THE GEM & JEWELLERY EXPORT PROMOTION COUNCIL

GEM TESTING LABORATORY

LAB

INFORMATION

CIRCULAR

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LAB INFORMATION CIRCULAR

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Now The Blues...

Sapphires with unusual colour zoning!!

It is not even complete two years, since the orange-pink sapphire controversy rose and shattered the world sapphire market. Now, recently some blue sapphires from Srilanka with unusual colour zoning have been encountered.

These stones have a body colour from medium blue to dark blue and exhibit a colour zoning that does not follow the growth pattern of the stone. The central part of the stone shows a typical hexagonal zoning for sapphires, but it becomes colourless towards the edges with uneven boundaries.

These stones have the rim pattern similar to, too much discussed beryllium diffusion pink- orange sapphires. These stones are of much concern so as to keep the controversy away. Neither traders nor the gemologists of the world want the situation that rose a year ago on beryllium / bulk diffusion treated pink-orange and yellow sapphires, which lasted for quite a long period of time.

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INSIDE THIS ISSUE.....

Imperial Topaz – Another Flavour to opt for.....

This is the gem for those who look for some thing different and expensive as well. Traders commonly use the term Imperial Topaz for certain varieties of Topaz. When a consumer listen to this term, he gets attracted to the term only, especially when one talks of the Indian market.

But.... What exactly Imperial Topaz is??

The answer to this question is....

Topaz is found in a number of colours / shades, some of them include colourless, brown, yellow, blue, orange, pink and a rarer red.

The pink- orange to pink colours/ shades are referred to as "Imperial Topaz". The material is best observed under incandescent light, as it enhances the pink or orange shades. But, the light source should not be changed as per the stone; any gem should be observed in a standard daylight irrespective of th region. For this purpose an artificial daylight lamp is considered as the best since it gives constant results throughout the globe.

The major source of the material is Brazil. The material is found at Dom Bosco, Rodrigo Silva and Saramenha - the topaz belt, west of Ouro Preto in Minas Gerais. All three areas were known to gem prospectors since 1730.

In the early days, topaz was the only gem of importance found near Ouro Preto.

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All the major gemological laboratories of the world like AGTA- GTC, GIA, SSEF, GRS has worked on these stones and found that a colourless rim is being observed in these stones, that does not follow the outline of the stone as in case of beryllium diffusion

A suspicious colourless rim is visible in a number of stones, which can be seen when the stone is immersed in Methylene Iodide and viewed in a strong diffused light.

The cause of these rims was projected as:

- Synthetic Overgrowth on natural cores may have developed during the high temperature heat treatment, resulting in melting and re-deposition of skin of the stone.
- Diffusion of lighter elements like beryllium, magnesium or lithium during the heating process as in case of bulk diffusion.
- Compositional differences between the core and the rims of the stone, which has been highlighted during heat treatment.

Dr. Hanni of SSEF has performed some sophisticated tests on these stones and found out that there is no difference in the composition of core and the rim of these stones, further no element like beryllium, lithium or magnesium has been detected, which could prove these stones as diffusion treated like beryllium / bulk diffusion.

All these stones exhibited the features of a heat treatment. On his observations, he concluded that these stones are not diffusion treated as no foreign element has been detected. The cause of light colour rim is a defect in the heating process, where oxygen accidentally enters the furnace chamber during the final stages of heating, thus decolorizing the rims of the stones.

Therefore, on these grounds, SSEF has decided to mention, only "heating" in the gemstone identification reports.

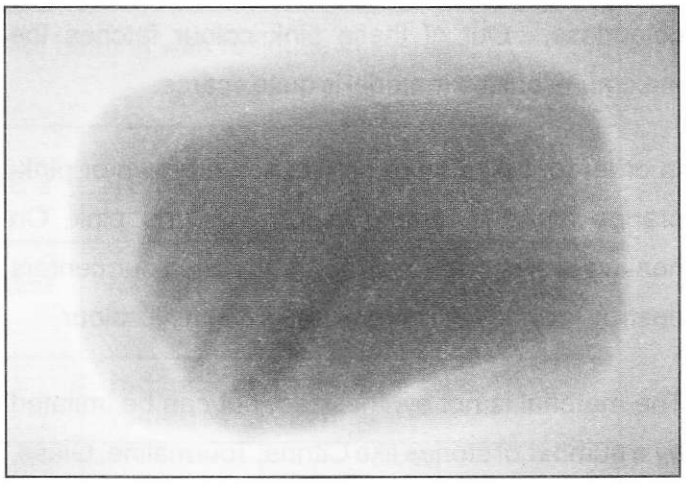
Some laboratories were against this theory, as they believed that something has to be introduced in the lattice in order to bleach the colour. They were banking on the facts related to beryllium diffusion, that hydrogen will diffuse through the structure at a much faster rate as compared to oxygen, which is the cause of colour rim.

After a hardcore research by GIA, in which the experiments were done at the place of treatment to get a better understanding of the colour causing phenomena in these stones.

Several hundreds of the stones were analyzed on Secondary Ion Mass Spectroscopy (SIMS) and LA-ICP-MS, no difference was observed in the composition at the core and the rim of these stones.

Finally, they also concluded that the cause of these unusual colour rims is a result of a defect in the heat treatment process.

Now, it looks the controversy has been solved so as to save the world sapphire market of blues even. The history is not repeated...



Unusual colour rim observed in Methylene Iodide in Diffused light.

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The name "Imperial Topaz" was given to honour the Brazilian royalty and since then the material is well known to the traders and customers as it helps to distinguish between topaz and other similar looking material like citrine.

Some say, the term originated in the 19th century in Russia, where the Ural mountain mines were an important source. Pink topaz from those mines was restricted to the family of the Czar.

Today, the gem trade generally uses the term for pink and pink-orange topaz from Ouro Preto, Brazil. Fine Pink topaz also comes from Katlang area in Pakistan. Some other sources include Nigeria, Srilanka, Burma, USA and Mexico.

The cause of pink colour is due to the presence of chromium as an impurity, while pink-orange colour is due to a combination of chromium impurity and a colour center.

The name really honours topaz of this pink- orange to pink colour as it fetches much more price as compared to other colours like yellow, blue or colourless. Out of these pink colour fetches the maximum, but the material is quite scarce.

In order to, make more profits; some brown or pink-orange topaz is heated to turn to purer pink. On heating brown or pink- orange topaz, colour centers destroy leaving only chromium, giving pink colour.

The material is not synthesized, but can be imitated by a number of stones like Citrine, Tourmaline, Glass, and beryllium treated sapphires (recently developed).

Topaz can be separated from Citrine by the higher heft and life, while from tourmaline by observing the pleochroism. Topaz lacks that strong pleochroism of tourmaline. If pleochroism seen, tourmaline is dichroic while topaz is trichroic.

Tourmaline also has characteristic inclusions as trichites and doubling of facet edges due to high birefringence of 0.020 while Topaz doesn't show any doubling.

The material can be easily differentiated from glass by higher life, luster and pleochroism.

The much cheaper beryllium treated sapphires may create problem in separating from "Imperial Topaz" as the colour shades are very close to each other and luster as well. Careful inspection of internal features will help in distinguishing between the two.

Inclusions like burst halos, healed fingerprints; diffused silk or melted crystals are the features of the treated sapphires while topaz exhibits phase inclusions or cleavage planes.

Topaz in its rough state may be confused with Tourmaline as both the materials have deep striations parallel to the 'C' axis. But Topaz belongs to orthorhombic crystal system- exhibiting a rhomb shape cross section and a perfect cleavage parallel to basal pinacoids while Tourmaline belongs to Trigonal crystal system exhibiting triangular or hexagonal cross section with 'C' axis colour absorption and lacks cleavage.

Materials like tourmaline, citrine or sapphires are quite common, therefore the choice of "Imperial Topaz will add another flavour to your collection.... .

Standardised Gemmological Report Wording developed by Laboratory Manual Harmonisation Committee (LMHC)

Laboratory Manual Harmonisation Committee (LMHC) is comprised of major seven labs of the world including GIA- Gem Trade Laboratory, AGTA-Gemological Testing Center (both USA), CISGEM (Italy), GAAJ Laboratory (Japan), GIT- Gem Testing Laboratory (Thailand), Gubelin Gem Lab and SSEF Swiss Gemmological Institute (both Switzerland). The committee is involved in developing the nomenclature for laboratory reports.

Recently, during the GILC meeting at Tuscon and Bangkok this year in February, the members of the Laboratory Manual Harmonization Committee (LMHC) have standardized the nomenclature that they use to describe and disclose heat treatment in corundum and the degree to which fissure " healing" has occurred and the residues that remain within the healed fissures and cavities, following the heating of corundum.

The committee has decided to give an alphanumeric notation on every report to be issued indicating minor, moderate or significant residue in the fissures / cavities.

This residue quantification terminology will be used taking into account the size and position of healed feathers and the nature of the residue. This residue may be comprised of structures ranging from a fine bubble-like network or very little 'thickness' to numerous lace-like structures that may have a considerable thickness.

Currently, GTL does not use the alphanumeric notations in its reports, but is going to mention about the residue (if present) in the heat-treated corundum that comes under "*On Request*" category. The report wording will be; "Ruby / Sapphire is commonly heated to improve the colour / clarity. This specimen exhibits the evidence of Heat treatment and minor/ moderate or major residues in the fissures."

Teminology used for residue quantification :

Status	No Indications of Heating	Indications of Heating (no residue)	Indications of heating with residues in fissures				
Report Alpha numeric	NTE	TE	TE 1	TE 2	TE 3	TE 4	TE 5
Report Text	No Indications of Heating	Indications of Heating	Minor residue in fissures		Moderate residue in fissures		Significant residue in fissures

Status	**Indications of heating with residues in cavities**	
Report alpha numeric	C1	C2	C3
Report Text	Minor	Moderate	Significant

GTL Annual Award Function...

The Annual Award function is being held on 31st May 2004 at Mohanlal Sukhadia Hall at 2nd Floor, Rajasthan Chamber Bhawan, M.I. Road, Jaipur.

Chief Guest, Shri Damodar Sharma, Secretary Small Scale Industries has kindly consented to present the certificates and deliver the valedictory address.

Following are the students who will be receiving their Certificates.

Diploma 27th Batch February to may 2003.

1.	Rohit Chhabra	1st Overall
2.	Jain Ritesh N.	1st Practical
3.	Rohit Singhal	
4.	Julian Bwalya Chamululu	
5.	Gajraj Singh Sandhu	
6.	Amit Sonthalia	
7.	Kanhaiya Goenka	
8.	Rishi Nagpal	
9.	Makhdoom Khan	
10.	Krishna Kumar Bhatia	
11.	Mtonga Jackson	
12.	Mohammed Ikramuddin	
13.	Gaurav Srivastava	
14.	Neena Khandelwal	
15.	Shravan Kumar Khatri	
16.	Sweta Jijja	
17.	Vivek A. Patel	

Diploma 28th Batch June to October 2003.

1.	Naveen Kumar Shukla	1st Overall
2.	Himanshu Jain	1st Practical
3.	Ira Agarwal	
4.	Chetan Aggarwal	
5.	Veeravalli Suresh	
6.	Sayed Shakir Ali	
7.	V. Khiran Kumar	
8.	Gulshan Verma	
9.	Narendra Singh Yadav	

Diploma 29th Batch June to October 2003

1.	Neeraj Dusad	1st Overall
2.	Niranjan Data	1st Practical
3.	Aashish Damar	
4.	Shamta Agrawal	
5.	John Christopher McDonald	
6.	Priyanka Bhargava	
7.	Kushal Darbari	
8.	Piyush Bhansali	
9.	Dashleen Kaur Arora	

Diploma-30th Batch October 2003 to February 2004

1.	Gaurav Modi	1st Overall
2.	Surabhi Kanodia	1st Practical
3.	Ankush Soni	
4.	Manju Choudhary	
5.	Prerna Jain	
6.	Rahul Agarwal	
7.	Rajeev Khator	
8.	Vikas Taneja	
9.	Vishal Gupta	
10.	Anurag Bhagla	
11.	Chitra Mewara	
12.	Pooja Tripathi	
13.	Rajiv Soni	
14.	Sourabh Seth	

Master's Diploma In Gem Identification

1.	R. Lalitha	Th : A	Prac : A
2.	Vivek Agarwal	Th : B	Prac : A
3.	Puru Agarwal	Th : B	Prac : B
4.	Ashish Sharma	Th : C	Prac : C
5.	Gajraj Singh	Th : B	Prac : B
6.	Md. Ikramuddin	Th : B	Prac : B

Diploma in Gemmology Gem A (U.K.)

1.	R. Lalitha -	Diploma
2.	Amrinder Singh -	Foundation

Correspondence Course in Gem Identification

1.	Saurabh Verma
2.	Nidhi Rathi

Trade Awards : Successful candidates for the awards initiated for students of GTL are :

GJEPC Award for the Best Overall student in Each batch :

- Mr. Rohit Chhabra — 27th Batch
- Mr. Naveen Kumar Shukla — 28th Batch
- Mr. Neeraj Dusad — 29th Batch
- Mr. Gaurav Modi — 30th Batch

Durlabhji Education Trust Award for the Best Overall Student for the Year 2002 - 2003

- Mr. Naveen Kumar Shukla

Bhuramal Rajmal Surana Award for the Best Student in Practicals for the year 2002 2003

- Mr. Jain Ritesh N.

CONGRATULATIONS TO ALL OUR STUDENTS AND WE WISH THEM ALL THE VERY BEST IN ALL THEIR FUTURE ENDEAVOURS.

WE HOPE THEY WILL MAKE A VALUABLE CONTRIBUTION TO THE GEM & JEWELLERY TRADE

Field Visits :

The 30th Batch of Diploma students visited the Jewellery units of Vaibhav Gems Ltd., Amrapali and Dwaraka's . 30th Batch went to the garnet mines at and near Tonk. These visits have provided them with a valuable insight into the manufacturing process of gemstones and jewellery.

Our Grateful Thanks

We are highly obliged to **Shri. Rahimullah Khan**, (Ms. Vaibhav Gems Ltd.), **Shri. Satish Saklecha Shri. S. K. Ajmera**, **Shri. Rajesh Ajmera**, (Amrapali) and **Shri Vijay Chordia** (Valentine Jewels), for providing In House Training for students of the Master's Diploma. Their continued support and encouragement is deeply appreciated.

Seminars and Conferences

- Mr. Gagan Choudhary, Asst. Director was deputed to represent GTL at the Gemstone Industry and Laboratory Conference held at Bangkok in February 2004. Delegates from different laboratories like SSEF, GIA, AGTA-GTC, GAAJ, CISGEMS, Gubelin Gem Lab, EGL, Gemlab.Inc and GIT were present at the particular meeting.

- The main purpose of the conference was to harmonize the information to be given to the consumers in laboratory reports. A Laboratory Manual Harmonization Committee (LMHC) had been formed and a responsibility has been given to them for developing a simpler nomenclature for laboratory reports. The committee comprises few experienced representatives from GIA - Gem Trade Laboratory, AGTA- Gemological Testing Center (both USA), CISGEM (Italy), GAAJ Laboratory (Japan), GIT- Gem Testing Laboratory (Thailand), Gubelin Gem Lab and SSEF Swiss Gemmological Institute (both Switzerland).

- The main issue on the agenda was the Ruby residue nomenclature (see details) and the accuracy of the country of origin reports issued by few laboratories. Other points included were- disclosure of beryllium treated stones, nature of treatment of blue sapphires from Srilanka with unusual colour zoning, CVD growth of synthetic diamonds.

- Mr. Gagan Choudhary also visited the Gem & Jewellery Institute of Thailand and the workshop of Ted Themelis. Discussions with other gemologists were very fruitful and on varied technical topics

Stone News - Some interesting stones through GTL.....

Synthetic Hydrothermal Sapphires:

Recently, a number of synthetic yellow sapphires made by hydrothermal process have been encountered. The colour range is light yellow to a pleasant yellow very similar to Srilankan stones. All the pieces had a good clarity, no visible inclusions, but few of them were visible under a higher magnification ranging from 30X to 40X. Some powdery, cloudy, flaky inclusions were visible very similar to bread crumb inclusions that are found in synthetic quartz. Only one or two pieces had chevron growth pattern - characteristic inclusions of hydrothermal method. All stones fluoresced yellow in long wave as well as short wave similar to natural counterparts. All other stones were conclusively identified as synthetic by Infrared Spectrometer, which exhibited characteristic water peaks in the region 3000 to 4000 cm^{-1}, not found in natural corundum or more common synthetic flame fusion sapphires.

Special Request???

If you want details on specific topics related to Gems, please do not hesitate to contact us. If details are required, the related topic will be published in the next Lab Information Circular (LIC).

If you want to share your experience related to your field. Please write an article and send to us for publication in LIC.

This will improve our relations and interaction.

Synthetic Forsterite

Beware!! Tanzanite dealers... a newer imitation of tanzanite has been deposited for testing. Rich blue colour with a tint of pink and greenish brown, very similar to the pleochroic colours of Tanzanite. Recently two specimens have been submitted in last one and a half months- indicates a large quantity is going to arrive in the market. The specimen had a black overtone, with a strong doubling the only identifying feature of Syn. Forsterite by a 10X lens. The material can conclusively be identified by its refractive index ranging from 1.640 to 1.673 with a birefringence of 0.033 and a lower SG of around 3.20, but can vary up to 3.35. Specimen had scattered pinpoint inclusions and had iron bands in visible spectroscope with an Infrared spectrum of Peridot- the more common name for the mineral Forsterite.

Colour Changing Garnets

Colour changing garnets are now a regular feature at Gem Testing Laboratory. The stones changes the colour from brownish green/ green in daylight to purple pink / red in incandescent light. The colour changing intensity varies from weak to strong. These stones are basically mixed with alexandrite lots because of the similar colour shades. Refractive index of these stones vary from1.78 to over the range of standard refractometer and Specific Gravity ranged from 3.85 - 3.95. Under visible spectroscope, stones exhibit a chromium, iron and manganese spectrum that is found in pyrope and spessartite garnets. Generally, the stones were clean, but some stones had oriented needles parallel to dodecahedral faces and scattered mineral inclusions in the form of crystals.

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