LAB UPDATE
"THE ARTIFICIAL BLUE GLASS" SOLD AS RARE GEMSTONE "HAÜYNE"

By GIT-Gem Testing Laboratory
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Since early June, GIT-GTL has received 2 pieces of striking blue gemstones sold as "Haüyne" in the market from clients for identification (Figure 1). The first obvious feature of these gems is that they possess very intense and bright blue colors similar to "neon blue" or "electric blue" colors. They appear as facetted mixed cut and cabochon cut, weigh 6.11 and 2.35 cts., respectively, and are transparent to translucent. As the clients informed us that these large gemstones were traded as "Haüyne" in the market while the gem haüyne itself is actually a rare gemstone and has been found commonly in very small size (less than 1 ct). Hence, these contradictory facts at a first glance have caused some doubts to us on such unusual large sizes.

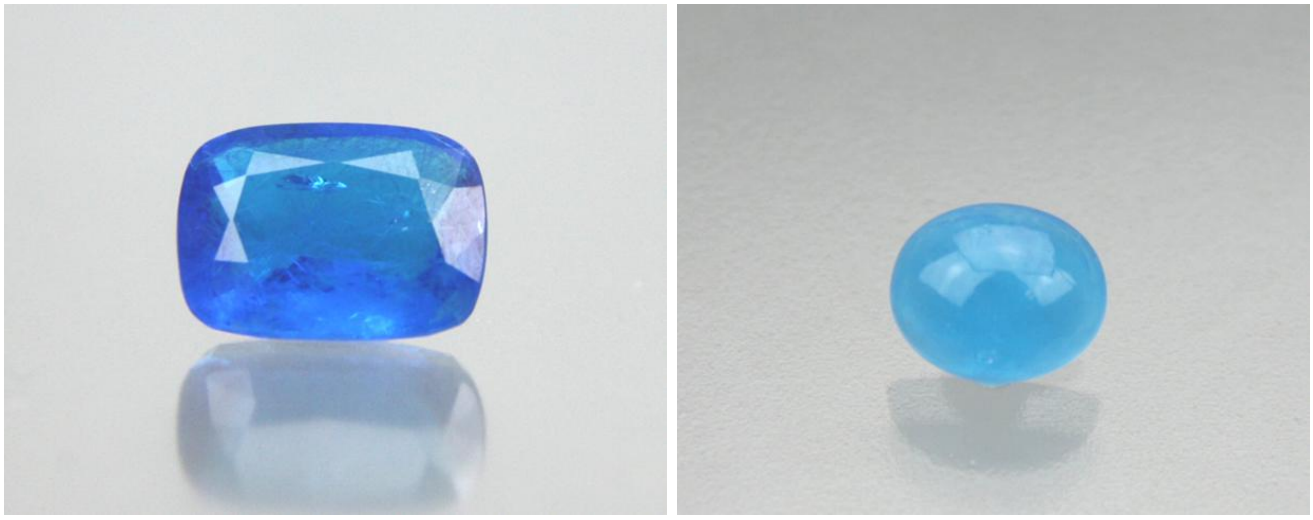

Figure 1: Two blue gemstones sold as "Haüyne" weighing 6.11 ct (left) and 2.35 ct (right) submitted to GIT-GTL for testing (photo: Warinthip K.).

Our routine gemological testing have revealed that these stones are single refraction (SR) materials under polariscope and also give a single refractive index (RI) reading ranging between 1.52 to 1.49. Their measured specific gravity (SG) values fall between 2.51 and 2.48 and the stones are inert under longwave and shortwave UV. Under a microscope, there are numerous colorless elongate prismatic crystals found as major inclusions in these gem materials (Figure 2).

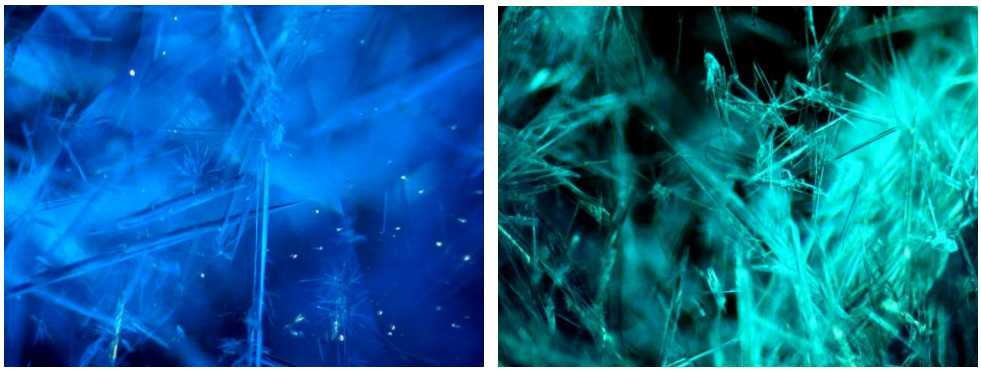

Figure 2: Photomicrographs revealing numerous colorless elongate prismatic crystals found as major inclusions in these gem materials.

Based on their basic physical properties alone, it is still not conclusive to certify such stones yet. Therefore other advanced analyses are required to provide additional data for identifying the authenticity of these gem materials. According to Laser Raman spectroscopic investigation the Raman spectra of these stones match perfectly with an artificial glass of our reference spectrum and they are completely different from the haüyne reference spectrum (see Figure 3 as an example). Even though, the inclusions identified by the same Raman technique gave a wollastonite phase, a calcium silicate mineral (Figure 4), thus further EDXRF analyses were carried out to check the chemical composition of these stones. As expected the stones contain rather high contents of silica (av. 79-83% SiO_2) with minor amounts of CaO (av. 5-7%), Na_2O (7-9%), MgO (2-4%), and trace amounts of FeO (0.15-0.2%), K_2O (about 0.2%), and CuO (about 1%). Hence based on these Raman and chemical analyses, these gems are identified as artificial glasses colored mainly by copper.

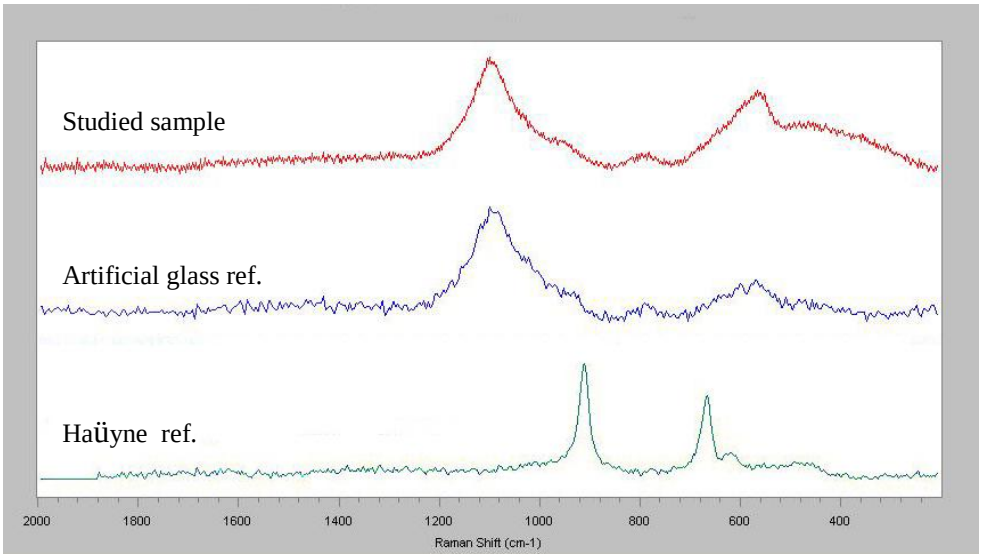

Figure 3: A representative Raman spectrum of the gemstones under this investigation (top) cf reference spectra of artificial glass (middle) and Haüyne (bottom).

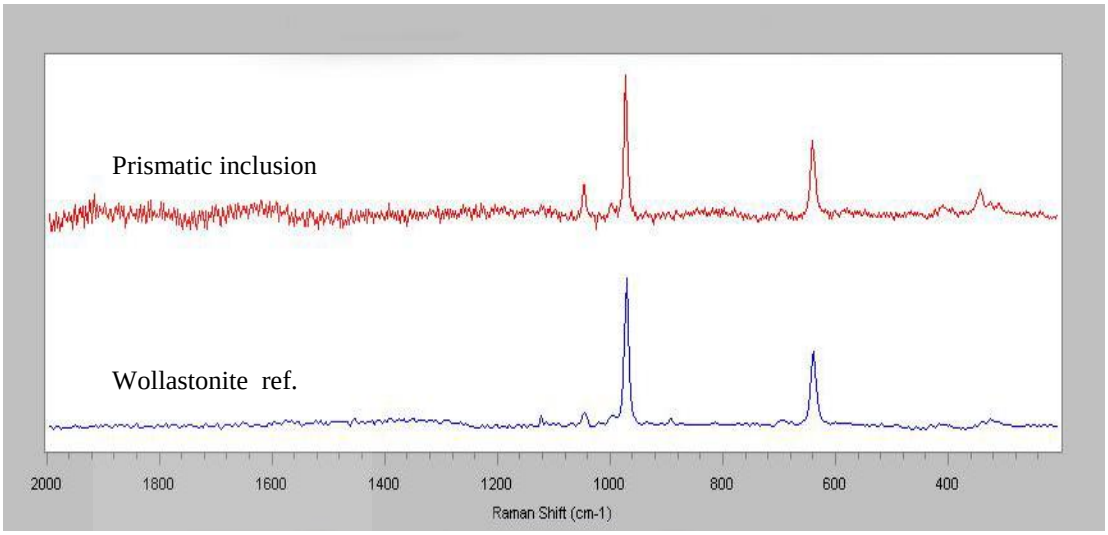

Figure 4: A representative Raman spectrum of prismatic inclusions (top) cf the reference spectrum of wollastonite (bottom).

In conclusion, based on its internal features and data from advanced analytical techniques, we are strongly convinced that these stones are "copper-doped artificial blue glasses containing synthetic wollastonite inclusions". As for the presence of the wollastonite inclusions in these glasses, it could possibly be a "devitrification" product commonly occurred in the glass industry to create such inclusions in the glass matrix.

Even though somewhat similar studies were reported previously by Hanni et al. (2001) and JIK and Maha Tannous (2001). However, our most crucial concern to the trade for issuing this Lab Update is that these stones may have been certified by some anonymous laboratories as "Haüyne". Of course this may happen fairly easy if one just simply bases the identification only on the basic physical properties of the stones alone which are essentially overlapping with those of haüyne (i.e., a single refractive mineral with RI of ~1.49 and SG of~2.5, and reddish orange to purplish pink fluorescence under longwave UV light). As such the presence of both solid inclusion phases together with their similar physical properties can easily mislead inexperienced gemologists or traders leading to false identification of these materials as haüyne. In fact the gem haüyne is actually a rare and high value gemstone, which its major sources are from Italy and Germany as well as USA (Wikipedia) and they have been found commonly in very small sizes (< 1 ct).

Moreover, when tracing back in our records to the year 2000, we found that the similar glasses had been once submitted to our lab. Hence, these gem materials are not new but they have been kept on entering the market from time to time. Hence, the best way to protect gem business is the traders must take a serious concern when there are new or strange gemstones entering the market or with some unusual quantity by acquiring the identification report from a reliable laboratory before purchasing.

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References

Hanni, H., Shun Tien Wu, Yuan Xingqiang, and Tsai Wen-Po, 2001. *A Glass imitation of blue chalcedony*, Journal of gemmology, Vol 27, No. 5, p.275-284.

JIK and Maha Tannous, 2001. *Glass sold as quartz* , Gems & Gemology, vol. 37, no. 4, p. 321.

Wikipedia, the free encyclopedia http://en.wikipedia.org/wiki/Hauyne#Physical_properties