

Lead Glass Filled/Repaired Rubies

In November 2004, a large number of rubies exhibiting uncommon features were submitted to the AIGS laboratory in Bangkok for testing. During a two month period, more than 200 of these rubies were analyzed in the laboratory. Lead was detected in their fissures and cavities. Between September and December 2004, a total of 244 of these rubies ranging in size from 3 to 97 carats were examined at the AIGS laboratory including 12 stones over 25 carats. During 2005, these treated stones kept the AIGS laboratory busy, though much fewer stones are encountered these days.

Flash effect in lead glass treated ruby.

All photos courtesy of Vincent Pardieu, AIGS Gem Testing Center.

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Surprised by the large number of stones suddenly appearing on the Bangkok market, the AIGS laboratory has decided to give priority to the study of these stones and began to research this new product.

Following several weeks of enquiry, we found that the treatment

was being performed in three different cities in Thailand: Chantaburi, Bangkok and Mae Sot. AIGS Gemological laboratory then published an initial study on this treatment available at www.aigslaboratory.com.

After the release of this initial study, several other companies have started their own experiments. The composition of the glass used for the treatment can vary from company to

company and has also changed with time. Recently, we saw a large Burmese type ruby with all the visual characteristics of lead glass filled ruby but after chemical analysis, no lead glass was present. Instead the filler was identified as a bismuth rich glass. Treaters are also experimenting with heating lead glass filled rubies at higher temperatures and sometimes with the beryllium atmosphere technique. But so far the

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results do not look to be very good as lead glass does not appear to be as good a flux as borax. Anyway, the point is that as with other treatments, it is not a single technique. There are variations in the glass composition and also the heating techniques. The parameters vary with the companies involved and also evolve with time.

Currently this treatment is not creating many problems for gemologists as the stones are easy to identify for gem labs and trained gemologists using darkfield or fiberoptic illumination in most cases. On a recent field trip to the Pailin gem market in Cambodia, the AIGS students with me had no

problem identifying the lead glass filled rubies present in the market using their darkfield loupes. Nevertheless, this treatment is still subject to controversies among the gem dealers, especially those involved in the trade of rubies that were heated with borax typically from Mong Hsu (Burma). The fact is that the lead glass filled rubies have become a serious competitor for the cheapest of these stones which are locally called in Thailand “Lai Thai rubies” due to the fact that their numerous glassy fluid inclusions looks like a network similar to a woven silk tissue.

The producers offer them as an inexpensive ruby alternative. In contrast to the beryllium sapphire controversy:

- The persons at the origin of the treatment were collaborating well with the labs that contacted them
- The stones were sold at very low prices compared to rubies of the same size, which immediately could raise some suspicion.
- The stones are very easy to identify for any gemological laboratory or even any trained gemologist.

As a result, the case here is very different from the

beryllium issue, where the detection of the treatment remains a real gemological challenge. We recommend to all people buying facet cut rubies or star rubies to check their stones carefully. If they feel that they lack the identification skills, we recommend that they submit the suspect stones to a qualified gem laboratory for testing.

Currently, the treatment is mostly performed on Madagascar rubies from Andilamena but we have recently seen several stones of probable Burmese or Indian origin (facet cut and also star rubies) which were filled with lead glass.



Necklace containing lead glass filled rubies. Jewelry such as this is now entering the global market.

Following the publication of the first version of this study in January 2005, AIGS gemologists have found that several other companies located in Bangkok and Mae Sot were also producing variants of lead glass ‘repaired’ rubies. These different companies are using glass, presenting different compositions, and the technique will probably continue to evolve. The glass composition can be very different from one company to another. Pure lead oxide, lead oxides mixed with bismuth, silica, or fluxes like borax can be encountered.

Temperatures, parameters, and results can be very different. At the AIGS laboratory, a large stone that was filled with a bismuth glass recently was observed.

The gemstone material can also be very different. The most suitable rubies for repair are stones with color potential that are rich in fissures. Mr. Thondisuk has had extensive experience with ruby from Andilamena, but any ruby material with fissures could be suitable for this treatment. Several lead glass filled star rubies of Burmese origin have been submitted for examination to the AIGS lab. This treatment is particularly interesting for star rubies since the temperatures used are lower than the temperature at which the rutile needles responsible for the star effect start to be affected.

The present article is an update to a study referenced above. It is the result of four specific visits to

Chantaburi by AIGS laboratory gemologists in December 2004 and January 2005 and two visits to the Orange Sapphire Company in Bangkok. This last company was famous for its production of sapphire heated with beryllium technology. Several rough and also cut samples from these companies were studied along with some stones furnished by Bangkok dealers interested in this study. The stones brought to the AIGS Gemological laboratory by our regular customers were also used as a basis for this study.

The purpose of this article is to provide to gemologists, gem dealers, jewelers and persons interested in the gemological field around the world relevant information to assist in the identification of glass filled ruby. Mr. Mahiton Thondisuk also wants to demonstrate that Chantaburi burners are not cheaters. He is happy to communicate the Thai technology used to produce this product and contribute to the recognition of Thailand and Chantaburi as a famous gem trading center.

Interview: Mahiton Thondisuk, Chantaburi, Thailand

Mr. Thondisuk explained to the AIGS gemologists that this treatment was the result of five years of study in association with several Thai scientists from different universities in Thailand. The idea was to develop a glass compound suitable to “repair” fissures in rubies.

“Beautiful natural stones for which human intervention is limited to cutting and polishing are very rare and extremely expensive”, explained Thondisuk. “There are many more lower quality gemstones compared to the tiny amount of real gem quality stones so that if we can find a good way to repair them, we can add them to the trade. In the beginning, I was not thinking that people would actually buy this prod-



Rubies found with lead rich foreign substance filling in fissures and cavities at the AIGS laboratory.



uct...a ruby repaired with glass—it’s crazy. So after a few months, I went north to do some farming. But some people began to buy these stones so I came back to Chantaburi two months ago to produce these stones.”

“You know,” he added, “I love naturally beautiful rubies. In fact I don’t really like to do this treatment but the market is looking for nice looking [inexpensive] stones. So I’m doing it...This is quite amazing to see how we can improve the beauty of these stones! ”

It was just after Mahiton Thondisuk returned to Chantaburi with Somkuon Plairahan that the lead glass ‘repaired’ ruby gemstones arrived in large numbers at the AIGS Laboratory.

Several isolated accounts of filled gemstones had been seen on the market a few months before and at that time a warning was published by the GAAJ (Japan) in March 2004 about lead glass found in ruby. Several short articles

were also published by the GIA, AGTA, GIT, and other organizations on their websites or in magazines. The AIGS laboratory had also presented some photos on these unique inclusions on its website last year and we



Left to right: Ruby expert Somkuon Plairahan, AIGS laboratory Director, Vincent Pardieu, master burner, Mahiton Thondisuk, glass filled ruby treater.

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had a presentation about this subject in March 2005 in Paris.

In fact, this treatment is not really a new development. The process was developed in 1982, by diamond cutter Zvi Yehuda from Ramat Gan (Israel) to produce “Yehuda diamonds.” The process used for fracture filling diamonds was quite common in the 1990’s. Several companies were producing such stones at that time. Many studies were conducted and many articles about them are found in gemological literature or on the Internet. In the fall 1994 edition of *Gems and Gemology*, an important study of these diamonds was presented. At about this same time, AIGS was developing some special radiographic instruments to detect lead glass filling in diamonds.

The fact is that lead glass filling of fissures is back and this treatment is now known in Thailand as “Paw Mai” (which translated from Thia means ‘new heat treatment’). A few months ago in Chantaburi this term was used for the beryllium treatment of stones. Most of the stones seen these days are believed to be mainly sent to Asian markets like China and India in which the conjunction of important gemstone traditions and the need for inexpensive gems has created a niche for this product. But these stones are known to have reached the USA and Europe. There, the answer to the product was diverse, as sadly some of these stones were sold without proper disclosure and got damaged after exposure to chemicals.

Mahiton Thondisuk adds, “It is simple. If I give you the choice between two rubies of equivalent beauty at the same price—one synthetic grown in a factory and one

grown in nature but ‘repaired’ by human technology after being mined—which one will you choose?”

“We are selling these stones at very good prices... Imagine how much a 20 carat heat treated ruby would cost and compare that to one of our stones of equal beauty? We are so [much less expensive]!”



Large lead repaired rubies offered for sale.



Lead glass filled rubies in process to be sold on tables in Chantaburi.

This is an important point and the position of the AIGS is that there is nothing inherently wrong with treatments as long as the customer is provided with the correct information about the stone and the price is related to the real quality of the stone. The important thing is the proper disclosure of the nature of the stone. A very good point with these ‘repaired rubies’ is that they don’t currently present any real identification problems.

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Note: The next issue of *GMN* will have the second part of this article on glass filled rubies covering the actual step-by-step process of filling and identification

techniques.