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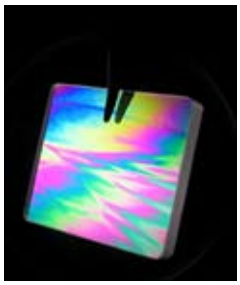
- The Future of Gem Testing
- Winza Rubies
- Micro x-ray tomography of pearls
- Age determination of pearls
- Flux grown synthetic spinel
- Coatings on gemstones
- The Wittelsbach diamond
- Courses in 2009
- SSEF Alumni Association
- New SSEF Logo and Reports
- SSEF and Burma
- SSEF shuttle service
- News from CIBJO, LMHC, and CEN

Dear Reader

During the last 12 months SSEF had a great diversity of commissions to deal with. The business of gemstone testing was much in demand and our education courses were fully booked. Students from all continents profited from our professional expertise. Developing new instruments and the examination of the next generation of analytical tools, were further areas where our specialists worked to ensure the excellence of future performance in the laboratory. SSEF is a leader in applied gemmology and many other gemmological laboratories follow in our footsteps. SSEF staff members again made contributions to international working groups for harmonisation or standardisation of operations. Off-premises testing was offered to three Asian trading locations and SSEF specialists gave talks in numerous major centres of the gemstone industry. Besides all these activities, we found time to research pressing issues and informed interested readers about new developments via various international journals. For me, the last year has been another characteristic period of booming business where we had to hire new members of staff. We rely on a blend of excellent professionals, forming the SSEF staff, as a guarantee for the high quality of our products. The bank crisis, which has been overshadowing the commercial world, will probably make my last year before retirement a very difficult one. Luckily the captain has a very capable first officer on his side who will be the new captain of SSEF from 2010 onwards:
Dr. Michael S. Krzemnicki. With high spirits I will thus complete my last year as a director of SSEF.

Wishing you all the best for the hard times ahead,
Prof. Dr. H. A. Hänni, director of SSEF



Cover photo:

Synthetic corundum slab showing beautiful interference colours under crossed polarizers. The pattern indicates slight subgrain rotation of the material. The SSEF Swiss Gemmological Institute has recently analysed the quality of a series of such scratch-resistant “sapphire glasses” for the Swiss watch industry.
Photo:
© H.A. Hänni, SSEF Swiss Gemmological Institute

Good news for our customers abroad: no VAT on our services

Due to a changed interpretation of the existing tax regulations by the Swiss tax authorities, our non-Swiss customers will no longer be invoiced the VAT of 7.6 % on services at SSEF. This means, you will not have to apply for the refund of VAT anymore in future.

SSEF membership fee:

Dear SSEF Client

Did you already know that the SSEF Membership fee is due on February 28, and a reduction of approx. 25% on the normal tariff list is granted to registered members only ?

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The Future of Gem Testing

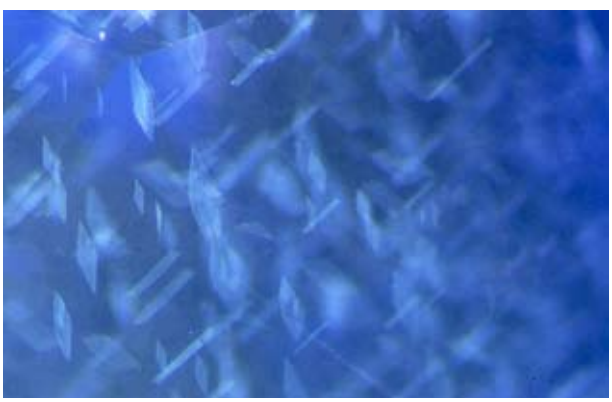
High tech joins forces with classical observation techniques

In the last few years, the position of gemmological laboratories has become increasingly important, especially for the high-end market. Consumers who invest in gemstones seek safe and reliable certification, which not only identifies the material, but also offers full disclosure regarding the formation, treatment, and even origin of the material. Starting from the present situation, the following article is an outlook into the future of gemmology, with a special focus on the trends, which will challenge our work as gemmologists.

Origin determination:
Every gemstone has an origin. Apart from the visual beauty of the stone, its origin may be a source of emotions and inspiration for people. Gemstones are minerals found in primary or secondary deposits; these mines have limited life expectancies before they are exhausted. This has already happened to a large number of deposits that were renowned for gemstones in the past (e.g. Kashmir sapphires). It will certainly happen to deposits currently producing gemstones. But as new deposits are continuously being discovered (e.g. copper-bearing tourmaline from Mozambique, rubies from Winza in Tanzania) the future does not look grim; in fact it looks promising and prosperous in terms of gemstone supply. When origin determination as a lab service was introduced at SSEF and other labs, the main sources of corundum were limited to a few classical deposits. This situation has become much more challenging with the discovery of large findings, especially in East-Africa and Madagascar in the 1990s. Origin determination never was and never will be easy, as it requires well-trained and highly experienced professionals. In future, gemmologists who want to practice origin determination have to have a sound understanding of the geological setting of gem deposits. A highly informative volume, updating current research on gemstone formation has recently been

published (Geology of Gem Deposits, Mineralogical Association of Canada Short Course Volume 37, 2007) and is highly recommended. Origin determination is based on a combination of observations (e.g. microscope, UV-reaction), measurements (e.g. RI, SG), and analyses (e.g. EDXRF, FTIR, UV-vis). Although new instruments (e.g. LIBS, LA-ICP-MS) do give us more insight into gemstone properties, I am convinced, that the meticulous observation of inclusions within a gemstone will, in future, remain the most useful tool for origin determination. The presence, shape and distribution of inclusions are the most sensitive indicators and references to different geological settings (i.e. different origins), much more so than chemical or spectroscopic features. In future, chemical fingerprinting by mass spectrometry, luminescence spectroscopy, stable isotopes and age determination, using radioactive isotopes within the gemstones or inclusions will further expand our possibilities.
Summarizing, origin determination will be important for part of the trade and thus remain a sophisticated

Small roundish dust flakes in an unheated sapphire from Kashmir. © H.A. Hänni, SSEF



Rhombic oriented dust flakes in an unheated sapphire from Madagascar. © H.A. Hänni, SSEF

challenge for future gemmologists. Classical deposits such as Kashmir, Burma, Sri Lanka for corundum, Colombia for emeralds, and Brazil for Paraiba tourmaline will remain premium „origin brands“ for the trade. Establishing new important sources as reputed origins is a question of good marketing.

Treatment of gemstones:
The treatment of gemstones is practised on a large scale. Economically it is important to cater for the market's high demand in gemstones. This will not change in future. The issue at stake, however, is the disclosure of treatments (CIBJO blue books, www.cibjo.org). Similar to other industries such as for nutrition (e.g. organic or mass produced with chemical additives), the conscious consumer wants to know what he is buying. There has also to be a price difference between these products, so one has the decision what one wants to buy. If the jewellery trade, especially on the high-end sector fails to disclose properly, the whole industry will face a dramatic loss of confidence.
The beryllium diffusion of corundum is a typical example of what happens when such a new form of treatment seriously puts affects the whole market by jeopardizing consumer confidence just because there was no proper disclosure from the moment the treatment was first introduced. Ultimately it was only by a concentrated effort of certain gemmological laboratories, including SSEF, that the detection of this treatment was possible; by investing in new and expensive technologies such as laser induced breakdown spectroscopy (LIBS) and laser ablation inductively coupled plasma mass spectrometry (LA-ICPMS).
In future we will see more treatments: simple and cheap ones for cheap stones, such as lead-glass filled fissures in low quality rubies, but also highly sophisticated for highly valuable stones, such as HPHT and multiple treatments for diamonds. Coatings will also have an important impact in the future, as technology in this field (e.g. for optics) has developed tremendously in the last few years.

Portable UV-Vis spectrometer developed by SSEF Swiss Gemmological Institute in collaboration with the Physics Department of the University Basel. The instrument uses a small spectrometer, which just has to be plugged into a laptop (see last page!). © M.S. Krzemnicki, SSEF 2008

Synthetic stones and imitations:
Every product has its market. This is also the case for synthetic stones. Especially synthetic diamonds produced by chemical vapour deposition (CVD) will have a considerable impact in future, as it's possible to grow (small) synthetic diamonds by quite fast and inexpensive means. Again, the main issue is the correct disclosure of a synthetic stone. Another problem is that synthetic stones may be mixed with natural ones. To identify a synthetic stone is not always easy and may be out of reach for the normal gemmologist who has not access to sophisticated equipment.
Imitations (and simulants) are products, which are used as cheap replacements for gemstones, but not necessarily with the intention of fooling the consumer. But again, appropriate disclosure is a requisite. These are rarely a threat for an experienced gemmologist; rather they show the creativity of the producers or forgers. For the retailer or end consumer, however, they can be very convincing and a source of bad and sorry investment.
We see with anxiety how terms are misused intentionally so as to confuse the end consumer. Especially with the anonymity of the e-market (internet) and television channels, an environment in which nearly no regulation is implemented, low quality stones (or synthetics and imitations) are often are sold without proper disclosure. International bodies such as the World Jewellery Federation CIBJO will more than ever be critical and irreplaceable in setting trade rules and expanding these into new distribution channels of gemstones and jewellery.

Gemmological laboratories:
Finally, I would like to address some thoughts about the future of laboratories testing gemstones. As stated above, detection of the origin, treatment, or even synthetic growth will become more difficult in future. As a consequence gemmology will be more scientific than it already has become in the last few years. Gemmology started as a practical application of mineralogy. It will increasingly expand into physics, chemistry, material science, biology and geology. Some laboratories such as the SSEF Swiss Gemmological Institute invest a lot of scientific and financial resources to be at the frontline of research in gemmology. They are trendsetters, developing new instruments or methods in order to safely identify and detect gemstones. Even gemstone dealers may profit from such inventions, such as with the

SSEF Diamond spotter, which is a small and easy tool to separate type I diamonds from type II diamonds (which may have been HPHT treated).
The technological progress due to space missions is one of the driving forces for new analytical methods. What has proven successful in space is certainly useful for gemstone analyses (e.g. LIBS). Especially what concerns the size and design of instruments, we will see a trend towards minimization in the future, as our recently developed small-scale portable UV-vis spectrometer shows (see article in the research section of this Facette).

Conclusion of this outlook into the future:
Generally spoken, some major laboratories such as the SSEF Swiss Gemmological Institute will be "brands", which help to maintain the confidence of the consumers in the market, even more than today. Apart from a few all-in-one laboratories, we will see more and more specialized labs, many of them concentrating on grading diamonds (and other gemstones) based on internationally accepted standards. Having in mind the complexity of gemstone identification, origin determination, and treatment detection now and in the future, I am convinced that the trade has to accept that this work cannot be done at the highest level of expertise for just a few dollars per gemstone report. Grading a diamond based on well-defined quality criteria can be done in a rather inexpensive and fast track routine. However, when it comes down to highly valuable items, such as a coloured diamond, where colour authenticity is asked, or an untreated sapphire, where the origin is asked, we will in future also require highly specialized experts and gemmological laboratories with sophisticated instrumentation.

This article is based on the presentation, given by Dr. Michael S. Krzemnicki at the 1st Herbert Smith Lecture, organised by the Gemmological Association of Great Britain Gem-A on 19th September 2008 in Hong Kong.

Beware of topaz cut to imitate rough diamond crystals and sold as diamonds to tourists and retailers. © SSEF, 2008

Winza, a new source of outstanding rubies from Tanzania:

Fig. 1: Unheated Ruby of 10.5 ct from the new deposit in Winza, Central-Tanzania which was certified 2008 at the SSEF. © H.A. Hänni, SSEF.

During the spring "Basel World" jewellery fair in Switzerland, we received a number of rubies at the SSEF booth, which showed some new features. The new kind of rubies of high transparency, that were presented by several dealers, all had a rather saturated red colour and showed no indications of heating. An absolutely striking 10.5 ct stone was presented to the SSEF laboratory for the purposes of a gemstone report with an origin indication. (Fig. 1). That an unsurpassed 20 ct ruby topped this excellent stone, later in the year, underlines the significance and the potential of this new source.

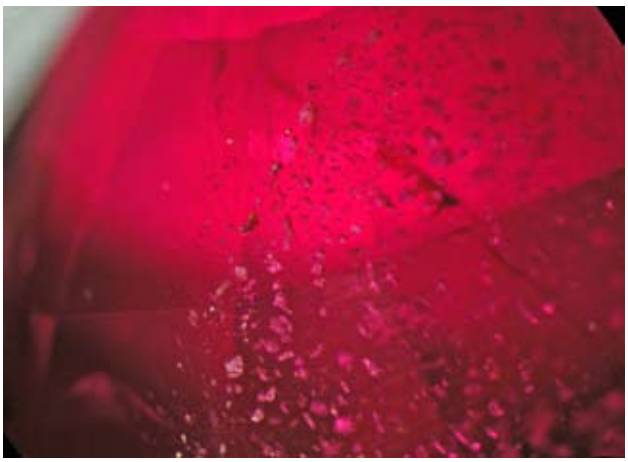


Fig. 2: Fluid inclusions with whitish grains. © H.A. Hänni, SSEF.

The internal features of the new material include specifically bent fibres, identified as hollow channels with a polycrystalline filling, probably of secondary minerals. Also often present are straight lines identified as intersecting twin lamellae. Healed fissures are charged with negative crystals with a polyphase solid filling consisting of white and often black grains. (Fig.2). Zircon as single inclusions or clusters have not been seen.
When the chemical composition was tested, with ED-XRF, Cr and Fe were found as main traces while Ga content was minor and Ti and V below the detection limit of the method. The clients were sure of the Tanzanian origin of the rubies and expected this origin to be confirmed on the test report. Not having seen rubies with the observed characteristics before, it was not possible to state a precise origin at that time. Only in January, after comparison with a lot of corundum furnished by Werner Spaltenstein, a rough gemstone buyer in East Africa, was a good coincidence of features observed.
The crystals and fragments showed different crystal habits and faces. The most surprising was an octahedron-like variation of the rhombohedral shape. On the triangular faces, with magnification, one can observe traces of surfacing-reaching twin lamellae, visible as sets of fine parallel lines. This indicated the origin as the Winza, Morogoro area, central Tanzania. Blue sapphires from the same mining area were also found in Spaltenstein's original parcel. A large ruby crystal, with adherent amphibolite parent rock and a blue kyanite crystal (Fig. 3), allows an estimation of the conditions of formation. The co-existing kyanite which is an indicator of high temperature, may suggest about 9.5kB/650°C of metamorphic formation. (Hunstiger, 1989).

The cut gems we have seen from this deposit, so far, suggest that there is a potential for high-grade rubies which do not need treatment but, as with all deposits, the lower qualities will surely be subjected to heat treatment to remove the blue spots and to lessen the conspicuousness of fractures.

Fig. 3: Pseudo-octahedral ruby crystal with adherent kyanite from Winza in two orientations. © H.A. Hänni, SSEF.

The Wittelsbach diamond

In December 2008, a historical blue diamond of 35.56 ct, named the "Wittelsbach diamond" was sold at an auction for a record price. This diamond is among the largest blue diamonds, only surpassed by the "Idol's Eye" (70.21 ct), the "Copenhagen blue" (45.85 ct), the "Hope" (45.52 ct) and the "Tereschenko" diamond (42.92 ct).
As for many famous diamonds, its history is linked to the glory and fate of nobility and kingdoms. Based on current knowledge, the "Wittelsbach diamond" was originally mined in India. In 1664, King Philip IV of Spain offered this blue diamond to his daughter, the Infanta Margarita Teresa for her engagement to her uncle, the Emperor Leopold I of Austria with whom she got married two years later. In 1722, after successive heritages, the blue diamond became the property of the Archduchess Maria Amalia, who married the Bavarian Crown Prince Charles Albert. The diamond remained the property of the royal family until the abdication of Louis III in 1918. As a consequence of the financial crisis at the beginning of the twentieth century, the family discreetly sold the now called "Wittelsbach diamond" in 1931. After that, official traces of the diamond vanished, until it resurfaced at an auction in London. The blue, cushion-shaped "Wittelsbach diamond" was sold to Mr. Laurence Graff for $ 24.3 millions. This is the record price for any diamond and jewel ever sold at an auction.

The SSEF had the chance to examine the "Wittelsbach diamond" previous to the auction. The cushion-shaped diamond has an extremely large culet and in spite of its shallow depth (depth proportions only approximately 38%), its blue colour is exceptionally pleasant. Under crossed polarizers, we could observe the best "tatami strain" pattern that we have ever seen. This anomalous extinction feature is characteristic for type II diamonds. Its blue colour is due to the presence of a minor amount of boron substituting a few carbon atoms within the crystal lattice. Such stones are classified as type IIb diamonds and are electrical conductors.

The Sunstone saga:
Red labradorite and andesine:

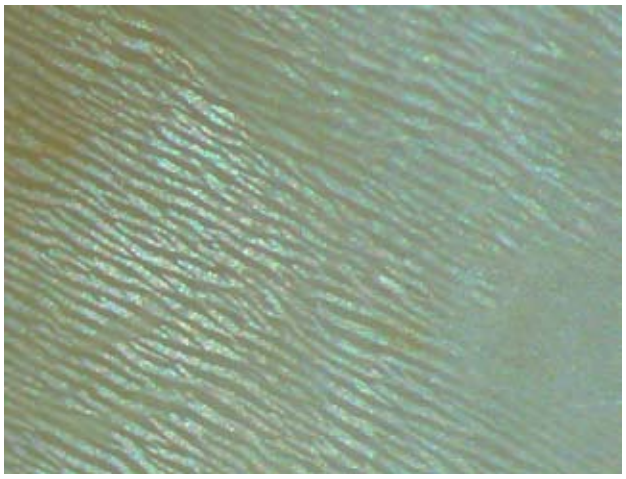
Since 2002, intense red and even green copper bearing feldspars are found on the market. In 2004, we published a first study on this material, which was said to come from Congo (M.S. Krzemnicki, Journal of Gemmology Vol. 29, No. 1, pp. 15-23). Although most material we have thus far tested in the laboratory was identified as labradorite, this material is often sold as andesine on the market. Both labradorite and andesine are neighbouring members of the plagioclase feldspars and differ only in their Na and Ca concentrations.
Recently, a large amount of this material has surfaced on the market, and rumours circulated that these stones have been treated to improve their colour. Different sources indicate various possible treatments such as heating, heating combined with copper diffusion or irradiation. Up until now we have only rarely tested feldspars in our laboratory, as they are generally too cheap for certification. However, to gain greater insight into the possibility of treatment, we are currently carrying out a series of detailed chemical analyses with LA-ICP-MS, to study especially the concentration of copper in these stones. Furthermore, we have received small parcels of such feldspars from Ahmadjan Abduriyim (GAAJ Japan) and Ted Themelis (Bangkok) to support our ongoing research on this topic.

Red and green labradorite analysed with LA-ICP-MS to gain insight in the copper concentration of these feldspars. © M.S. Krzemnicki, SSEF 2008

Flame structure of pearls

The close relationship in structure of shell and pearl means that analytical results gained from the shell are also valid for pearls of the same species. The sheen displayed on nacreous pearls is due to the structure of stacked aragonite tablets in parallel superimposition. Non-nacreous pearls often show a flame structure that is due to a crosswise array of bundles of aragonite laths or fibres. Small domains of bundles alternate with their orientation forming a crisscross array. Light striking the side of the bundles is reflected, whereas light falling on the profile of the bundles is absorbed. This behaviour results in brighter areas alternating with darker ones, producing the flame structure. This structure is typical for the porcellaneous lining of marine gastropod shells (e.g. Conch, Melo) and some bivalves (e.g. Cassis shell), and their pearls produced by the same mantle tissue.

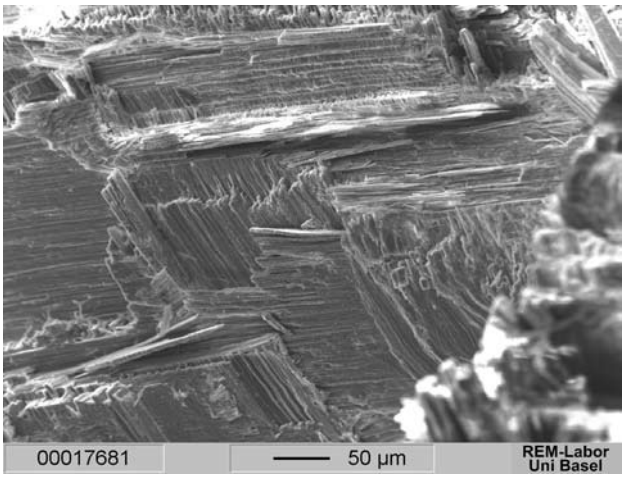
Flame structure as seen on a pink Conch pearl with brighter and darker areas. Photos © H.A.Hänni, SSEF



A pattern of reflecting bright spindles alternating with dull spindles on the inner surface of a Tridacna shell. The bright spindles display interference colours. Width of image 4 mm. Photo © H.A.Hänni, SSEF

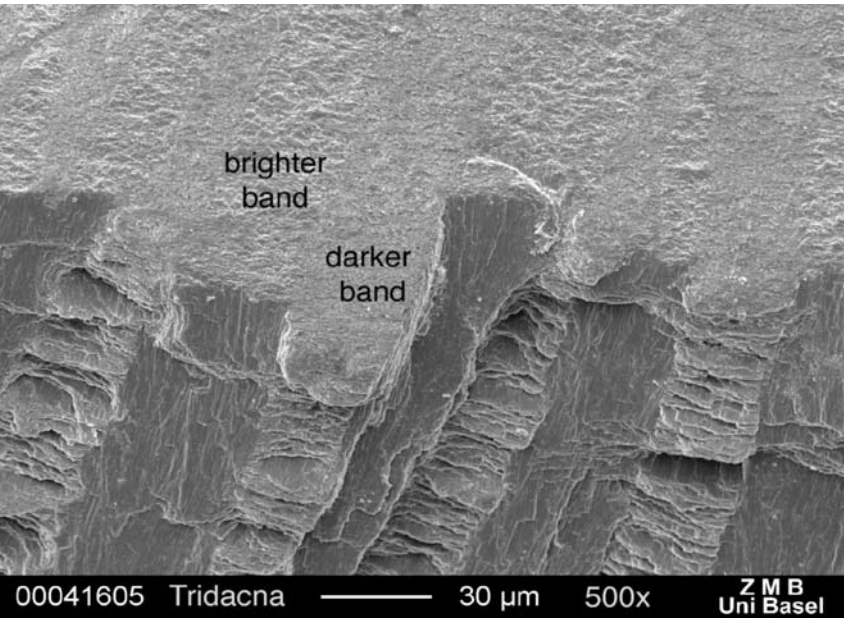
A similar situation was encountered when examining white Tridacna pearls that often show a fine spindle structure. Since no pearl was available for crushing and to investigate the broken surface, a Tridacna shell was kindly provided by the local natural history museum. Fine spindle-shaped lines are seen with a 10x lens on the inner surface of the shell and can be described as spindle structure.

In order to investigate this banded structure, broken material from a Strombus shell and from a Tridacna



SEM picture of a broken surface of Strombus gigas shell (pink Conch) showing a criss corss orientation of arrays. The laths consist of aragonite and form in layers. Picture Marcel Düggelin, ZMB

shell was analyzed with a scanning microscope SEM. The material consists of fibres and lath-shaped aragonite crystals in specific crosswise orientation. On the surface, they appear as lighter and darker alternating bands. With a strong fibre light one may even see interference colours, which gives an indication of the thickness of structures involved (0.1 μm). Under the SEM, at about 500x magnification, the same bands (about 20 μm wide) are visible in bright and dull. But the higher magnification allows a better resolution of the structure.
Stacked piles of aragonite lamellae in crisscross position form the material. Those lamellae that stand in a reflection position to the light are bright; those in the opposite position conduct the light away and are darker. The thickness of the lamellae of about 500 nm explains their capacity to interference with light, producing spectral colours.



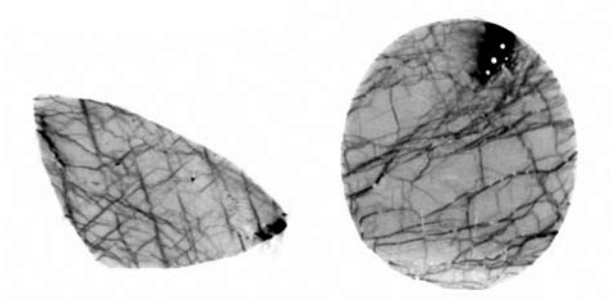
SEM picture of the surface (upper part) und a broken surface of a Tridacna shell. The crisscross structure consists of aragonite lamellae of approx. 500 nm. Magnification 500x. Picture Marcel Düggelin, ZMB

Micro x-ray-tomography
displays growth features of pearls.

Traditional identification of natural and cultured pearls requires high quality x-ray shadow pictures. All the internal features of the three dimensional pearls are projected down onto a flat x-ray film. The normal SSEF routine for pearl identification requires two x-ray pictures. The pearls are rotated between the two exposures to present different orientations for each of the two exposures. Seeing the typical characteristics necessary for a clear identification of the pearl is usually a straightforward procedure. In some cases, however, it would be advantageous to have a more specific knowledge of the shape of the central area, i.e. the details of the onion-like growth structure. Especially gonad-grown beadless cultured pearls (product of a first bead rejection), often called “South Sea Keshi” in the trade, are sometimes difficult to identify.
Recently, the SSEF has investigated the potential of micro x-ray tomography to identify pearls. This method is well known in biology and technology, and has been introduced into gemmology by E. Strack, and later by U. Wehrmeister et. al. (2007). Micro x-ray -tomography displays in detail the growth features of a pearl in a three-dimensional picture after scanning the pearl for several hours. Any section can then be chosen and differences in x-ray densities are shown. Areas of different minerals, for example calcite, aragonite and vaterite, or cavities and fissures are clearly visible. Through Prof. Hänni’s teaching position at the University of Lausanne, the SSEF has had the possibility to investigate some pearls and to obtain convincing pictures in regarding growth characteristics. Thanks go to Dr. B. Putlitz for her support and performance in producing the tomographies.

How much glass is in the ruby?

A controversy has arisen between different gemmologists dealing with the amount of glass in a fissure-filled ruby. Of course there are gradual differences, but let us discuss an extreme case such as a lead glass-filled ruby sold for $10 per carat yet looking like a $2000 stone. As the fissures are not sealed by a re-crystallisation process, as with borax-assisted heat treatment, the lead glass can be etched away with hydrofluoric acid. The original weight of the stone can thus be obtained, after the acid cleaning, and would give the added weight as a percentage, if necessary. But a non-destructive way is what gemmologists would preferentially seek. X-ray fluores-



Micro X-ray tomography of a lead glass filled ruby. Two sections of the same stone are displayed. Picture by Dr. B. Putlitz, University Lausanne.

cence can show the presence of lead. The amount and distribution is shown in a two-dimensional x-ray shadow picture. As we have a good relationship with the analytical laboratory of the University of Lausanne's Earth Sciences department, we have tried an alternative and up-to-date method: micro x-ray-tomography. See details of the method above. As materials with different x-ray densities are pictured in different shades of grey, the distribution of corundum and lead glass can be distinguished easily. It is then a matter of some hours to scan the treated ruby and sum up the volumes of corundum and lead glass. Thanks go to Dr. B. Putlitz for her support and performance in producing the tomographies.

^{14}C age determination of "Neptunian" beads from Asia

During the first Macau Jewellery & Watch Fair, in January 2008, the author purchased four baroque-shaped drilled beads of an unknown material, labelled "Neptunian beads". The orangey brown samples had white striae and the orangey portions showed an appealing sheen. (Figure 1). When asked about the origin the seller reported that the material was from a conch fossil, found at an altitude of 5000 m, in the Himalayan Mountains. Promotional literature, provided with the samples, added that the beads had several medicinal uses. Close examination of the beads showed that the material had two main layers, which is common for conch shells. As the material appeared too recent to be a fossil, the author decided to apply a method rarely used in gemmology: age determination by radioisotopes. The Swiss Federal Institute of Technology in Zürich performed ^{14}C isotope measurement to calculate the age of the specimens. Radiocarbon dating can determine ages up to 30,000 years. To make the determination, the laboratory took 200mg of powder from the drill hole of one of the beads. A spectrum, relating time with atmospheric radiocarbon content and the sample data, is shown in figure 2. Because above ground nuclear weapons testing in the 1950s substantially raised the concentration of ^{14}C in the atmosphere, and consequently in all living organisms, the test produced two possible results. The ^{12}C/^{14}C ratio of the sample intersected with the atmospheric ratio for 1957 and 1997. Clearly, the beads are far younger than the 35 million years claimed in the brochure. We thank Drs. G. Bonani and I. Hajdas, SFIT, for their help in resolving the present case with a test new to gemmology. Raman spectroscopy identified the material as aragonite. The density of the beads was 2.78g/cm^3. EDXRF analysis showed that Ca was the only major element, with traces of Sr also present, as would be expected for aragonite from a conch shell.

Fig. 1: Baroque-shaped bead, marketed as fossilized "Neptunian" beads, proved to consist of recent shell material. © H. A. Hänni, SSEF 2008

First published by H.A. Hänni in the Gem News International section of Gems & Gemology, Fall 2008 .

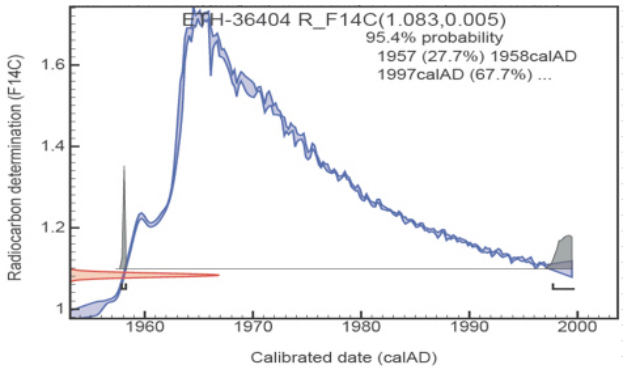


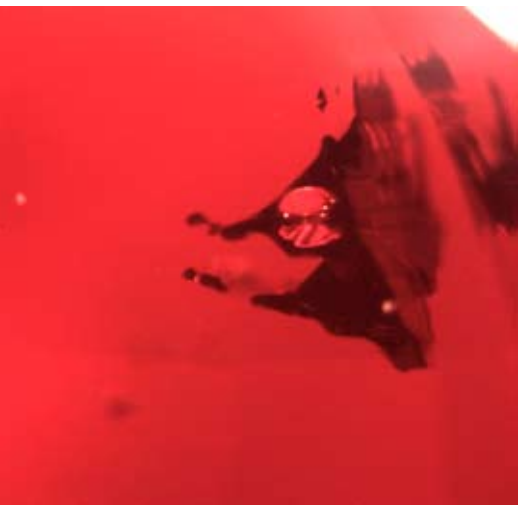
Fig. 3: Plotting the ^{14}C concentration (red) with the blue ^{14}C distribution curve over the last 50 years shows two grey intersections, which indicate that the aragonite from the Neptunian beads formed either in 1957 or 1997. Graph courtesy of G. Bonani and I. Hajdas, SFIT; © SSEF Swiss Gemmological Institute

Flux grown synthetic red spinels again on the market

Flux grown synthetic spinel. © M.S. Krzemnicki, SSEF

During and after the Hong Kong Jewellery Fair in September the SSEF Swiss Gemmological Institute has received several red spinels for testing, which were found to be flux synthetic spinels. These spinels apparently have been offered in Bangkok in the last few weeks.

Flux synthetic spinels are not a new issue. Actually, Nassau describes in his book "Gems made by man" (1980) that flux synthetic spinels were accidentally grown already in the mid-18th century in an attempt to produce synthetic rubies. Muhlmeister et al. (1993), Schaub (2004) and Notari & Grobon (2004) have well described the properties of similar stones more recently. With the appreciation, which fine quality red spinels are seeing nowadays in the market, it is not astonishing that synthetic spinels have shown up just now again. Different to flame-fusion synthetic spinels (e.g. by Verneuil-process, mostly light blue, yellowish-green, and colourless), the investigated flux synthetic spinels are very convincing and similar in appearance to natural spinels of best quality. Only by meticulous microscopic observation and chemical analysis, their synthetic formation may become evident. Traditional gemmological methods are no help, as RI, SG, and the absorption spectrum are similar to natural spinels. Between the crossed filters of a polariscope, the tested flux synthetic spinels all showed distinct anomalous extinction due to internal strain, which may also be observed in natural spinels, especially around inclusions. Under LW and SW ultraviolet, the stones generally exhibit a distinct orange-red fluorescence, sometimes slightly chalky yellowish orange along facet edges. But again, a safe detection based on these observations is not possible.



Flux residue with gas bubble in synthetic spinel. © M.S. Krzemnicki, SSEF

Microscopic evidence:

The investigated synthetic spinels all are very pure, however they all show small jagged to tubular cavities filled with black to orange brown residues of flux. The presence of large gas bubbles within the flux residues is due to an exsolution of the homogeneous flux during the cooling of the synthetic spinel. Apart from flux inclusions, one spinel showed a distinct six-sided metallic flake, most probably originating from the platinum crucible in which the synthetic spinel had grown.

Natural red spinels, especially the ones from Burma (Myanmar) often are quite included, showing healed fissures with plenty of small octahedral negative crystals and various crystal inclusions, notably rounded (corroded) carbonates. Often they may also contain brownish iron-hydroxide in open fissures and cavities, which should not be confused with the above described flux residues in flux synthetic spinels.

Sophisticated analyses support microscopic evidence:

The chemical composition of the analysed red flux synthetic spinels is at a first glance quite similar to the composition of natural red spinels. Different to Verneuil-synthetic spinels which show a high alumina concentration, these flux synthetic spinels have a stochiometric Mg:Al similar to natural spinels. This explains also why the flux synthetic spinels do not differ in RI and SG from their natural counterparts. Apart from these main constituents, the stones all revealed distinct chromium concentrations (0.5 – 2.5 wt% Cr_2O_3), combined with traces of iron, vanadium, nickel, zinc, and gallium. Platinum was found in one specimen due to the mentioned metallic flake. These elements (except platinum) may also be present in natural spinels. In accordance with Muhlmeister et al. (1993), the main distinguishing feature is the low concentration of zinc (0.01 – 0.02 wt% ZnO). Natural spinels show concentrations generally exceeding these concentrations by a factor of ten or more (Schaub 2004).

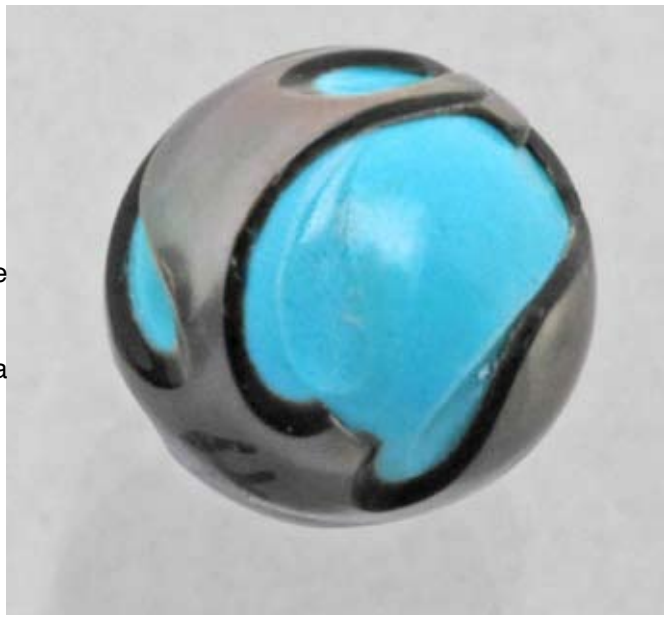
Raman spectra show a distinctly broader peak shape (at 406 cm^{-1} Raman shift) for the flux synthetic spinels when compared to natural spinels. Similar peak-broadening is also known for Verneuil-synthetic spinel and is an expression of internal strain locally deforming the cubic crystal structure. Apart from this, the excitation with our green laser (514 nm) resulted in strong photoluminescence peaks due to chromium. However, these emission peaks are much less structured than in natural chromium-bearing spinels (see also Notari & Grobon), offering another good possibility to distinguish these flux synthetic spinels from natural ones.

Even the crystals look like natural:
Flux synthetic spinels grow as well-shaped octahedral crystals. They often show triangular surface features similar to those commonly found on natural spinel. Also slightly different in close inspection, these beautiful crystals may easily fool rough gemstone buyers when mixed with natural spinels. Only careful observation with the loupe or microscope, and eventually sophisticated testing at a reputed gemstone laboratory such as the SSEF Swiss Gemmological Institute may tell the difference between natural and synthetic.

Natural and flux grown synthetic spinels. Both are octahedral crystals before cutting. © M.S. Krzemnicki, SSEF.

Engraved cultured pearls with an unexpected bead.

Recently the SSEF laboratory received four black culturd pearls for testing. The nacreous surface was engraved with a floral pattern which was deep enough to expose the bead nucleus, which was light blue in colour and resembled turquoise. According to the producer, turquoise, citrine, and amethyst have all been used as bead materials in their cultured pearls.
As two of the cultured pearls had been cut in half, it was a simple matter to determine the chemical composition of the bead material by ED-XRF. While turquoise would show phosphorus, copper, and iron, these beads contained barium and sulphur. Microscopic investigation revealed a fine granular composition that was distinctly different from the structure of turquoise. Finally, characteristic peaks in the Raman spectrum indicated the presence of an epoxy resin. We thus concluded that the beads in these cultured pearls were an artificial material, and not turquoise. Based on the chemical composition, we deduced that the material was barium sulphate powder that had been dyed and then hardened with an epoxy binder. The dye was not identified but it seems clear that such beads could be produced in any colour desired.



Engraved cultured pearl with a blue barium sulfate bead imitating turquoise. © H.A. Hänni, SSEF.

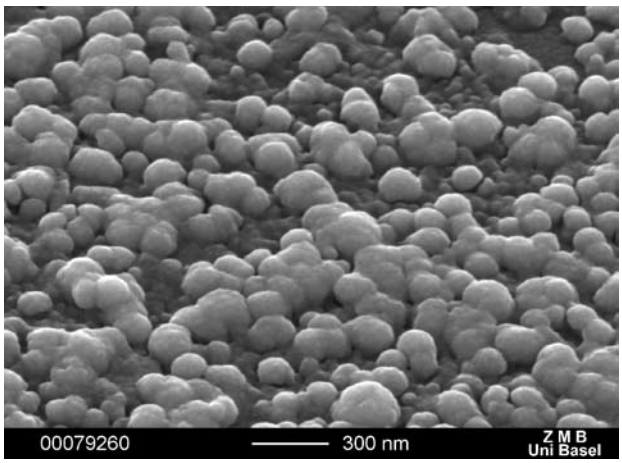
Using the hydrostatic method, we measured the specific gravity at 2.28 for the engraved cultured pearls and 2.10 for the bead material. The SG of typical Pinctada margaritifera cultured pearls is around 2.71, with slight variations depending on the size of the nucleus and the thickness of the nacre. The distributor of these new engraved cultured pearls informed us that his products might also contain yellow beads. P. maxima cultured pearls are also beaded with colourful nuclei. When our client was informed of the identification of this material, he indicated that he was not aware that the material being used was imitation turquoise and that they would be changing their marketing of the materials accordingly.

Colourless coatings of gemstones:

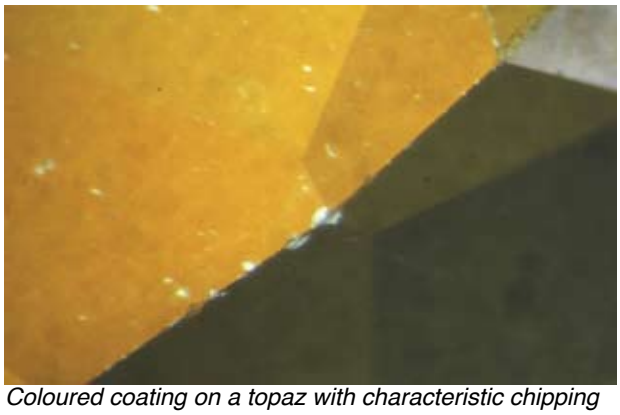
In beginning 2008, the SSEF Swiss Gemmological Institute sent different gemstones (emeralds, titanite, topaz, cubic zirconium oxide and synthetic moissanite) for coating to two different enterprises (known as “Serenity Technologies” and “Better than diamond Inc.”). These two enterprises are processing a colourless coating (with a thickness of a few tenths of ppm) on stones to – as they say - improve their brilliance and hardness. In the trade, such a coating is actually known as DLC (“Diamond Like Carbon”), i.e. a carbon film, but which lacks the crystalline structure of diamond. Under the microscope, we did not detect any difference in comparison with the observations performed before the treatment. When analysing with the DiamondView™, we did not observe any overgrowth on the stone, probably also due to the very small thickness of the coating. Spectroscopic analyses with FTIR and Raman did not reveal any indications of a surface treatment, nor did chemical analyses with XRF. Some weeks later, we received some coated cubic

zirconium oxides from their most recent production from one of these enterprises (Serenity Technologies). They reported that their new process should create some “nanocristalline diamonds” on the surface, instead of DLC. Under the microscope, again, we could not detect any indications confirming the presence of a treatment. It was only by using the SEM (Scanning Electron Microscope) that some very small particles of a maximum of 250 nm in size covering the surface were revealed(Photo 1). Chemical analyses indicated the presence of carbon and silicon. With spectroscopic methods (FTIR, Raman) the treatment could not be detected thus far, as was also the case for the DLC coating.
So, in fact, except the presence of carbon there is no indication allowing us to associate the term “diamond” to this treatment. Further research is under progress so as to understand and detect such colourless coatings on gemstones and also to clearly identify what these coatings are made of.

Taking into account the development in this field of technology, we think that the detection of this new type of coating could be a challenge for gemmological laboratories in the future. This is in contrast to all coloured coatings encountered so far at SSEF, where identification is straight forward when using the microscope and other spectroscopic and chemical analyses.



High magnification SEM picture of the surface of a coated CZ. Picture Marcel Düggelin, ZMB



Coloured coating on a topaz with characteristic chipping along the facet edges. © M.S. Krzemnicki, SSEF

Golden South Sea cultured pearls just as harvested at Terramar (Jewelmer). © H.A. Hänni, SSEF

Golden South Sea Pearls from Jewelmer

In May 2009, Prof. Hänni was invited by Jacques Branellec to visit the Jewelmer pearl farms in northern Palawan (Philippines). Gold-lipped Pinctada maxima shells, which have been grown in their own farms, are producing gonad-grown beaded cultured pearls. The remote location and the natural sanctuary-like environment guarantee healthy shells. When at the same time skilled technicians work under scientific conditions, respecting requirements of modern pearl farming, a high quality product can be expected. Mr Branellec helped SSEF pearl research by giving access to the facilities, allowed sampling of shells and put the highlights on that excursion by his self-piloted helicopter trips around his pearl farms.

Terramar pearl farm (Jewelmer) in N-Palawan, one of the locations where Jewelmer (Manila) is culturing the sought-after "golden South Sea pearls". © H.A. Hänni, SSEF

SSEF Courses in 2009

Again, our SSEF courses have been very successful with a high number of participants. The SSEF Swiss Gemmological Institute is continuing to form gemmologists at different levels starting from our Basic, and leading to Advanced and Scientific courses. In April 2008, Jean-Pierre Chalain, director of the diamond department gave a one-week special course for the staff of the gemmological laboratory of the Directorate of Precious Metals and Gemstones in Manama (Bahrain). This course was a follow up of our Scientific diamond course, specially designed to supply a hands-on training on the Raman-, FTIR-, and UV-VIS-NIR spectrometers recently installed in their laboratory.

In 2009, the SSEF continues to be your partner for improving your knowledge in gemmology. If you are looking for a basic diploma in gemmology, we suggest you follow the SSEF Basic Training Course (22 June - 7 July) and/or the SSEF Basic Diamond Course (7-11 September). Students who pass the final exams in theory and practice successfully (see section „congratulations...“) receive the SSEF diploma. Through further advanced courses on coloured stones (28 September – 2 October) and diamond treatments, topics of the basic courses and complementary information are explained in greater depth. In 2009 we are again offering so-called practical days, which will take place 20th April, 8th June, 14th September and 2nd November. These days are dedicated for practical gem testing on stones from the SSEF collection or even on your own stones. You will hereby refresh your gemmological skills with our well-experienced education staff.
As has now been the case for many years, SSEF is in 2009 also offering its highly appreciated Scientific Gemmology Course (26-30 January and 10-14 August 2009) and Scientific Diamond Course (2 – 6 February and 19 - 23 October 2009).

For the complete course programme or more information please contact SSEF: admin@ssef.ch (tel. +41-(0)61 262 06 40) or see our website www.ssef.ch (download our course programme as a pdf file!).

SSEF Basic and Small Diamond Courses

The SSEF is highly reputed for the certification of diamonds. To share this experience, the SSEF has developed the Basic Diamond Course, which is addressed to anyone who wants to expand their knowledge about diamonds and diamond grading.

The participants of the SSEF Basic Training Course in summer 2008 (see “congratulations...”). © SSEF, 2008

During this course, the participants will be learning about the different steps required to grade the quality of a diamond. The course ends with a final exam, in which successful students will be delivered the SSEF Basic Diamond Certificate, recognized by the Swiss Gemmological Society (SGG).
Some years ago, the SSEF created a special course for the luxury industry, which may be concerned about the quality management of small diamond lots. Participants of this advanced course will approach and themselves perform the quality control of such small diamonds. This special small diamond course is aimed at people working in the jewellery and watch industry. Previous experience is welcome but not a requirement. For information and application contact us by phone (+41 (0)61 262 06 40) or email (admin@ssef.ch).
For the training of a larger number of staff members, we are pleased to offer you SSEF Company Courses, which may be especially designed to meet your specific requirements. Please contact SSEF for any question concerning such a Company Course (admin@ssef.ch, or tel. +41 61 262 06 40).

Scientific Diamond Course

The SSEF Scientific Diamond Course (SDC) took place in February 2008. The two participants, Ofra Klein Ben David and Rodney Katz, received their SSEF Scientific Diamond Certificate. This one-week course offers the participants an insight into the most advanced methods to analyse diamonds. Up-to-date analytical equipment is demonstrated and the participants exercise themselves the various

techniques in order to separate synthetic diamonds from natural ones, and to detect treated diamonds. The methods presented include infrared spectroscopy (FTIR), absorption spectroscopy in visible and ultraviolet (UV-VIS) at low temperature (-120°C), and photoluminescence spectroscopy (PL) at low temperature. This year, we offer you two possibilities to participate at this course, either from 19 - 23 October, or from 1 – 5 February 2010. In the course notes, the topic is illustrated with numerous spectra and two tables, which summarise the „Defect Induced Vibrational Bands“ and the „Optical Bands“. A list of literature references is also given. For further information contact SSEF: admin@ssef.ch (tel. +41-(0)61 262 06 40) or see our website www.ssef.ch where you can download the detailed course programme.

The participants of the Scientific Gemmology Course in August 2008, with staff from the SSEF. The participants are (from right): Florian Le Goff, Daniele Manasse, Colette Hemlin, and Luc Phan.

Scientific Gemmology Course

A total of seven students participated at the SSEF Scientific Gemmological Courses (SGC) held in January and August 2008. After completion of the one-week course packed with information, Peter Brangulis, Maris Gertans, Colette Hemlin, Johannes Hunziker, Florian Le Goff, Luc Phan, and Daniele Manasse received their course certificate. This year, we will offer the Scientific Gemmology course again in 10-14 August 2009 and in 25-29 January 2010. During the course, the participants are learning techniques and applications of instruments like X-ray fluorescence spectrometry, UV-Visible-NIR spectroscopy, LIBS (Laser Induced Plasma Spectroscopy), Raman and FTIR spectrometry, as performed at the SSEF Swiss Gemmological Institute. Participants with a scientific background or advanced experience in gem testing will profit the most from this course. For information and application contact us by phone (+41 (0)61 262 06 40) or email (admin@ssef.ch).

New: Advanced Pearl Course

We are excited to announce a new opportunity to increase your expertise in a key gemmological topic. As understanding the different kinds of pearls in the market is increasingly important, because of the diversity of natural and cultured pearls available, SSEF is offering an Advanced Pearl Course in January and November 2009. Contents of the course include a thorough introduction into pearl formation, working with single pearls and strands of pearls, evaluating pearl cross sections and radiographs. Participants will make x-rays radiographs, chemical analyses, and x-ray luminescence pictures. Raman and UV-Vis reflectance spectra are further techniques that form part of this specialised course. SSEF is extremely well equipped to hold such a course as, in our laboratory, the most prestigious pearls are frequently analysed and our pearl reports ensure confidence, internationally, in the trade for natural pearls.
For more information, please contact SSEF: admin@ssef.ch (tel. +41-(0)61 262 06 40) or see our website www.ssef.ch

Collection of cross sections of natural pearls and cultured pearls (beaded and beadless) to study internal features of pearls. © H.A. Hänni, SSEF 2008.

Congratulations...

2008 has been a very good year for SSEF teaching courses with more than 40 students attending, and who by their active participation have greatly contributed to the success of our courses. SSEF Swiss Gemmological Institute wants to express its congratulations to the following students for receiving:

SSEF Basic Gemmologist Certificate:

With the highest distinction
- Rachel Blöchliger, Einsiedeln

With distinction
- Lionel Blaser, Dress Your Body SA, Cormondrèche
- Hrvoje Nad, Zagreb, Croatia
- Nadège Totah, Horovitz & Totah SA, Geneva

and the following successful participants:
- Nataliya Berezhna, Zürich
- Stéphane de Weck, Horovitz & Totah SA, Geneva
- Svetlana Hohl-Mishchenko, Zürich
- Maricela Lancoud, Froideville
- Andres Rodriguez, Valencia, Spain
- Sinika Romisch, Rheingauer Auktionen, Germany
- Christine Scholaert, Zug
- Karin Wullschleger, Richterswil

SSEF Basic Diamond Certificate:
- Antonella Arcuri, Ebikon
- Lionel Blaser, Dress Your Body SA, Comondrèche
- Laurent Duding, Piaget SA, Geneva
- Sandro Ganguin, Gordola
- Alexandre Glarner, Piaget SA, Geneva
- Laurent Joray, Roventa – Henex SA, Bienne
- Christina Maersk, Luzern
- Pedro Serodio, Piaget SA, Geneva
- Béatrice Sylva, Piaget SA, Geneva

Only participants who pass the final exam receive the SSEF Basic Gemmologist or Basic Diamond Certificate. The qualification requires theoretical knowledge as well as practical skills in gemstone testing or diamond grading.

Advanced Gemmologist Certificate:
courses on treatment and origin of coloured stones
- Angela Berden, Christie's, London
- Rachel Blöchliger, Einsiedeln
- Flavio Butini, Inst. Gemm. Nazionale, Rome, Italy
- Emma Checkly, Christie's, Paris
- Daniel Girod, Christie's, Amsterdam
- Rumi Guscetti, La-Tour-De-Peilz
- Lyne Kaddoura, Christie's, Geneva
- Jessica Koers, Christie's, Amsterdam
- Jean-Marc Lunel, Christie's, Geneva
- François Maurisse, Annemasse, France
- Helen Molesworth, Christie's, Geneva
- Jessica Silli, Christie's, Geneva
- Robert Vogelsang, Zürich
- Rachel Warner, London, Great Britain

SSEF Special Course UV-VIS-NIR:
- Anu Manchanda, Anchorcert, Birmingham, UK

SSEF Scientific Diamond Course
- Rodney Katz, Israel
- Ofra Klein Ben David, Israel

SSEF Scientific Gemmological Course
- Peter Brangulis, Assay Office of Latvia
- Maris Gertans, Assay Office of Latvia
- Colette Hemlin, Montréal, Canada
- Johannes Hunziker, Herrenschwanden
- Florian Le Goff, La-Chaux-de-Fonds
- Luc Phan, Altkirch, France
- Daniele Manasse, Roma, Italy

We wish all successful participants a sparkling gemmological future!

SSEF Courses 2009:

26 - 30 Jan	Scientific Gemmology
2-6 Feb	Scientific Diamond
20 April	Practical Training
9 June	Practical Training
22 June - 7 July	Basic Gemmology
10-14 Aug	Scientific Gemmology
7 - 11 Sept	Basic Diamond
14 Sept	Practical Training
28 Sept - 2 Oct	Advanced Coloured Stones
19 - 23 Oct	Scientific Diamond
26 Oct	Advanced Diamond
27 - 28 Oct	Small Diamonds Quality Grading
23 - 25 Nov	Advanced Pearls

2010

4 Jan	Practical Training
25 - 29 Jan	Scientific Gemmology
1 - 5 Feb	Scientific Diamond

SCHWEIZERISCHES GEMMOLOGISCHES INSTITUT
SWISS GEMMOLOGICAL INSTITUTE
INSTITUT SUISSE DE GEMMOLOGIE

New SSEF Logo

Nowadays, a logo and a slogan are esential to position yourself in the market. Whether it is for a pizza delivery, a company producing high-end gadgets, or even gemmological laboratories.
As a Swiss company, offering Swiss-made products and gem testing services, we did not have to search too far, but have chosen the Swiss cross in our new logo to express our commitment to the highest precision and quality combined with well established traditions and norms in gemstone testing.

The SSEF has always been a leading authority in gemstone testing based on scientific research and instrumentation. For more than 10 years we are offering our SSEF Scientific Courses. Many participants are using the knowledge they acquired in our courses in gemmological laboratories world wide. That's why we have chosen the slogan "SSEF,the Science of Gem Testing" to be part of our corporate identity.

New SSEF Reports

- Cut grade on Diamond Reports
- with Prooftag authentification

In the beginning of 2009, we are modernizing the look of all SSEF reports including the new SSEF logo.

For our new SSEF Diamond Report, there will be some changes concerning the presentation of the grading results. The aim is, that the four quality grades (4 C's) are more readily visible on the report. Furthermore, the SSEF introduces the cut grade (excellent, very good, good, medium, poor) on our reports based on very strict and rigid cut criteria.

Our new SSEF Gemstone reports for single loose stones and our Test Reports for mounted stones or pearls will only see a slight refreshing.

For security reasons, each new SSEF report will also carry an authentification tag. This exclusive "Prooftag Bubble Tag" enables you to to verify that the report has really been issued by SSEF.

New floor added to the SSEF laboratory

In order to better serve the requirements of gemstone testing, the SSEF board has made the decision to enlarge the surface area of the laboratory by more than 30%. This increase in space allows better organisation and operation of our working scheme. Handling large numbers of small diamonds requires a larger space than just diamond grading. The separation of spectroscopy, where light is allowed, and spectroscopy performed in the dark, requires two spectroscopy rooms. Additional space was also required for the accommodation of work sheet storage within reach of the office. A conference room offers space for receiving clients in an atmosphere of greater privacy. The new floor is fully operational and busy since the end of December 2008.

The Prof. Hänni gemstone collection stays with SSEF

A collection of well-characterised reference samples is the most reliable source for gemmological work, especially for origin determination. For over 40 years, Prof. Hänni has collected gemstones in a systematic way, often picking the samples for their origin. This unique collection of common and exotic gemstones also contains synthetic crystals and specifically treated stones collected over the years. As for gemstone sources, treatments often appear only for a short period of time on the market and are subsequently only rarely seen again. Being in the possession of such samples, however, often enables us to identify a stone from a client just by comparing its properties with similar stones from this collection.
The Prof. Hänni gemstone collection has been built up using scientific and gemmological principles and contains approximately:
- 1300 cut stones, natural, synthetic and imitation
- 800 boxes with rough gemstones
- 50 items of organic origin including pearls and shells.

A database reports all characteristic features of these stones. While working with SSEF Prof Hänni has used these samples for research and education. Now that he will retire in one year he has offered the SSEF to buy the collection as a foundation for further research.

Donations are welcome:
In December 2008, the board of SSEF decided to buy the entire collection and is seeking sponsors who would like to donate funds in order to keep the collection as complete as possible and to support research in gemmology for the future. Please contact M. A. Christen, President of the SSEF board, email: christen.advo@bluewin.ch, for further details.

Small Diamond News

Testing colour authenticity

We have known since 2000, that brown and inexpensive type II diamonds may be treated using High Pressure and High Temperature (HPHT) in order for them to become colourless. SSEF was the first gemmological laboratory to develop a routine to detect HPHT treated diamonds. This method is based on (1) the determination of the diamond type and (2) for any type II diamond on the detection of specific low temperature photoluminescence features. If you want to learn more about this, you are cordially invited to join our one-week Scientific Diamond Course (2 – 6 February and 19 - 23 October 2009, see our website: www.ssef.ch). These sophisticated testing methods currently remain very expensive compared to the price of an individual small diamond.
Testing colour authenticity of diamonds is one of the major challenges, especially when checking batches of colourless small diamonds. Since we have implemented a new step in our routine in December 2009, the SSEF Swiss Gemmological Institute is now checking the authenticity of colour for non-sampled lots. This applies to batches smaller than 91 stones and generally to all step cut diamonds (“baguettes”). For batches of more than 90 diamonds, a representative sampling is quality controlled, but colour authenticity can so far not be assured, as this would render too expensive and time-consuming. In cases where the colour of a given lot is not checked for its authenticity, the SSEF report mentions in the comment-section, that colour authenticity has not been checked.

The SSEF is currently developing a new automatic diamond tester, which will expand our detection possibilities in the near future and allow colour authenticity tests even for very large lots of small diamonds.

News from CIBJO, LMHC, CEN

In 2008 we had plenty of meetings and workshops with organizations such as CIBJO – The World Jewellery Confederation, LMHC – Laboratory Manuel Harmonization Committee, and CEN – European Committee for Standardization.

CIBJO: The Congress 2008 was held in Dubai (14-16 April). The assembly of delegates created a foundation that will be responsible for financing and administering the worldwide Corporate Social Responsibility (CSR) education programme for the jewellery industry, which CIBJO is going to organize in collaboration with the United Nations. A further section – the Precious Metals Book – has been added to the CIBJO Blue Books, which already include the “Diamond Book”, the “Coloured Gemstones Book” and the “Pearl Book”. The CIBJO Retailer's Guide to Trust and the CIBJO Retailer's Guide to Marketing complete these major trade documents. On the CIBJO website (www.cibjo.org) these documents can be downloaded.

LMHC: The Laboratory Manuel Harmonization Committee is formed of representatives from seven major gemstone testing laboratories, including AGTA-GTC (USA), CISGEM (Italy), GAAJ Laboratory (Japan), GIA-Gem Trade Laboratory (USA), GIT-Gem Testing Laboratory (Thailand), Gübelin Gem Lab (Switzerland) and SSEF Swiss Gemmological Institute (Switzerland). In May 2008, the committee met in Milan and in September in Tokyo. Among many other discussions, the following points were addressed:
- the nomenclature for adularescent plagioclase,
- a round-robin test of treated emeralds,
- coated tanzanite,
- green amber versus copal,
- alexandrite,
- master series of padparadscha,
- master series from ruby to pink sapphires,
- comparison of members reports,
- Information Sheets No. 1, 3, 5, 8, 9.
- The emerald information sheet (IS No. 5) was adopted and is soon available on the website of SSEF and the other LMHC members.

CEN: SSEF participated at two meetings of CEN– European Committee for Standardization to discuss a document named " Consumer confidence and terminology in the diamond industry". In September 2008 we met in Brussels for the kick-off meeting and in November in Antwerp for the workshop. The nomenclature of synthetic diamonds was by far the most debated topic among others. At the present stage, it is too early to report here any outcome since the discussion did not reach a consensus yet.

SSEF and Burma:

Trade ban on gemstones and support for locals

Since a trade ban for gemstones from Myanmar (Burma) is now effective, SSEF has decided to offer a special service to clients exporting gemstones to the States and other countries with a similar trade ban regulation.
Upon request, SSEF issues gemstone reports with a special comment indicating that the stone does not originate from Burma (Myanmar). This service is only applicable to single stones or stone lots which do show features (inclusions, chemistry, spectrometry) which are not consistent with characteristics known from Burma.

The comment on such a report is:
Based on the analysed and observed properties, Burma (Myanmar) can be excluded in our opinion as origin of the examined gemstone.

This service is offered at a 25% reduction from the normal report fee including origin determination.

For further details, especially when testing lots of small coloured stones, please contact SSEF Swiss Gemmological Institute (gemlab@ssef.ch).

Burmese gemstones have always been an important part of our business. This explains why we have quite strong ties to this country. Knowing the difficult situation in Burma, especially after the devastating typhoon that hit the country in May 2008, we have contributed to a fund raising campaign of the Swiss gemstone trade to support a Burmese NGO organisation which mainly focussed to restore the local drinking water system in the southernmost part of Burma.

Pierre Lefèvre, SSEF gemmologist with a superb spinel, which was tested in Bangkok in 2008. © SSEF

Location:
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c/o. Premacut Ltd
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Silom Road, Bangrak
Bangkok 10500

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tel. +66 (0)2 635 28 44
fax. +66 (0)2 635 27 44
local mobile +66 (0)84 467 71 30
e-mail gemlab@ssef.ch
ssef.bangkok@gmail.com

On-site service in Bangkok

After the successful launching of our services in Asia, we will continue our on-site service in Bangkok and Hong Kong also in 2009. Equipped with our mobile instruments and spectrometers, every gemstone is meticulously analysed before certification. In 2008 we have tested some very outstanding gemstones in Bangkok, including a very large and pure spinel, peridot, and tsavolite, apart from numerous sapphires and rubies.
If you wish to profit from this service, please contact SSEF at gemlab@ssef.ch to receive our newsletter or check our website www.ssef.ch, on which our on-site services are announced.
Our next on-site service in Bangkok is scheduled for the **11 – 15 March 2009**.

Sparkling mix of coloured stones, purchased in Bangkok in 2008. © M.S. Krzemnicki, SSEF

SSEF appoints two representatives for Asia:

We are glad to announce that SSEF has found two very charming representatives for the Asian market. For any specific requests about the presence of SSEF in Asia you may now also directly contact our SSEF representatives.

Judy Tu has started in January 2008 to cover the market in Far East building up our customer relations and media presence in Taiwan, China and Hong Kong. You can contact her (in Chinese or English) by email at SSEF.Taipei@gmail.com.

Mrs. Vannaxay Thu is taking charge of our customer relations in Bangkok (Thailand). You may also contact her (in Thai, Vietnamese, or English) to fix an appointment during our on-site testing services in Bangkok. using the email address SSEF.Bangkok@gmail.com.

SSEF Shuttle: London our new destination

Since december 2007, we offer our clients a weekly shuttle service from **Hong Kong** and **New York** in collaboration with Malca-Amit.
In december 2008, we have expanded this fast and convenient service with a new weekly shuttle from **London**.

The shuttle service includes:
- Temporary clearances in & out
- Pick up and delivery
- Swiss customs duties & VAT guarantee fees
- Airfreight valuable cargo under our consolidation

you will profit from:
- Swiss quality certification of your most valuable items at the SSEF
- Your gems are back in your hands within 10 days
- Insurance: We propose to you interesting rates for your shipments under full liability.
- We take care professionally of all customs issues.
- Significant reduction in your shipping costs.

By using our new shuttle service, your diamonds, coloured stones, pearls and jewellery will be shipped smoothly to SSEF, which offers you first class gem testing services. For further information visit our website: www.ssef.ch or contact the SSEF administration at admin@ssef.ch

Natural pearls are formed by different species. The colour of these pearls is natural and not the result of a treatment or bleaching. Pearls by T. Hochstrasser. © SSEF, 2008

Natural Pearls

In 2008, the SSEF has tested a very large number of natural pearls. With the current rise in estimation of natural pearls, the certification of pearls by an internationally reputed gemmological laboratory is a need.
The SSEF Swiss Gemmological Institute is in the favorable position, to test many of the most exquisite and prestigeous natural pearls currently on the market. Every year, SSEF is publishing several articles on pearl research (see publications 2008) and is a leader in pearl identification, offering our pearl knowledge in highly specialized courses (next Advanced Pearl Course 23-25 November 2008).
Among the natural pearls tested, a necklace of 41 natural pearls was quite outstanding due to its impressive size, very regular shape, even colour and high lustre. In November 2008, the necklace was sold at an auction in Geneva for 1.32 mio $.

Important new client 2008

Natural pearl reports for T. Hochstrasser

Since end of 2007, we have received impressive quantities of natural pearls from a new client, Thomas Hochstrasser (www.naturalpearls.ch) to issue pearl reports. Originally a gemstone cutter, he has successfully built up a very large collection of nacreous and non-nacreous pearls, most of them with SSEF reports.

SSEF around the globe...

2008 has been a very active and successful year for SSEF. Not only have we made the best turnover in terms of reports and services. The SSEF has also made many turnovers in travelling around the globe.

In January 2008, Prof. Henry A. Hänni and Dr. Michael S. Krzemnicki were travelling in Asia, offering on-site gemstone testing at the Macao Jewellery Fair, in Bangkok, and in Taiwan. Pierre Lefèvre was participating on behalf of SSEF the first gemmological LA-ICP-MS user group meeting (GLIUG) in San Diego (USA). In the following months, SSEF was at the Inhorgenta in Munich and offering on-site services on a second trip to Macao and Hong Kong. Later in spring, Prof H.A. Hänni and Dr. M.S. Krzemnicki were testing gemstones in our premises in Bangkok. Pierre Lefèvre met our clients at the Salon International de Haute Horlogerie SIHH in Geneva. Jean-Pierre Chalain was travelling to the Middle East to participate at the CIBJO Congress in Dubai, and to give a special diamond course at the gemmological laboratory in Manama (Bahrain).

In May, Prof. H.A. Hänni and Dr. M.S. Krzemnicki were invited speakers at the annual meeting of the Swiss Gemmological Society presenting news from the lab, our portable UV-Vis spectrometer, and tourmalines from Afghanistan. Prof. Hänni was further visiting a pearl farm in Palawan (Philippines). With a group of students from university Basel, Dr. Krzemnicki visited Djevahirdjian SA in Monthey (Switzerland), producer of synthetic stones for the watch and jewellery industry. He was further invited by the German Gemmological Association to present a talk about detection of low-temperature heated pink sapphires in Idar-Oberstein (Germany). J.P. Chalain was our delegate at the LMHC meeting in Milan (Italy). Not enough, we were also present at the Geneva auctions to test gemstones on the spot.

In June, Prof. Hänni, J.P. Chalain, Luc Phan and Chiara Parenzan from SSEF were participating at the famous gemmological meeting à Poil (France). One month later, J.P. Chalain participated at the DeBeers Diamond Conference in Oxford. Dr. M.S. Krzemnicki and P. Lefèvre were again in Bangkok to test gemstones for our clients.

In September, SSEF participated at the Hong Kong Jewellery Fair. During a busy week, Dr. M.S. Krzemnicki, J.P. Chalain, Mrs. Petra Niggli and Ms. Judy Tu were testing a large number of stones at our booth. Apart from this, J.P. Chalain was involved in various meetings, including the CEN kick-off meeting in Brussels, the meeting of the CIBJO Coloured stones commission steering committee in Bangkok and the LMHC meeting in Tokyo.

Prof. H.A. Hänni during his talk in Birmingham (Gem-A Midlands Branch) in November 2008. © Gem-A

In October, Prof. H.A. Hänni and Dr. M.S. Krzemnicki were invited speakers at the Centennial Gem-A Conference in London, talking about damage on gemstones and new portable instruments for gemmologists. This Conference was also announced as the second European Gemmological Symposium. The follow up will be in June in Switzerland (see EGS 2009). Shortly after, Prof. Hänni and Dr. Krzemnicki were presenting each a talk about pearl farming and jade at the annual gathering of the Gemmological Guild of the Netherlands in Leiden. Prof. Hänni was speaking further to the HRD Graduates Club in Antwerp and the Gem-A Midlands Branch in Birmingham. Apart from this, SSEF was present at the November auctions in Geneva. Mr. Chalain then participated at the CEN workshop in Antwerp. Finally, Dr. Krzemnicki and Mr. Lefèvre were testing gemstones on-site in Bangkok, well organised by our SSEF representative in Bangkok, Ms. Thu (SSEF.bangkok@gmail.com).

SSEF in Macao and Taiwan:

In the beginning of 2008, the SSEF participated at two Jewellery Fairs at the Venetian in Macao. Apart from being the „Las Vegas“ of the Far East, Macao is trying to become a major hub for the jewellery and luxury business. The SSEF was present with a booth at both Fairs and provided on-site testing services to its customers. Apart from this, SSEF strengthened its position in Asia further with an on-site service in Taipei (Taiwan). Organised by Judy Tu, our SSEF representative in the Far East, we not only tested a large number of outstanding gemstones, but also gave a number of lectures to the Gemmological Associations of Taiwan.

Dr. Michael Krzemnicki held the first Herbert Smith Lecture in Hong Kong

During the Hong Kong Jewellery Fair, the Gemmological Association of Great Britain (Gem-A) organised the first Herbert Smith Lecture to celebrate the Centenary anniversary of the association and to honour Herbert Smith (1872 – 1953) as one of the founders of modern gemmology. For this lecture, Dr. Michael S. Krzemnicki from SSEF was invited to speak about the future of gemmology. The content of this talk is summarised in the “focus” article of this SSEF Facette. The lecture was preceded by a talk entitled '5000 years of Gemmology', presented by Dr Jack Ogden, Gem-A CEO and a specialist on the historical development of gems and jewellery.

Dr. Jack Ogden and Dr. Michael S. Krzemnicki at the Herbert Smih lecture 2008 in Hong Kong. © Gem-A

SSEF Alumni activities

In 2008, SSEF Alumni was not as active as in previous years due to an overload of work in the laboratory. Nevertheless, many of our members have joined us at a very exciting lecture with Vincent Pardieu, gemmologist and enthusiast, who took us on his extensive travels to gem mines in East-Africa. As always, these gatherings are perfect possibilities to meet and discuss with gemstone experts.
On our website www.ssef-alumni.org you find all information about SSEF Alumni and the latest SSEF Alumni newsletters. SSEF would like to thank again Mr Leon Ascot, President of SSEF Alumni for his enthusiasm and great work organising the Alumni events and Laurent Cartier, who has contributed and perfectly edited the last two newsletters. Thank you Leon and Laurent!

An ‘ambassador’ for SSEF in Madagascar. I came across him in artisanal ruby and gold mines on the weekend. Photo kindly provided by Laurent Cartier. © 2008

EGS 2009, June

From 5 - 7 June 2009, the Swiss Gemmological Society (SGS/SGG) will be organising and hosting the next European Gemmological Symposium in collaboration with SSEF Swiss Gemmological Institute. The idea of such a European meeting has been pushed forward over the years by SSEF after we organised in 2005 the very successful Gemmo-Basel to honour the 60th birthday of Prof. Hänni. At a meeting in 2007 in our premises, representatives from several European gemmological associations agreed to organise an annual symposium to strengthen the ties between gemmologists in Europe. After the first and second successful European Gemmological Symposia in Idar-Oberstein by the DGemG (2007) and in London by Gem-A (2008), it is now the time for the Swiss association to organise the upcoming event.
The list of speakers is impressive, including keynote lectures by Sir Gabi Tolkowsky and Martin Rapaport. Apart from lectures about diamonds, coloured stones, pearls, and jewellery, there will be also information about the trade situation in different market segments.
The Symposium will conclude with a field trip to a crystal cave in the heart of Switzerland at the Grimsel. The Symposium will also include a poster session (contributions are welcome!). The three best posters will be awarded with a total sum of 3000.- Swiss Francs.

For more information about the European Gemmological Symposium 2009 and how to contribute with a poster, please see the website: http://www.gemmologie.ch

Visit us in 2009 for On-Site SSEF reports

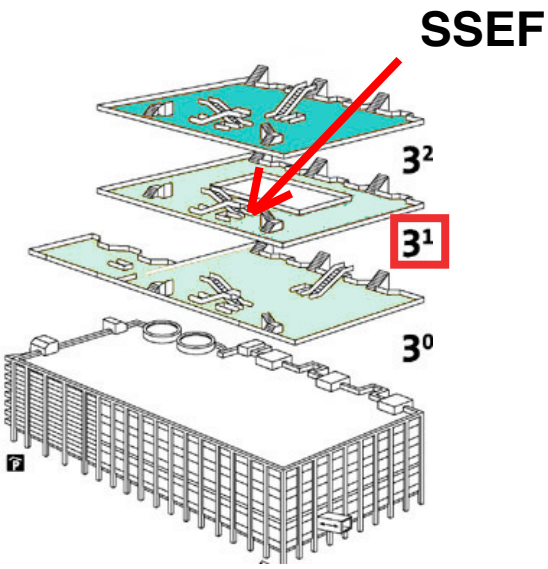
In 2008 we will be available at the following events:

Inhorgenta Munich	20 - 23 Feb 09 (no reports)
HKK	4 - 7 March 09
Bangkok	11 - 15 March 09
Basel World 2008	26 March - 2 April 09
Geneva Sales	10 - 12 May 09
Hong Kong Fair	23 - 27 September 09
Geneva Sales	16 - 19 November 09

Further on-site services in Bangkok are not fixed so far, but will be communicated on our website and in newsletters.

Basel World 2009: Benefit from our 24h Express Service

During the BaselWorld (26 March to 2 April 2009), the SSEF offers once again our well appreciated Express Service: get a test report within 24 hours! We are located at the same place as in previous years in hall 3 (hall of elements) at our booth 3.1/ N07 on the first floor (telephone at booth: +41 (0)61 699 51 29). We look forward to meet you there and to offer you a nice cup of coffee while you bring or pick up your stones.



Close up: Chiara Parenzan

Chiara Parenzan joined the SSEF team more than a year ago after her participation at an SSEF scientific gemmology course. Her background is perfect as she was trained in Bologna (Italy) as a geologist with a masters degree in mineralogy, topped with a GG diploma. She has been trained in our laboratory in all skills of gemmological work: diamonds, coloured stones and pearls. Until now, Chiara has tested thousands of natural pearls and gathered knowledge for origin determination and diamond grading. She is about to become a reliable pillar of the SSEF team.

We are glad having found in her not only a skilled gemmologist, who is about to metamorphose into a fully professional gem expert, but also a person, who is by her background expanding our international expertise in Italian style and cooking.

Goodbye to Thomas Frieden

Thomas Frieden, after serving as an SSEF board member for 22 years has stepped back from this position in December 2008. As a keen gemmologist, jewellery wholesaler and pearl importer he has always had a close contact to the trade. With him as an interface to the laboratory business we could profit from his deep knowledge of trade mechanisms. We enjoyed most his strong sense of humour, and less his financial Sherlock Holmes features. We will hope he will still go on visiting our lab and giving his expert opinion on cultured pearls.

Publications 2008

In 2008 we again published numerous articles in gemmological journals and trade magazines. For reprints, please contact SSEF (gemlab@ssef.ch)

Hänni, H.A. (2008) A diamond Briefing. *Jewelry World, March, 199, 99-104 (in Chinese)*

Hänni, H.A. (2008) Jadeïte jade gezien door de ogen van een Europese gemmolog. *Holland Gem, 14, 5-8. (in Nederlands)*

Hänni, H.A. (2008) Modern pearl farming for South Sea cultured pearls, *Jewelry World, 199, May, 10. (in Chinese)*

Hänni, H.A. (2008) New rubies from Tanzania. *Jewelry News Asia, June, 2008*

Hänni, H.A. (2008) Einige Gedanken zu Jadeit Jade. *Z.Dt.Gemmol.Ges. 57, 1/2, 5-12.*

Hänni, H.A. (2008) Pinctada maxima cultured pearls grown beadless in the mantle. *Gems & Gemology, Vol. 44, No. 2, 175-176*

Hänni, H.A. (2008) twinned cultured pearl. *Gems & Gemology, Vol. 44, No. 2, 176-177*

Hänni, H.A. (2008) New rubies from central Tanzania. *Gems & Gemology, Vol. 44, No. 2, 177-8*

Hänni, H.A. (2008) Natural impregnation of a rock by copper minerals. G*ems & Gemology, Vol. 44, No. 3, 266-267*

Krzemnicki M.S., Groenenboom P. (2008) Colourless forsterite from Mogok, Myanmar. *Gems & Gemology, Vol. 44, No. 3, 263-265*

Krzemnicki M.S. (2008) Serpentine artifact resembling Lybian desert glass. *Gems & Gemology, Vol. 44, No. 2, 181-182*

Krzemnicki M.S. (2008) Trade Alert: Flux grown synthetic red spinels again on the market *SSEF Newsletter, October 2008. Reproduced in many trade journals and blogs.* *www.ssef.ch/en/news/pdf/08-10_newsletter_spinel.pdf*

Krzemnicki M.S., Hänni H.A. (2008) New Tanzania mine uncovers source of exceptional rubies. *InColor, spring 2008, 46-47*

Krzemnicki M.S. (2008) The future of gemtesting. *Journal of the Gemmological Association of Hong Kong, Vol. 29, (in press)*

Krzemnicki M.S. (2008) Hart und spröde: Diamonds are (fast) forever !? *Goldor No. 8, (german and French)*

Krzemnicki M.S. (2008) Echte Perlen: Die Schönheit der Vielfalt (Teil 1). *Goldor No.10 (German and French)*

Krzemnicki M.S. (2008) Echte Perlen ohne Perlmutter: Unbekannte „Schönheit“ (Teil 2). *Goldor No. 12, (German and French)*

Lefèvre P. & Chalain J.P. (2008) Experimental CVD synthetic diamond from LIMHP, *Gems & Gemology, Vol.44, No.2, pp. 185-186.*

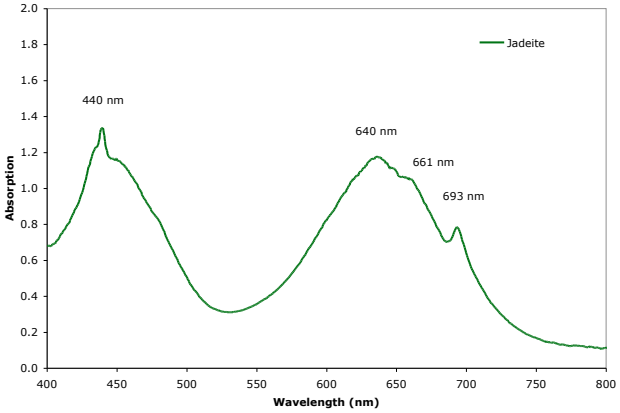
Donations 2008

With the generous support of our donors the laboratory collection is growing every year. The SSEF would like to thank the following people, who have made donations of gemstones or instruments in the past year. We announce their names in recognition of their generosity:

- Hanspeter Husistein, for a batch of coloured stones, including sapphires.
- Thomas Färber for five old Verneuil synthetic rubies, showing very strongly curved banding.
- Thomas Hochstrasser: for numerous nacreous and no-nacreous pearls and for shells of different species.
- Henry A. Hänni for untreated corundum from Madagsacar and Songea (S-Tanzania), for colour changing garnets from Tanzania, and for Be-diffusion treated orange sapphires from Tanzania.
- Pierre Grumser for two treated diamonds (one sample Koss fissure filled; the other multiple treated, HPHT and irradiated)
- Thierry Chantitch for a necklace of cultured pearls (Akoya)
- Lucas Schweizer for two grey diamond cubes of 2.27 ct.
- Gemburi Company in Chanthaburi (Thailand) for an unheated ruby of 1.58 ct from Winza, Tanzania

Dr. Michael S. Krzemnicki with an exceptional jadeite necklace in Taipei.

Below:
The UV-Vis spectrum of the jadeite, analysed with our new portable UV-Vis spectrometer (see article on the last page!) shows characteristic chromium and iron absorption features. © SSEF



Latest News:

Portable UV-Vis Spectrometer on Sale

In the last Facette (No. 15), we presented a first prototype of a portable UV-Vis spectrometer for gemstone testing. This instrument was developed by the Physics Department of the University Basel in collaboration with SSEF.

Already in use for more than a year in the SSEF laboratory and on our on-site appearances world wide (see page 23!), we offer now a second generation of this small but powerful instrument with the following improved features:

- better excitation in the UV
- light diffuser to enhance spectra reproducibility
- UV lamp (365 nm) for luminescence spectra
- a set of holders for stones of different size
- very fast scan time (usually less than 5 secs)

You can buy this light weighted but highly sensitive instrument, which comes in a well protected safety box directly at SSEF

Price: 24'000.- Swiss Francs (without VAT)

The instrument set includes:
- High resolution spectrometer (Avantes)
- Light source (300-1000 nm) for absorption spectra
- Light source (365 nm) for luminescence spectra
- Stray light protected sample chamber
- Program for spectra analysis (Avantes)
- Plug-and-play (USB) with any Windows PC or laptop (PC not included !)
- Manual how to install and use the spectrometer
- Large collection of reference spectra of gemstones
- Safety box protecting against mechanical shock

During the coming **Basel Show 2009, the instrument will be on display at our booth 3.1/N07** on the first floor of Hall 3 (Hall of Elements).

We strongly recommend you to do an additional one-day training at SSEF (or in your premises) to learn how to use the instrument and advanced possibilities of the PC program. This training is not included in the above set price.

Please contact SSEF to get the complete information brochure or for ordering.
tel. +41 (0)61 262 06 40, fax. +41 (0)61 262 06 41
email: gemlab@ssef.ch

The SSEF Team wishes all friends and customers a successful New Year 2009 and would like to thank you kindly for your continued support of the SSEF laboratory.