GJEPC INDIA

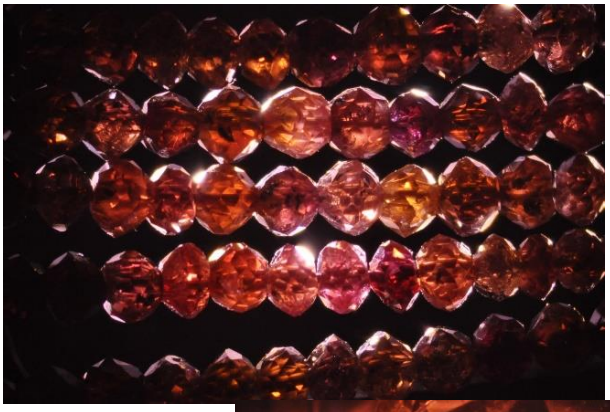
GEM TESTING LABORATORY
The Gem & Jewellery Export Promotion Council

LAB INFORMATION CIRCULAR
VOLUME 77 | SEPTEMBER 2020

RED-BROWN 'HPHT' SYNTHETIC DIAMOND STRING

The GJEPC-Gem Testing Laboratory (GTL) routinely encounters synthetic (lab-grown) diamonds of various types, including HPHT- and CVD-grown and in a range of colours, specifically colourless to yellow to brown and pink. Most of the previously encountered diamonds were either loose or set in jewellery pieces with proper cutting styles; only few of them were 'polki-cut'. Recently, a bunch of strings containing dark red to brown faceted beads was submitted for identification at the GJEPC-GTL in Jaipur, gross weight of which was 79.28 ct (figure 1). Initial observations with unaided eyes suggested the beads to be diamond (natural, treated or lab-grown), hence, the string was directly observed under a microscope. The beads which appeared opaque in overhead light displayed much better transparency, with rich red to brown colours under transmitted lighting of the microscope (figure 2). In addition, majority of the beads contained numerous black-opaque inclusions (figure 3) present as clusters – such patterns are commonly observed in HPHT-grown synthetic diamonds, associated with the metallic flux used during the growth process.

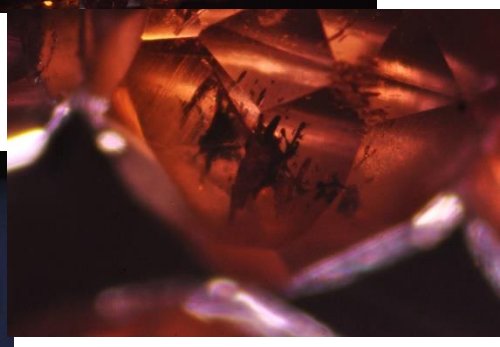
1. *Red-brown beads in this bunch, weighing 79.28 ct were identified as HPHT-grown synthetic Type-Ib diamonds.*



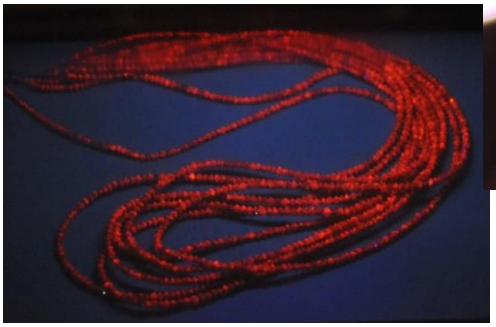
2. *The beads which appeared opaque under overhead light appeared transparent displaying red to brown colours under transmitted light of the microscope.*

Under short-wave UV, all beads displayed an intense orange-red fluorescence (figure 4). Identity of these beads as diamonds and their classification as Type-Ib were further established by Raman and infrared spectroscopy, respectively. Further, because of the numerous metallic inclusions present, some of the beads also displayed their affinity towards a hand-held magnet. Therefore, based on the analytical data obtained, microscopic analyses and attraction towards a hand-held magnet, these beads were identified as synthetic diamond.

Although, these diamonds were of much lower quality as compared to the recent production of synthetic (lab-grown) diamonds but can be a useful addition for the beading sector.



3. *Black-opaque inclusions are a common feature in HPHT-grown synthetic diamonds, which were present in these beads also.*



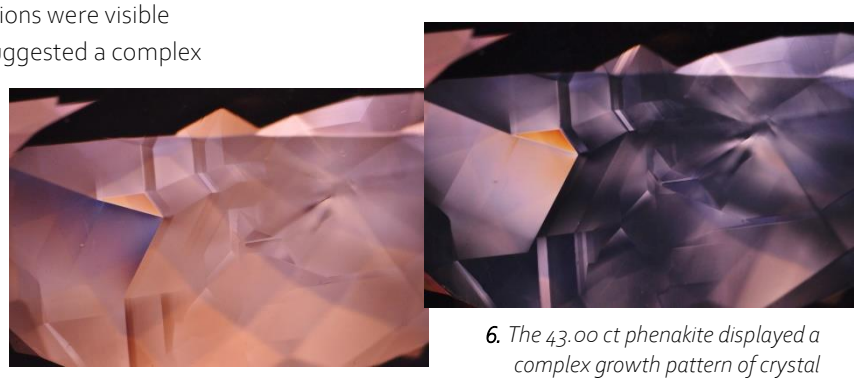
4. *The synthetic (lab-grown) diamond beads displayed a strong / intense orange to red fluorescence under shortwave UV.*

AN IMPRESSIVE PHENAKITE

5. This 43.00 ct phenakite was striking for its unusual size, colour and clarity.

A beryllium orthosilicate mineral, phenakite is still an unknown and rare gem material, not only for the consumers but also for most of the jewellers. Faceted gemstones in large sizes are extremely rare, but because of their colourless nature, phenakite is best known for their brightness amongst the collectors.

Recently, the GJEPC-GTL received a 43.00 ct (measuring 27.00 x 20.07 x 11.00 mm), yellow-brown, oval mixed specimen of phenakite which caught attention not only because of its unusual size but also colour and clarity. The tested specimen was free of any eye-visible inclusion, but displayed strong colour zoning, reminiscent of some topaz specimens, the laboratory had seen previously. No inclusions were visible under a microscope, but closer examination of colour zoning suggested a complex growth pattern of crystal, dominated by rhombohedral faces.



6. The 43.00 ct phenakite displayed a complex growth pattern of crystal dominated by rhombohedral; brightfield illumination (left) and darkfield illumination (top).

Further gemmological testing revealed uniaxial optic character, refractive index of 1.660 - 1.677 with birefringence of 0.017, hydrostatic specific gravity of 2.96 and a weak greenish fluorescence under UV (longwave and shortwave); these properties are consistent with phenakite. Identity of the specimen as phenakite was further established by Raman and infrared spectroscopies.

Although undetectable, yellow-brown colour is reported to be produced by irradiation of colourless phenakite. But, a combination of size, colour and clarity made this an impressive specimen of phenakite.

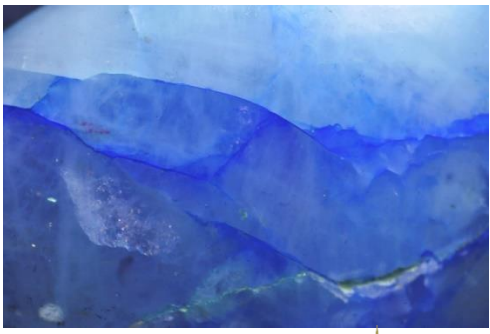
AZURITE IN FELDSPAR

7. This 16.31 ct cabochon was identified as potassium feldspar coloured by azurite within the fissures.

There are numerous gem materials, which are coloured by various types of minerals present in the form of grains, crystals or flakes within the host mineral or concentrated within their fissures and /or cavities. Recently, the GJEPC-GTL received a cabochon weighing 16.31 ct, which displayed concentration of blue colour within the fissures of grey coloured host – such features are commonly associated with dyed materials. Careful examination under the microscope revealed a planar structure associated with lamellar twinning in feldspar. The fissures displaying blue concentrations were quite wide and appeared solid, which suggested that the material in the fissures was rather a natural mineral and not a dye.

Raman spectra (with 532 nm laser) of the host and blue material in fissures agreed with those of K-feldspar and azurite present in laboratory's as well as RRUFF database.

This specimen could easily be misidentified as a 'dyed' specimen, and hence reminds us of importance of careful observations.



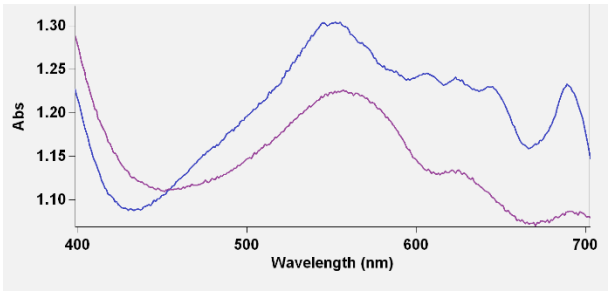
8. Fissures with blue material (azurite – identified by Raman spectra) were relatively wide, which suggested that these are rather natural.

UNUSUAL VIOLET 'MAXIXE-TYPE' BERYL

9. This 149.23 ct beryl is unusual for its violet colour.

The GJEPC-GTL recently examined a violet, cushion mixed cut stone weighing 149.23 ct which was received for identification. Standard refractive index was measured at 1.570-1.580 and specific gravity at 2.77; these values are consistent with beryl. A distinct dichroism with violet-pink and blue components was readily visible on rotating the stone under polarizing filters as well as a dichroscope. Under shortwave UV, a weak greenish fluorescence was visible, while a desk-model spectroscope revealed a series of lines in the red region. Such spectroscopic features are associated with 'maxixe-type' blue beryl. The specimen was virtually inclusion-free and displayed only few scattered transparent crystals under microscopic examination.

UV-Vis-NIR spectra showed a series of absorption bands in the region 500 – 700 nm along the blue direction (o-ray); such absorption pattern is typically associated with 'maxixe-type' beryl and coloured blue by either natural or artificial irradiation. However, there is no conclusive test to determine if the blue colour is caused due to natural or artificial irradiation; the same applies to this specimen of violet beryl too.



10. UV-Vis-NIR spectra of violet beryl displayed a typical pattern associated with 'maxixe-type' beryl with a series of bands in the region 500-700 nm (blue trace – 'o' ray).

This unusual violet 'maxixe-type' beryl is notable for its unique colour (in exceptional size) which was encountered for the first time at the laboratory – surely, an interesting addition to the colours of beryl.

'CARAMEL SPICE' OPAL

A brown cabochon weighing 6.30 ct was submitted for identification at the GJEPC-GTL which caught our attention due to its streaks of brown and white colours. This material was submitted for the first time at the laboratory and hence initial observations gave no idea about the gemstone. Standard gemmological testing revealed spot refractive index of 1.470 and hydrostatic specific gravity of 2.03; these values are consistent with opals. Identity of the specimen as opal was further established by Raman spectroscopy; no difference could be resolved in Raman spectra of white and brown streaks.

The specimen was therefore identified as 'natural opal' in the report, but the depositor informed that this material is a new variety of opal, known as 'caramel opal'. Further internet search revealed that this opal is rather a new find in Mexico (exact location not given) and is marketed under the trade name 'caramel spice opal™'. Currently, Mexico is the only source for this material, while the name 'caramel' is derived from its appearance, reminiscent of a caramel drenched dessert. The laboratory, however, will continue to report this material as 'natural opal'.

11. This opal cabochon with brown and white streaks is being marketed under the trade name 'caramel spice opal™'.

YELLOW-GREEN MAGNESITE – "LEMON CHRYSOPRASE"

The term "lemon chrysoprase" has been used for an opaque rock mainly composed of magnesite (a magnesium carbonate mineral) and coloured green by nickel; because of its citrus colour, this is also known as "citron chrysoprase". The name "chrysoprase" is inappropriate for this material but is into existence for decades. Considering the composition, "lemon magnesite" or "citron magnesite" would be more appropriate names for this material.

This yellow-green magnesite forms as a result of weathering or alteration of serpentine by hydrothermal activities and is found as fillings in peridotite, dunite and serpentine – the rocks where chrysoprase is also found. In fact, 'lemon' magnesite and chrysoprase often occur together in the same fracture or nodule. Western Australia has been a major source for this material. Further, it is also common to find specimens containing both these minerals, and in such cases using correct terminology and disclosure becomes lot more challenging.

12. *The yellow-green magnesite with brown veins or matrix, coloured by nickel is inappropriately sold as "lemon" or "citron" chrysoprase in the trade.*

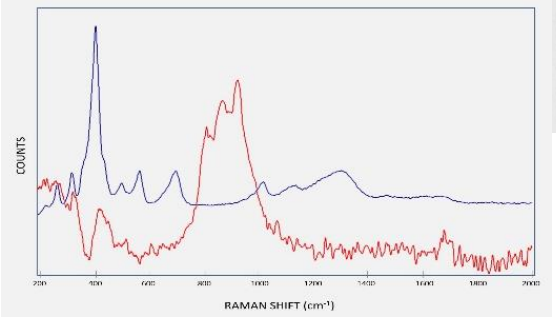
At GJEPC-GTL, we have examined few specimens of 'lemon' magnesite, with and without brown matrix, which also contained areas of white quartz as veins and patches. In such cases, the laboratory typically uses the nomenclature based on samples' compositional percentage. Usually, if a sample contains less than 10% of secondary mineral, it is not mentioned in the reports, while in cases of more than 10% secondary mineral, primary as well as secondary minerals are mentioned.

AMETHYST WITH GOETHITE "CACOXENITE" INCLUSIONS

In recent years, amethyst with "cacoxenite" inclusions has gained a lot of popularity on internet shopping sites. The same is also reflected in high number of such specimens received for identification at the GJEPC-GTL. All submitted samples over a period of past two years contained eye-visible sheaves of yellow-brown inclusions, mostly oriented along (rhombohedral) planes of the quartz crystal. In most cases, depositors of the samples were interested in reports mentioning "cacoxenite", and not simply amethyst.

13. *Representative sample of amethyst with sheaves of goethite inclusions, being sold as "cacoxenite".*

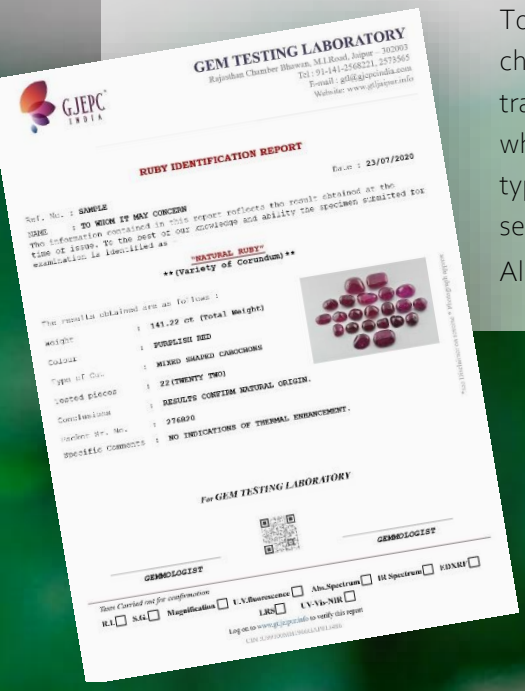
Micro-Raman spectroscopy has proved to be most useful tool for non-destructive identification of inclusions, as was used for these specimens. This is however interesting to note that all specimens submitted to the laboratory for reports on "cacoxenite" were rather turned out to be "goethite", while they are being sold as "cacoxenite" all over the internet.



14. *Raman spectra of cacoxenite (red trace) and goethite (blue trace), readily separates these two minerals.*

PACKET LOT CERTIFICATION CONTINUES TO GROW AT GJEPC-GTL

With the introduction of special pricing for certification of packets containing large number of pieces last year in July 2019, the laboratory has seen a significant rise in testing and certification of such parcels. Considering increased acceptance of reports issued by the GJEPC-GTL amongst international buyers, special pricing was introduced, enabling local suppliers to provide a report of authenticity with their parcels. Low-cost certification of these parcels has enabled the exporters to filter out possible treated, synthetic and fake counterparts, which might have accidentally mixed in packets of natural gemstones during their processing and/or handling. This not only helped to establish the credibility of the exporters but also Jaipur and India as a gemstone hub.



GEM TESTING LABORATORY

RUBY IDENTIFICATION REPORT

Date : 23/07/2020

Ref. No. : SAMPLE

NAME : TO WHOM IT MAY CONCERN

The information contained in this report reflects the results obtained at the time of issue. To the best of our knowledge and ability the specimen submitted for examination is identified as :

"NATURAL RUBY"

(Variety of Corundum)

The results obtained are as follows :

Weight : 141.22 ct (Total Weight)

Colour : PURPLISH RED

Type of Cut : MIXED SHAPED CABOCHONS

Treated pieces : 22(TWENTY TWO)

Conclusion : RESULTS CONFIRM NATURAL ORIGIN.

Packet Sr. No. : 376020

Specific Comments : NO INDICATIONS OF THERMAL ENHANCEMENT.

For GEM TESTING LABORATORY

GEMMOLOGIST GEMMOLOGIST

Tests Carried out for confirmation

R.I. S.G. Magnification U.V.Fluorescence Abs.Spectrum DI.Spectrum FTIR/RT

LWS UV-Vis-NIR

Log on to www.gjepcindia.com to verify this report

To maintain authenticity of the reports and ensuring that the tested samples are not changed after certification, all packets are delivered back to the depositor in transparent tamper proof plastic bags, marked with unique identification number, which is also mentioned in the reports. Further, if a parcel contains mixture of stone type, for example, natural and treated or synthetic counterparts, all are placed in separate transparent bags and then placed in a larger transparent tamper proof bag. All details about the filtered groups of stones are mentioned within the reports.

SPECIAL PRICING FOR LARGE PACKETS

Option 1: Reports issued are based on testing of all pieces in a packet	
100-499 pieces: All gemstones, above 0.05 ct each	Rs. 150 per piece
500+ pieces: All gemstones, above 0.05 ct each	Rs. 125 per piece
200+ pieces: All gemstones, below 0.05 ct each	Rs. 100 per piece
Option 2: Reports issued are based on testing of 25% pieces in a packet	
Minimum 100 pieces (25% pieces will be charged)	Rs. 200 per piece

For more information on certification,
call the front office at **+91-141-2568221** or **2573565** or **+919261018000**, or write at **gtl@gjepcindia.com**

launching soon!

renovated laboratory premises with world-class infrastructure and equipment

The GJEPC-GTL is taking a leap by turning into a world-class laboratory, with infrastructure at par with global benchmark. The laboratory which currently operates at a mere space of 1,000 sq ft is soon moving to an expanse of around 10,000 sq ft premises, with all required security features. With the range of sophisticated equipment being put into operation, the laboratory has plans to offer a bouquet of new services to the trade.

Written and edited by: Gagan Choudhary *(Director)*

QUERIES? Write or Call us:

for technical matters:
Meenu Brijesh Vyas *(Asst. Director)*
Vinaynder Sikand *(Manager – Diamond Grader)*
Sandeep Vijay *(Sr. Executive – Gemmologist)*

for administrative matters:
Kailash Chand *(Executive)*
Ajit Bansal *(Business Development Executive)*
Nishant Sharma *(Front Office Assistant)*

www.gtljaipur.info ✦ gtl@gjepcindia.com ✦ +91-141-2568221, 2573565

RAJASTHAN CHAMBER BHAWAN, 2ND FLOOR, M.I. ROAD, JAIPUR-302003, INDIA

learn more about GJEPC's activities and initiatives at www.gjepc.org