TECHNO-GEMS

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What are synthetic lab-grown diamonds, rubies, emeralds and opals? Is there a market for them? Are they of any value to art jewelers?

by

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Fine gemstones are becoming as rare as hen's teeth, as the saying goes. Much of the natural material on the market has been enhanced, altered, treated in some way to improve its appearance, and even then the price can be high. So what is a jewelry maker to do?

Well, you can design without gemstones. You can use found objects. You can use agates and jaspers (which may still be dyed or treated in other ways). Or you can use lab-grown gem materials. In fact, sometimes the only way to get a gem material of the size, clarity, color or shape you need to fulfill a design concept is to use a lab-grown stone.

(Lab-grown stones may be synthetics, that is, they may have the same physical and optical properties and the same chemical composition as the natural; a synthetic ruby *is* a ruby, it just grows in a lab not underground. However, lab-grown stones may have no natural counterpart, for example, cubic zirconia (CZ) or yttrium aluminum garnet (YAG). These are lab-grown diamond imitations, not synthetic diamonds. Moissonite is synthetic silicon carbide but it is still a diamond imitation.)

When San Francisco jewelry artist Abrasha designed a necklace that would cage gemstone spheres in stainless steel and gold, the design called for the spheres to be put into the cages before the soldering was done. So Abrasha chose synthetic rubies for his gem material. "I couldn't [use] any other materials," he says. "Glass would explode. Onyx would crack. Pearls would burn. Nothing else would take the heat." The cost to use

natural rubies would have been “outrageous…many hundreds of thousands of dollars.” Even if the cost would not have been prohibitive, the inclusions in natural material might have caused the rubies to explode. In addition, the color would have been nearly impossible to match, and the spheres, which would have had to be hand cut, would probably not have been uniform. The flawless, machine-cut, synthetic spheres—which were actually manufactured for use in braking mechanisms and measuring devices—were perfect. And the cost was about $25 each. Abrasha has also used synthetic ruby rods in several ring designs. The rods are made for the watch industry to be cut into the “jewels” in a “jeweled movement.” The rubies act as bushings against which the gears rotate.

Madison, Wisconsin, jewelry artist, Don Friedlich, also found that synthetics were the only way to produce an idea he had for a large pendant. The design would entail having a large, colorful, custom-cut gem material inlaid with diamonds. It remained an idea until he found a German lapidary company in Idar-Oberstein willing to cut the pendant from synthetic ruby and synthetic spinel.

Not only designers, but cutters find that synthetics may answer a commission question. Wichita, Kansas, gem cutter and carver Rick Stinson was asked to carve a large ruby. Although the client’s budget was “awfully nice,” he says, almost nothing would have been enough to get a natural ruby crystal of the size and quality the project demanded. “Most natural rubies are not grown in ideal conditions,” he notes. “They are silky, or ‘mudded up’ [purplish] or fractured or flawed.” So he recommended a synthetic or lab-grown ruby to his client. Stinson took great care to educate his client so it was clear what they were getting. “Once I was comfortable that they really understood, that they knew what was what, then it was okay to proceed.”

Lab-grown gem materials have been around a long time. The first gemstones to come out of a lab were rubies, produced more than 100 years ago, in 1902, by Auguste

Vernueil, then professor of applied chemistry at the Museum of Natural History in Paris. Five years later, more than five million carats a year were being made. The flood gates were open.

Although Verneuil's fairly simple process is still used today to produce millions of carats of inexpensive synthetic sapphires, rubies, and spinels used in the jewelry industry, the demand for pure single crystals for lasers and communication devices has resulted in ever-more sophisticated manufacturing processes and higher quality crystals. It was almost inevitable that some of this material would find its way into the gem market. In addition, some chemists couldn't resist the desire to best Mother Nature at her own game, and they produced lab-grown emeralds, rubies, opals, and even turquoise and lapis of very high quality. Not even diamonds were exempt from manufacture. Since the 1950s, most industrial diamonds—used in countless grinding and cutting processes--have been produced in laboratories. Even fine quality lab-grown diamonds have been used in electronic devices of all kinds. Finally, gem-quality man-made diamonds have come onto the jewelry market in large numbers. (At this writing, lab-grown diamonds are not sold loose; they are all set in finished jewelry.)

So why is there resistance to synthetics among so many cutters and designers?

A lot of it probably stems from a misunderstanding of terminology. While synthetic is the correct term for gem materials that have the same physical, optical, and chemical properties as a natural, mined stone, things become confusing when materials, such as synthetic corundum (sapphire), are used to imitate another species of gemstone—alexandrite chrysoberyl, for example. The correct description, "synthetic alexandrite-like corundum (or sapphire)," is a mouthful to say as well as difficult and time consuming to explain to a customer. "Synthetic color-change corundum" (also correct) may make the customer's eyes glaze over. The term "imitation alexandrite," although correct (the

corundum is imitating the alexandrite) has connotations of glass, plastic or assembled stone. So all too often the descriptive tag for the stone has become truncated to “synthetic alexandrite.” This is incorrect. The stone is not a lab-grown alexandrite chrysoberyl, which exists, and is the only stone that can be called synthetic alexandrite. So while the term “synthetic” is gemologically the correct term for lab-grown emeralds, corundums, opals, chrysoberyls, beryls and diamonds that are virtually identical to the natural, mined stones, as time has passed, the word “synthetic” has become tainted with the meaning “fake.”

The term has also become tainted with the impression that synthetics are “cheap.” And it’s true that Verneuil material is very inexpensive to make and widely used in birthstone rings, pendants, and class rings. But there are other, very high-quality synthetic materials--grown by time-consuming processes, under exacting conditions that very closely mimic the conditions under which natural stones grow—which are much more expensive to produce. These are far from “cheap,” although they are much less expensive than natural stones of the same clarity and color. For example, synthetic gem-quality diamonds are only about one-third the cost of natural stones of the same color and clarity.

Yet despite the hesitation of designers to use the stones, they have possibilities—as Friedlich, Stinson and Abrasha have shown. In fact, one of the reasons Friedlich pursued his pendant design was because he felt that lab-grown gemstones were underused in the market place. “I hadn’t seen much inventive work with these materials and I thought there was an opportunity there.” He notes that lab-grown material holds an ambiguous place in designers’ minds. Whereas collectors of high-end, art jewelry are open to any kind of jewelry material--paper, glass, plastic, wood, coal, graphite, for example--they are less interested in traditional precious gem materials, and they lump synthetics into that group. Yet at the other end of the spectrum, traditional mainstream jewelry buyers are more conservative and so place more emphasis on the intrinsic value

of the materials used. For them, lab-grown material often falls into a dubious category. As a result, synthetics, says Friedlich, “end up in the gray zone in the middle.” Even though he sometimes lectures about the materials at conferences, he says, and people seem intrigued, few jewelry makers follow up with the material’s possibilities.

Abrasha feels there is a place for lab-grown stones in studio and art jewelry. “In art jewelry, the design is more important than the intrinsic value of the stones. In traditional jewelry, it’s more about the intrinsic value of the materials.” In fact, he says, traditional jewelry is usually built specifically to showcase that item of intrinsic value. His clients, like Friedlich’s, who are usually educated about studio and art jewelry, and open to unusual materials in jewelry, have never questioned his use of synthetics in his work, he says.

For Stinson, lab-grown materials are simply a matter of practicality. “I’m not necessarily a champion of lab grown stones. I think it’s important to know about them and consider them for color, for their possibilities,” he says. If the material doesn’t exist in nature, then the obvious choice is to use synthetics. For example, when it became clear that he was never going to get rough red beryl (also called bixbite or bixbyite and sometimes marketed as red emerald) that was clean enough or large enough for him to cut, he sought out a synthetic version. “I could bring out the clarity and the color and give someone a stone that would talk to them at a price that was unbelievably cheap compared to what people were paying for the natural [bixbite].”

Although lab grown stones, says Stinson, are “not a big percentage of my business, I’ve tried to make them available for those who do want them. It’s a shame not to consider all the possibilities out there and be hung up just because a stone is lab-grown. Their palette of colors is incredible.” However, it is “super important,” that buyers understand what they’re getting, he says, whether it’s natural, lab-grown, treated or untreated.

Although Friedlich makes no predictions about the future use of lab-grown stones, he says, “To me, with all the political and emotional baggage surrounding the natural gems, and conflict diamonds and all that, the synthetic material seems more politically correct. You have stones that are chemically and optically the same as the natural, but no culture has been abused getting them.”

Sidebar: What about Cultured?

Because the term synthetic has come to mean “fake” or “cheap” in many minds, it’s understandable that manufacturers and retailers of high-quality lab-grown gemstones should shy from the term synthetic. Because the value and quality of cultured pearls have been accepted by the public, manufacturers of lab-grown stones have long sought to apply the term “cultured” to their product. For 50 years, jewelry organizations, such as Jewelers Vigilance Committee (JVC) and the American Gem Trade Association (AGTA), have objected to the use of “cultured” for anything but pearls; and the Federal Trade Commission (FTC) has agreed. However, in the summer of 2008, the FTC shifted its ground somewhat, stating that although the term might be deceptive if used alone, when “cultured,” in reference to lab-grown gem materials, was qualified by the terms "laboratory created," "laboratory grown," "[manufacturer-name] created," or "synthetic," then there was “insufficient evidence” to show the term cultured was deceptive or misleading.

Which means you can use “cultured” if you also qualify it. But if you’re going to shorten an otherwise long identifying tag—laboratory-grown cultured diamond--it’s best to shorten it to “laboratory-grown diamond” rather than just “cultured diamond.”