughout Japan.

LOCALITIES/COLORS

Although phosphophyllite has been found in a dozen countries, it has only been found in gem quality in Germany and Bolivia. To date, all faceted gems have been from Potosí or Oruro, Bolivia.

Phosphophyllite gemstones from Bolivia have a unique color, a beautiful blue-green hue (Figure 2) with light-medium to medium tone. Analysis has shown that Bolivian phosphophyllites contain almost no manganese while the German material does contain manganese, which likely accounts for the color differences. German material ranges from colorless to a slightly brownish yellow-green, light-medium in tone at best.

CLARITY

Eye-clean gems are always the most desirable, but the rarity of the material generally leads to stones with some eye-visible inclusions.

STONE SIZES

Most phosphophyllite gems are less than 10 carats. Well-cut

FIGURE 1: *Phosphophyllite crystal, 5.2 cm high, from Unificada Mine, Cerro Rico, Potosí, Bolivia. This piece is currently in a private collection. (Photo courtesy of Jeff Scovil, www.scovilphotography.com)*

FIGURE 2: *A 2.85-carat phosphophyllite from Potosí, Bolivia. (Photo by John Bradshaw, www.rarestone.com)*

gems with eye-clean clarity over 2 carats are rare. Coast to Coast Rare Stones has sold 37 faceted phosphophyllites since 1993, only eight of which were over 2 carats. The Smithsonian has a 26.9-carat phosphophyllite. The largest on record is a 74-carat flawless stone in a private collection.

TREATMENTS

There are no known treatments for phosphophyllite.

PROPERTIES

Phosphophyllite has a hardness of 3-3.5 and a refractive index of 1.595-1.521. It is biaxial negative with a birefringence of 0.021-0.026. Doubling of the back facets is usually visible due to the high birefringence. Specific gravity is 3.08-3.13. It is inert to purple in shortwave UV. The luster is vitreous, and cleavage is perfect in one direction, distinct in two directions. Toughness is poor. It is stable to light but sensitive to heat and soluble in acids.

KEY SEPARATIONS

There are very few stones that might be confused with phosphophyllite. Beryl and apatite would perhaps be the closest color matches. Although careful measurements of refractive indexes should be enough, the low birefringence of both apatite and beryl would distinguish them from the higher birefringence of phosphophyllite.

AVAILABILITY

As mentioned, all phosphophyllite gems are from Bolivia. There is no current production. Crystals or cut stones can occasionally be sourced when old collections and inventories become available. When these items do become available, the highly prized well-formed mineral specimens will always be more valuable than the cut stones they would yield, leaving even less material for the rare gemstone market.

PRICING

Phosphophyllite is well known among collectors but not among the general public or even within the gem and jewelry trade. Pricing material that is not readily available is difficult at best. A wide range of prices can generally be expected when gems are available as there are not many comparables at any given time. If there is nothing in the market to compare, then the price an item is sold for is what a buyer is willing to pay. Prices reported here reflect prices paid for eye clean, well-proportioned, faceted gems sold in the recent past.

Sub-carat stones range from $800 to $1,100 per carat. For sizes between 1 and 2 carats, prices range from $1,100 to $1,800 per carat, and between 2 and 3 carats from $1,800 to $2,500 per carat. For gems in excess of 3 carats, pricing is negotiable. Noticeable inclusions and/or less-than-ideal cutting could greatly reduce these prices. ◆

About the Author: *John J. Bradshaw is currently a lapidary and wholesaler. He also has served as gemstone curator at the Harvard Mineralogical Museum, traveled extensively for consulting, speaking, and buying, and authored many articles on gems and faceting.*

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