

ISG Mini-Course: Gemstone Treatments



Welcome to the International School of Gemology's Mini-Course program and The Gemstone Treatments course. This mini-course has been taken from our full ISG Registered Gemologist Appraiser program and contains all of the course materials from a specific section of the program. We present it here as a mini-course to enable those simply wishing to learn about gemstone treatments and to do so at a greatly reduced tuition price. We hope you enjoy this and all of the ISG Mini-Courses.

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As the industry learned with the Tibet andesine hoax (see www.TibetAndesine.com), the treatment of gemstones has become a worldwide issue. At no time in the history of this industry have jewelers been confronted with so many treatments that seem to come in a never-ending stream out of Thailand and China and many other locations. The reason is probably obvious to most since this has been at the forefront of the industry over the past few years and promises to be one of the fastest-growing segments of the industry for which gemologists will need to stay updated.

There is no way to offer a complete listing of gemstone treatments since the people doing the treatments are constantly developing new methods of treatment. And while gemstone treatments are viable, and in fact necessary to ensure enough gemstones to

sustain the markets, they also require proper disclosure to buyers to maintain the integrity of the industry. All too often new gemstone treatments are put forth on the market without disclosure to specifically be deceptive of the treatment to make more money than the stone would otherwise be worth.

Treatments are good when disclosed and priced accordingly. But when we have the “cookers” coming up with new treatments that are unknown to the market, and these folks sell the treated gemstones as natural, counting on no one being able to identify their new treatments, then we have a problem. And indeed, this industry has a problem as more and more treatments are being developed and sold on the markets without disclosure.

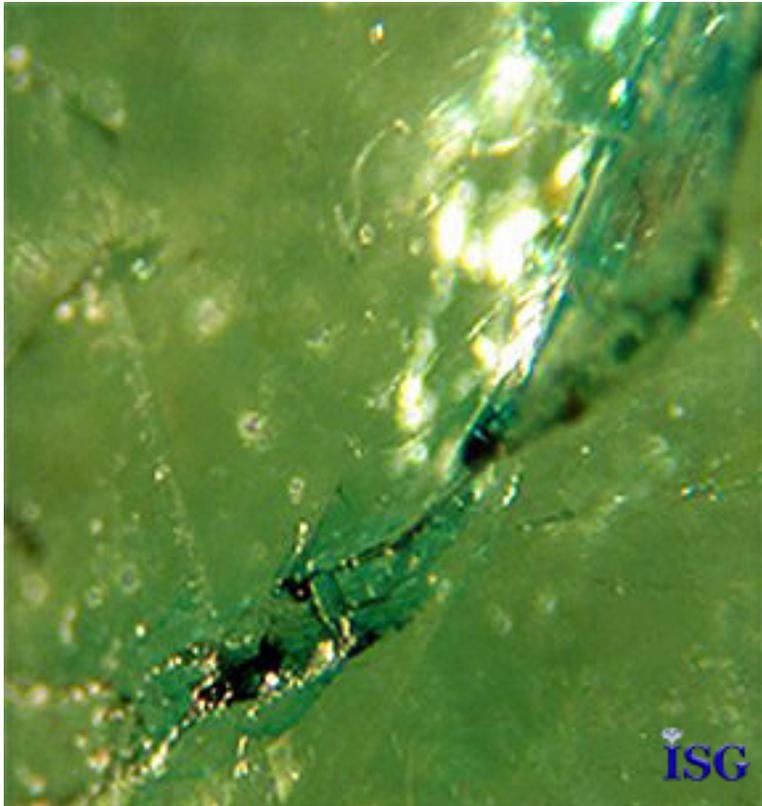
For this reason, it is important for you, the gemologist, to be able to identify as many of these treatments as possible. You will never know them all, and neither will anyone else. But you need to stay up on the latest news and information to help protect yourself and your clients in the gemstone markets.

Our effort in this lesson is to acquaint you with the most often seen treatments, and in

subsequent lessons present you with identification methods of these treatments for specific gemstones. Remember, this list is not complete and never will be. And the gemstone treatments we present here are simply a classic list.

You must always stay up on the latest in the way of new information regarding treatments. I can assure you that it will be a lifelong effort to try to stay up with the latest products being turned out by the many gemstone “cookers” worldwide.

Let's take look at the most often seen treatments and their indicators.



Oiling

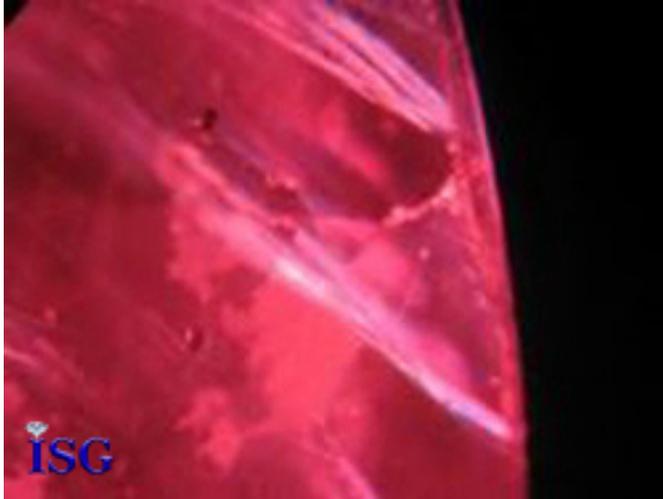
This treatment dates back hundreds of years to the emerald mines of Colombia and continues to this day. As the name implies, the oiling of gemstones imparts oils of various types into or onto a gemstone to change its appearance. In the case of Colombian emeralds, it is used both to seal the stone from foreign material getting into the naturally occurring surface breaking fissures, and as you can see at left it can be used to impart a false-color into the stones. Opals are often oiled to help seal the water inside them. The most important part about oiling is that it is a temporary treatment. It was well known in earlier times that emeralds were always oiled and needed to be re-oiled from time to time. Today, however, many jewelers are afraid to discuss treatments making the oiling of emeralds considered taboo and not discussed unless necessary, an issue that creates mistrust with consumers who have access to a lot of information via the internet regarding oiling. For that reason, jewelers and dealers should acquaint themselves with the oiling process to speak freely and confidently with consumers on the subject.



Dyeing

Artificially enhancing gemstone colors by the use of dyes has also been around for hundreds of years. Many gemstones have a lot of porosity which makes them easy targets for dyes to be introduced into their structure causing greatly changed colors.

Some stones such as black onyx would not exist without dyes since black onyx rarely occurs naturally. Others such as lapis lazuli, quartz, and other porous stones can remain their natural color but be greatly enhanced in beauty using dyes. Just like oiling, the dyeing of gemstones is often a temporary treatment that can wear out over time. Disclosure is very important with dyes in a gemstone to properly inform the consumer or buyer of the condition of the stone as it relates to the beauty and value.



Fracture Filling

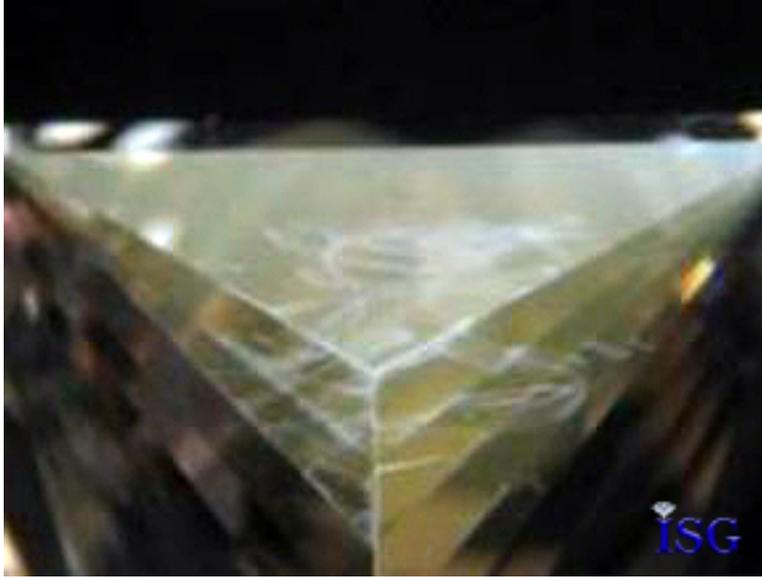
Although most often thought of as a diamond treatment, the filling of fractures and fissures in colored gemstones to improve their salability is widespread in the industry. Of most important note is ruby as seen at left.

Rubies are by nature extremely rare and expensive. When many large and low-priced rubies started to hit the market a few years ago questions were immediately raised about the source and condition of these stones. Sure enough, these were found to be highly fractured stones that normally would not have been viable on the market. However, by use of the glass infilling process such as used on diamonds these otherwise unsalable rubies were rendered viable for the market.

The problem as you can imagine was proper disclosure. As is more often the case with new gemstone treatments that have not been

identified, these stones were not disclosed as to their treated condition which caused a lot of problems for the markets. Eventually, however, the identification methods were found to be easy and these new rubies settled into a rather low status in the markets due to the sometimes very heavy amount of treatment material that is imparted into the stones. As we will see in later chapters the identification of this process is easy for those with proper training.

One important note on the fracture filling of gemstones is structural viability. None of these rubies or other filled stones should be put to the jeweler's torch for retipping of a prong or sizing. The filler material expands at a different rate than the gemstone and will cause a catastrophic loss of the stone in the event heat is put to the stone. This is very important and something that jewelers need to be aware of when doing any type of repair work with a questionable ruby or another gemstone that may have been filled.



Coating

Gemstone coating is another age-old treatment that is getting more popular. The reason is that some of the coatings being used have become much stronger and able to withstand a lot more wear and tear. As seen at left, this is a coating on a diamond that is extremely tough and wear-resistant. All we could find for our efforts were these lines that were impossible to detect without turning the diamond into an overhead light aimed at just the right direction. But other coatings are not so tough. Some of the coatings such as the Mystic Topaz coatings are very fragile and are usually scratched even before the stone is set. Most coatings can be identified using the immersion cell due to these minute scratches that so often appear due to simply being bumped around in a gemstone paper. As we

look at various gemstones you will learn which can be easily identified and which may take more stringent testing.

Color Infusion



This has become a hot topic as the cookers have perfected some gnarly methods of infusing various elements into gemstones.

The concept is to force elements, sometimes on an atomic scale, into a gemstone crystal structure to impart new or enhanced colors to the stone. The most recent was the andesine from China, with tourmaline, aquamarine, sapphire, and others either already known or waiting in the wings. The terms “diffusion” and “infusion” are often interchanged in the markets, but, they are different processes. For the purposes of this course, we will deal with them as a single concept since they both deal

with the artificially changing and enhancing of a gemstone color based on the introduction of foreign elements into the gemstone structure. This is the concept of “diffusion”, “dyefusion”, “infusion”, or whatever someone wants to call it.

There is a lot of science involved with the concept of diffusion and color infusion, and a lot of disagreement within the scientific community as to what exactly constitutes true diffusion of a gemstone instead of some fancy dyeing. Either way, the diffusion dyefusion of elements into gemstones to impart new colors or simply improve existing colors is here to stay. The key is for you to make every effort to keep informed on the latest information since this treatment is one of the most difficult to detect, particularly for grassroots level gemologists. But it is possible to identify diffusion in many gemstones due to unusual inclusions or unnatural formations that are caused by the diffusion process if you know what to look for. Just as we did with the andesine investigation, sometimes diffusing foreign elements into a gemstone leaves features inside that are just a bit too strange, a bit too out of the ordinary, which allows us to have indicators of the diffusion process. That

is why it is so important for you to keep informed of the latest to give you, and your clients, the best possible advantage in properly identifying the diffusion processes in gemstones.



Irradiation

Irradiation can take many forms and processes. Irradiation is used to knock out sections of a gemstone crystal lattice to impart colors that are not naturally occurring with the stone. A classic case is that of many blue diamonds on the market. These are extremely rare in nature and very expensive. By use of irradiation, the blue color can be obtained artificially making many otherwise off-color diamonds salable. Another example is blue topaz; the irradiation process knocks out part of the crystal lattice of the topaz with

the follow-up heating used to bring out the resulting blue color. Natural blue topaz in the colors we see on the market are quite rare. By use of the irradiation technique these beautiful gemstones are widely available and at very reasonable prices. Radiation of diamonds to impart colors has been widespread for years. It is easy to identify in most colors using Raman technology, the exception being a green diamond that has color caused by natural radiation to start. But radiation of gemstones such as pink tourmaline and imperial topaz has become something of a normal expectation in today's market. And in many cases, the process is one that cannot be positively identified by anything other than the most advanced scientific testing. We will look at the irradiation process on a stone by stone basis and see if we can find methods to identify this treatment that you can do using tools at your disposal there in your own lab.

The types and names of gemstone treatments could go on and on. Even subsections can be created for things like high pressure / high temperature (HPHT) treatments of diamond and related types of treatments. But our purpose is to expose you

to the basics since most of the exotic treatments you will encounter will be variations of the above basic treatment processes.

One important note that some may be asking: What about plain ordinary heating of gemstones? Well, there are a couple of issues there. First, the heating of gemstones has been around for centuries and is considered the extending of a natural process that goes on in the ground. Second, for the most part, the heating of gemstones to improve their color is permanent and again, considered as a continuation of a natural process.

The treatments we are discussing above are either not natural, not permanent and/or greatly alter the original gemstone from anything that would be considered anywhere near natural. That is the key element, and perhaps that most important. The heating of a gemstone is a process that could have occurred in its natural state underground, but perhaps the environment in which it grew as a crystal cooled before the maximum color was attained. The result of the heating after mining is a continuation of the process, and the result is one that could well have occurred

before mining had the environment been conducive. But with the artificial treatments, we have something unnatural in some way or another, and the value is greatly impacted as a result. That is why the treatments above require proper disclosure because the beauty and value of the stone have been impacted beyond what would be considered natural. And that is why we study these particular treatments and will leave the simple heating process other than this brief discussion.

Before moving on to the next lesson, let's take a Quick Quiz from the ISG Created and Treated Gemstones course to test your understanding of the information in this lesson. Remember, you can take the Quick Quiz as many times as you like to test your knowledge.

[NEXT PART](#)