
# Answers on "Andesine-Labradorite" color source!

***Basic gemological testing and knowledge gives us many answers!***

I want to open this report with a simple, but sincere apology to every consumer out there who has become embroiled in this controversy over andesine-labradorite. You deserve better treatment than what you have received from all of us in the gemology industry. And while this will undoubtedly get me flamed by a few of my professional peers, I will admit to you that we let you down when you asked for simple answers to simple questions.

Well, let's see if we can fix that here.


The original purpose of these reports was to establish whether or not the “andesine labradorite” being sold by some of the major television shopping channels was comparable in quality and gemological properties to the Oregon Labradorite Sunstone to which the shopping gurus compared their material. And was there a grass roots level test that could be done to separate the Oregon material from the television material?

The answers were easy. No, no and yes. No the material being sold by the shopping channels is not comparable because it is not labradorite according to the **GIA "A"** Chart, the book **GEMS** by Robert Webster, and other sources. No the properties vary significantly because the shopping channels are not selling real labradorite. And yes it is easy to separate the true Oregon Labradorite Sunstone from the television shopping channel material because the Oregon material is indeed a very rare and unique form of labradorite, while the television channel material is further down on the feldspar scale and is not labradorite.

But you asked for one more answer: Is the television shopping channel material of natural color as folks like Jewelry Television claimed.

You reported getting the bum’s rush by the Jewelers Vigilance Committee.  You got disrespected by

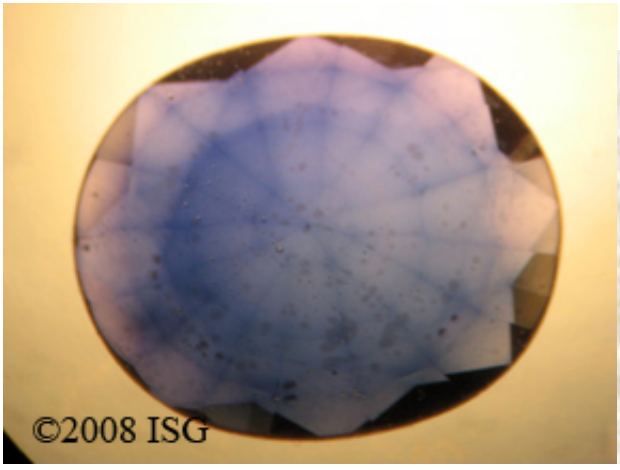
various gemological forums boards. You got nothing but excuses from the rest of our industry.

Upon hearing of your plight the ISG spent several hundred dollars and more than a few late nights to get you some answers. I'm sure it won't be in the scientific mainstream as we use grass roots level gemology here. But since we are the only gemology school in the United States that offers a course in the Identification of Synthetic Gemstones that also covers treatments, we have over 800 beryllium diffused sapphires in our ISG Student Reference Collection due to our study of diffusion treatment. We drew on that experience to assist you. Which is where we begin.

**What is diffusion?**

Diffusion is a process by which gemstones are heated to a very high temperature in an atmosphere that has a high level of one element or a combination of elements, which allows that element to either enter the gemstone's crystal structure, or attach itself at or slightly below the surface of the gemstone facet. The added presence of this element causes the gemstone to be greatly improved in color. But this is a color enhancement treatment that must be disclosed to the buyer.

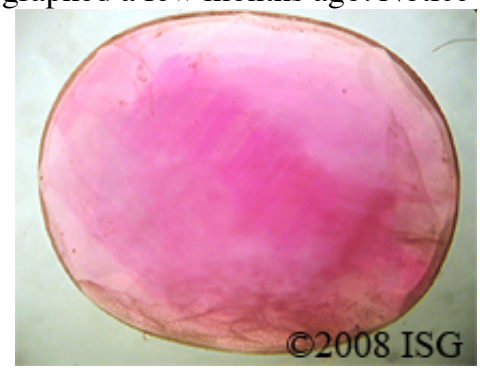
The key identifier to most diffusion treatments is that the coloring elements will tend to congregate to a greater degree at the facet junctions. You will actually get darker colors at the facet junctions. Below left is a picture of a sapphire that has been diffusion treated with an iron/titanium combination to improve the overall color and make it darker. We are looking in an immersion cell. This is simply a dish with either water or another liquid that allows us to see the surface of the stone better. Immersion cells are going to be very important in our discussion.

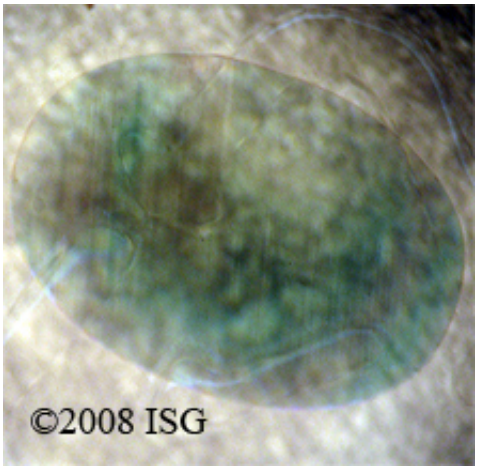




Now look at the red gemstone above right. This is a red "andesine-labradorite" sold by Jewelry Television. And you can see the same tell-tale color concentrations at the facet junctions in the Jewelry Television stone just as you see in the diffused sapphire. No doubt, both of these stones have been subjected to a diffusion treatment to improve the color. And you will further note that the overall color of the red stone is concentrated at the corners and along the facet junctions. A classic indicator of color enhancement by diffusion treatment. But there's a lot more. Another type of diffusion is called bulk diffusion, and is used to beryllium treat sapphires. This is a diffusion process by which the element of beryllium is small enough to completely penetrate the crystal lattice. But one important feature that we have found by inspecting literally hundreds of Be treated sapphires is that that the diffusion of the beryllium never happens uniformly. The final color will always show significant zoning as the beryllium simply does

not reach all areas of the crystal lattice in a uniform pattern. And once more, the immersion cell allows us to view this. And for our purposes we poured out our water and instead used benzyl benzoate as it has a higher RI and allows better viewing of the gemstones. Below at left you see a photo of a Be treated sapphire from the ISG collection photographed a few months ago. Notice the pattern of the diffused color in the stone after the treatment.



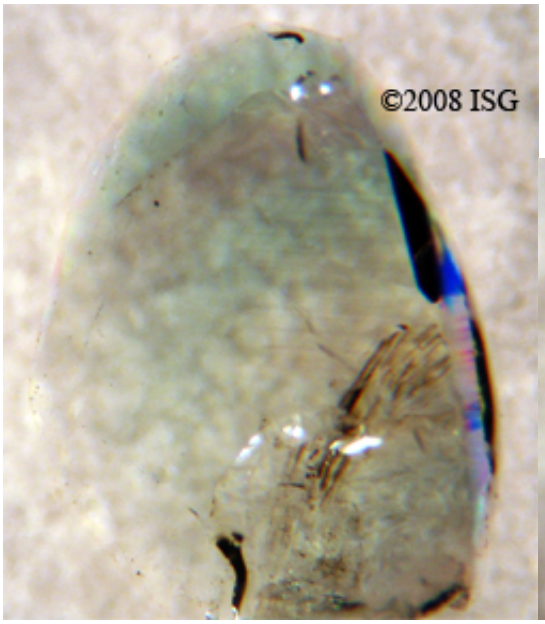



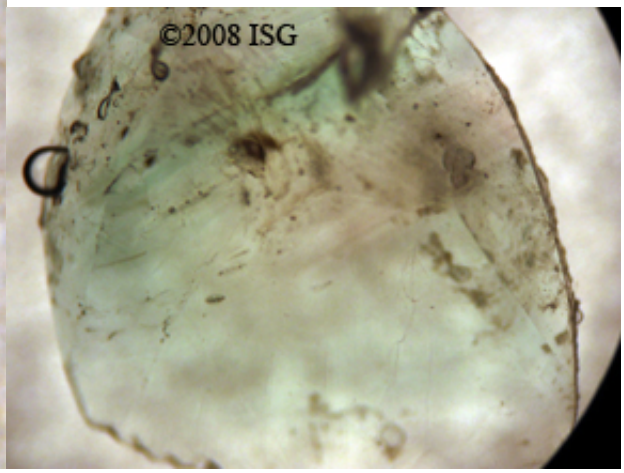

And above right, note the green “andesine-labradorite” sold by Jewelry Television and photographed yesterday in the ISG office. Virtually identical type of color pattern, although I doubt it was done using beryllium. And the immersion cell on the right is the bottom of a Dixie cup with benzyl benzoate. (we are on a budget in the ISG office) So you can see some writing through the stone from the bottom of the cup. And while it is common for colored gemstones to have color zoning, we have found the shapes and formations of diffusion enhanced color treatment to be fairly easy to identify after reviewing hundreds of known bulk diffused gemstones. We don't know exactly what was used in the diffusion treatment of this stone, but we do have a strong indicator as to the process used. But let's look at this stone deeper. After our last report we heard from a couple of industry dealers (who will remain anonymous to keep them from catching any stray rounds) who reported some tests were showing strong numbers of a copper/iron diffusion treatment. This type of treatment would account for the higher refractive index readings of this material, above oligoclase sunstone, which we believe the material to actually be. But this brought about another thought: If it is diffusion treated with a copper/iron combination the treatment should not go very far into the stone. So being short on time last week, we simply took out a red one and used a 16 oz waffle headed framing hammer to bust it open. Not exactly high tech gemology, but it served the purpose. (and started something on the JTV blog that we had to stop…LOL) And sure enough, the color was only partial. This week, we had more time so we actually took a cutting tool and cut a green “andesine-labradorite” from Jewelry Television in two. It actually cleaved before we got all the way through it. But that was OK as it allows us a better look in our benzyl benzoate immersion cell. Here are the results. Below you see two images of the stone. One before and one after our Dremel tool’s

actions. Next, are the results.



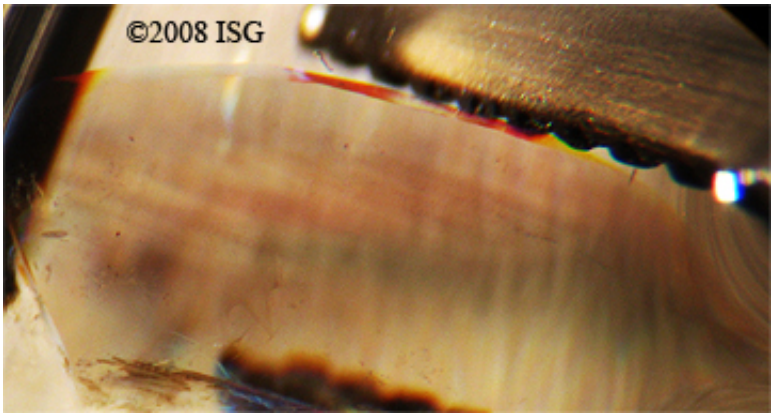
In the benzyl benzoate immersion cell, the true structure of this stone comes to light. Below left is one half of this stone. If you look just to the left of the ISG copyright notice, you will see where a thin piece of the surface of the stone cleaved off when the rest of the stone broke. Notice that this area is totally colorless while the original surface of the stone shown on either side is green. This is a classic condition for a surface diffusion treatment as the color did not penetrate very far into the gemstone.




And in the photograph above right, you can see the color concentration along a facet junction that is still intact on the top of the stone, and that the color does not penetrate very far at all into the stone. The yucky stuff is tape that we used to hold this stone down while we cut it, and photographed it immediately after it broke. So it still has some sticky left on it. But the coloring is clearly surface reaching only, and still shows concentration along the facet junctions. But there are a couple of more to go…. Below you see a high magnification (90x) photograph of one of these pieces of this green "andesine-labradorite" viewed side on. And this image, in my opinion, tells at least part of the story of what is being sold by Jewelry Television and others. Here you can see why some of the green stones show a distinct red coloring. It's not the color shift like the real Oregon Labradorite Sunstone. Rather it is from a combination of the original crystal color, and the color after diffusion. The red you see is

from the original crystal. Such as the hematite platelets we saw in a specimen of supposed red "andesine-labradorite" last week. The one that was the exact match to the inclusions in an oligoclase sunstone from India . But if you look at the green color that is being transmitted through the stone; you will notice that it is the same outline as the table facet of the stone. In this photograph, you are seeing what the stone originally looked like, and why it looked the way it did before we cut it open. And why some of the green stones on Jewelry Television appear to be red and green.




But the real slam dunk on this issue takes us back to the photograph below. Mother Nature did not, by a HUGE coincidence, place red color concentrations just at the right place in this feldspar crystal millions of years ago, where someone was going to put triagonal facet junctions today. The only way you are going to get color concentrations along facet junctions like this is due to artificial color enhancement of the gemstone. Most noteably by diffusion treatment.


Exactly how and why this was done we do not know. How many others are like this, we don't know. But the "what" on this stone.....we do know. And we have other specimens of both the red and green in the ISG office under study. **Editorial Comment:** I should probably end this by confirming that the ISG has not been paid by anyone to do this report. We have done it at the request of consumers, and we bought and paid for all of these specimens direct from Jewelry Television and other sources. Not all of the information is contained here due to time and space constraints. There is much including unusual absorption spectra in the red stones that is yet be researched. But we are beholding to no one, and have paid the boatman ourselves on this one regardless of what ensues. (no pun intended). The answers thus far were not obtained by rocket science; it was obtained by experience, knowledge, and some basic gemological tests that far too many US gemologists have forgotten how to do. And most forgotten in all of this is the consumer. Why would so many people have to reach out for so long to our industry for answers, and get no assistance? There are a lot of things that people need to buy these days beside gemstones. And the potential fallout of this situation could damage consumer confidence for years to come. So why did the gemology

industry turn a blind eye for so long? And just where is the Jewelers Vigilance Committee, anyway? I hope that Jewelry Television and the other shopping channels involved with this situation will do the right thing and do some internal investigations, be honest about the mistake, fix it, and move on. If there is a lot of finger pointing, accusations, ranting and raving, and threats and intimidations it is going to serve no purpose other than to further alienate an already alienated public. Due to the sheer size of this situation, we are at a cross roads as an industry. We can either cowboy up and do the right thing, fix the situation and make things right with consumers. Or we can break down into further anarchy and run consumers off to buy thimbles, spoons and other collectibles. The future is up to us. Let's make the most of it while it's still in our control to do so.

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For 5 years Robert was Senior Gemologist / Buyer in the Claims Replacement Service and Gemological Laboratory of USAA Insurance in San Antonio, Texas. During these 5 years, Robert worked to establish new procedures that were adopted in the operations procedures for USAA, and taught classes for underwriters, policy service staff, adjusters, and Special Investigations Units throughout USAA. Robert was also active in the SIU division and assisted in the Major Claims division for USAA Special Investigations Unit.

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