

RAPAPORT TM _®

THE FIGHT'S GETTING REAL

A SPECIAL REPORT ON
SYNTHETIC DIAMONDS
BY RAPAPORT

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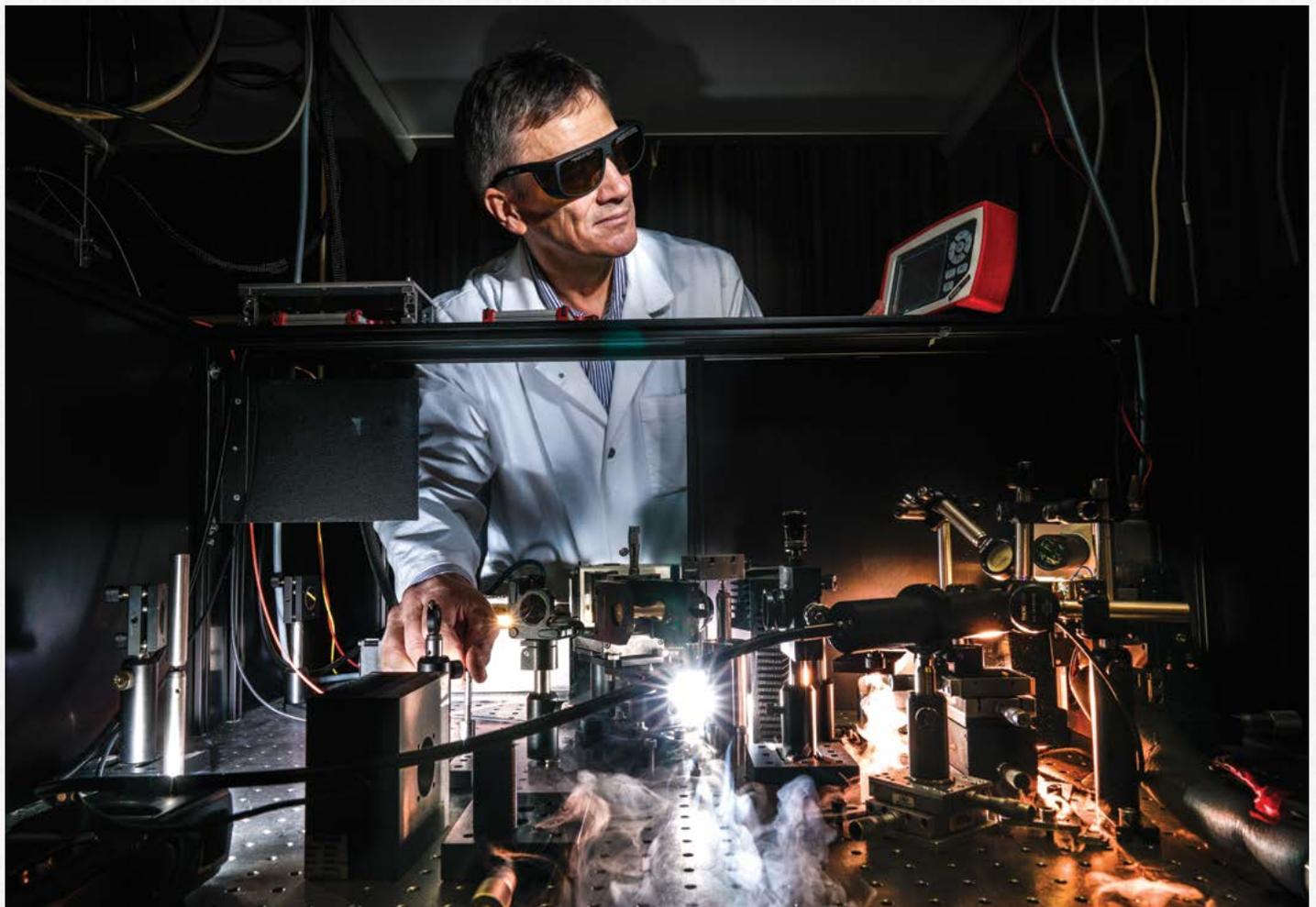
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THE MEAT OF THE MATTER

The natural-diamond trade needs to get off the defensive in the debate over synthetics. By Avi Krawitz



In a bold and somewhat savvy move back in January 2018, Tyson Foods, one of the largest food-processing companies in the US, took a minority stake in Memphis Meats, a startup in the budding cultured-meat industry.

Despite the deal's sleeping-with-the-enemy feel, the investment sparked little controversy, as Tyson was the latest in a line of high-profile investors in the food-tech business. Memphis Meats also counts Bill Gates, Richard Branson and Cargill Inc., another meat producer, among its backers.

Lab-grown meat, which is essentially cultured from animal cells, offers environmental benefits, but it also taps into social trends.

If the product takes off, lab-grown meat could help lower greenhouse-gas emissions and reduce damage to the environment, which the food industry

currently impacts through deforestation and overcrowding. Economically, it could ride the wave of ethical consumerism and the strong movement toward non-meat diets.

Rather than resist the new product category, meat-processing companies have embraced it as a complementary business that could drive growth. "We continue to invest significantly in our traditional meat business, but also believe in exploring additional opportunities for growth that give consumers more choice," explained Justin Whitmore, vice president of corporate strategy and chief sustainability officer at Tyson Foods.

THE 4DS

The key, it seems, is to know what you're eating. While the product is still in its early days and many still question whether consumers will take to it, ordering a steak in the future will likely involve more than choosing rare, medium or well-done.

But for that to happen, restaurateurs will have to provide full disclosure of what's on the menu, and regulators will need to oversee the correct documentation of that disclosure. The Food and Drug Administration (FDA) in November agreed to share regulation of cell-cultured food, monitoring the collection and differentiation of cells, while the US Department of Agriculture would oversee production and labeling of these products.

That's led to a debate over what to call meat derived from animal cells rather than the animal itself, and whether you should even use the word "meat" to describe it. Some argue it should be called

“cultured,” “synthetic” or “in-vitro” meat, while lobbyists such as the US Cattlemen’s Association refer to it as “cell-cultured products” or “cultured tissue” (i.e., not meat).

Correct labeling is vital, since food-tech companies note that their product has the same taste, look, texture and nutrition as regular meat. Plus, they need to differentiate to demonstrate their added value. Their businesses won’t be viable without the proper detection, disclosure, documentation and differentiation (the 4Ds) of the alternative meat products becoming available.

DIAMOND PARALLELS

The diamond industry faces a different set of challenges when it comes to lab-grown, even as one can clearly draw parallels to the meat industry’s experience. It has also reached a more mature phase of its synthetics discussion, particularly when it comes to implementing the 4Ds.

Regulators are less involved in the quality control of lab-grown diamonds, although they have weighed in on what is considered a diamond: The Federal Trade Commission (FTC) declared last year that the word “diamond” could refer to natural or synthetic stones. Of course, the trade body still requires lab-grown suppliers to make the proper disclosures in their marketing and sales pitches. But it has largely been left to the natural-diamond sector to police synthetics supply through grading and detection. Undisclosed mixing of synthetics in parcels of natural diamonds remains a significant threat to diamantaires, undermining the value of the mined product. Alarming, the number of cases of such mixing continues to rise.

DIFFERENTIATION PHASE

Undisclosed synthetics have dominated the lab-grown narrative over the last few years. Diamantaires have become aware of the problem, and an impressive number of synthetic-detection services and machines have become available, even if it remains difficult to neutralize the threat.

Today, however, the discussion has shifted to focus on differentiation as lab-grown diamonds gain in popularity and acceptance.

“For us, 2018 was the year that lab-grown diamonds got a place in the jewelry industry,” researchers at lender ABN Amro wrote in a recent report. “We think that 2019 and 2020 will be the years that lab-grown diamonds take off and move from an introduction phase to a growth phase.”

Synthetics producers are investing to tap that growth. De Beers is building a new facility, and Diamond Foundry is expanding to raise its supply significantly. Meanwhile, equity firm Huron Capital bought into WD Lab Grown Diamonds, and even the Flemish government has provided a \$2 million grant to develop Antwerp-made synthetics.

Differentiation is important for the lab-grown industry, as it is for natural diamonds. A majority of the synthetics players market themselves as the ethical alternative to mined diamonds, which they claim are tainted with conflict and hurt the earth. That has put the natural-diamond trade on the defensive, resulting in the industry having to prove

its added value over synthetics when it should be the other way around. The lab-grown product, after all, is the newcomer trying to gain market share.

To ensure sustainable growth, synthetics suppliers need to show that their competitive edge extends beyond badmouthing natural diamonds — particularly since the claim that a lab-grown diamond is eco-friendly, transparent and ethically sourced tends to be vague, as the DPA has noted. There is very little, if any, source verification of lab-grown diamonds or monitoring of its ethical footprint. Ideally, lab-grown producers should adhere to the same know-your-supplier practices that a growing number in the natural-diamond trade do.

BELIEVING IN THE PRODUCT

The mined-diamond industry needs to get off the defensive in the synthetic-diamond debate. It can do so by amplifying the good that diamonds do — through both its corporate social-responsibility programs and its role in providing livelihoods to tens of millions of people. It should also enhance its storytelling about where a diamond comes from, building on the wave of source-verification and traceability programs that have recently emerged.

Consumers do care about what they’re buying, and they want to be assured that their purchase is making a positive contribution. Natural-diamond companies should be providing those assurances regardless of the rivalry with synthetics. It has become quite clear that the natural-diamond and jewelry brands able to garner growth in today’s challenging environment are those investing in technology and telling a meaningful story.

In that context, the synthetic-diamond debate should not be about the threat of losing market share. Lab-grown products, whether meat or diamonds, provide a different appeal and will evolve to a segmented market. Rather, it’s about the diamond industry believing in its product. Having survived the early-disrupter challenges that cultured meat is now presenting for food suppliers, the natural-diamond trade should have the tools to sell with confidence. The growth of synthetics may continue to shake the market, but natural diamonds have a unique value proposition that still resonates with consumers. ■

THE INDUSTRY HAS HAD
TO PROVE ITS ADDED
VALUE OVER SYNTHETICS,
WHEN IT SHOULD BE THE
OTHER WAY AROUND

2020

ABN AMRO EXPECTS LAB-GROWN DIAMONDS TO MOVE FROM AN INTRODUCTORY PHASE TO A GROWTH PHASE IN 2019 AND 2020



Shedding light on Lightbox

De Beers' new lab-grown line has shaken up the diamond trade. Here's a closer look at the implications of this controversial move. By Lara Ewen

Lab-grown diamonds may still be relative newcomers to the luxury market, but not since the dawn of the internet has a subject left the diamond industry so divided. That's why it was particularly shocking when, in May 2018, diamond behemoth De Beers announced its Lightbox line of lab-grown mounted jewelry, which launched online direct to consumers in September.

Industry reactions ranged from excitement to fear, and while it's still too early to know what the long-term impact of Lightbox will be, there is no shortage of opinions about the news.

Popular fashion

For its part, De Beers says Lightbox came to market only after significant consumer research, which it reports has largely shown that people take lab-grown diamonds less seriously than mined ones.

"What we have seen increasingly over time is that there is really broad and growing confusion amongst consumers about what a lab-grown diamond is, and how they're produced, and how valuable they are, what they should cost," says David Prager, the company's executive vice president of corporate affairs. "And we also identified that there was some interest in them as fashion jewelry, once people understood what they were, but that people really didn't see them as something suited to a life event of real emotional significance."

Instead, he says, people "see them as pretty and sparkly and fun, and they should be marketed accordingly. You can buy Lightbox for a beach holiday, because you're not worried if you misplace one of your diamond lab-grown studs. You can go on the website and you can buy one to replace it."

This more casual segment "wasn't being served by the lab-grown diamond producers [before now], because they were going for the kind of classic diamond territory," he explains.

Nonetheless, he acknowledges that many customers may still consider Lightbox high-end. "There are going to be some people who feel like they're getting a luxury product," he says.

Putting them in their place

The idea that lab-created diamonds are not suitable for emotional purchasing is certainly not a new one, and De Beers' entry into this space has helped clarify the distinction for retailers that were already loath to carry them.

"De Beers-produced lab-grown diamonds have been serving as a stabilizing and correcting force

GROWTH FIGURES

- In 2014, about 97% of the US industrial diamond market was using lab-grown stones, since their properties could be customized for specific applications.

- The lab-grown industry currently has the capacity to produce about 2 million carats of gem-quality polished per year, the majority of which is under 0.18 carats.

- Output could grow to between 10 million and 17 million carats per year by 2030 if the sector sustains its current annual growth rate of 15% to 20%.

- Today, it costs \$300 to \$500 per carat to produce a diamond via the chemical vapor deposition (CVD) method, compared with \$4,000 per carat in 2008.

- The percentage of consumers willing to buy an engagement ring with a lab-created diamond as a center stone rose from nearly 39% in 2016 to almost 70% in 2018.

Sources: US government data, Bain & Company, MVI Marketing

in the lab-produced diamond market, just as they have in the mined-diamond market," says Elizabeth Doyle, co-founder of New York-based vintage and antique jewelry retailer Doyle & Doyle.

Doyle, who does not stock lab-grown product, says the introduction of Lightbox has given these diamonds a level of acceptance they did not previously have, but has also helped put them in their place. "I believe this mainstream acceptance will grow as De Beers continues to market its product to the younger consumer. With that being said, their focus on lab-grown diamonds in a fashion-type product will likely reinforce the widely held belief that lab-grown diamonds are not appropriate for an engagement ring."

A matter of marketing

Indeed, with a consumer price tag of \$800 per carat, Lightbox is not meant to compete with De Beers' core mined-diamond product, according to Prager. "You'll notice that on all the Lightbox marketing material and advertising and online, we don't use the De Beers brand to market it," he points out. "That's with a lot of forethought and clear intent, because we understand that in many consumers' minds, the name De Beers is synonymous with diamonds. And we want to make it really clear what these are and what these aren't. We want to create a clear separation."

While there may be marketing plans for Lightbox in New York and Los Angeles, Eric Swanson, sales manager at Neustaedter's Fine Jewelers in St. Louis, Missouri, reports that the midwest hasn't seen anything, so the product is effectively nonexistent in the eyes of his customers. In fact, he says, "90% of millennials don't even know who De Beers is. Young people prefer brands that are small and independent and new and cutting-edge."

Swanson, whose store stocks both lab-grown and mined stones, says he was "expecting that within a month or two of the announcement, people would ask me why our lab-grown stones were three times the cost of Lightbox, but not one person has said anything at all [about the brand]. So we haven't had to change anything. Yet." ►

"WE WANT TO MAKE IT REALLY CLEAR WHAT THESE ARE AND WHAT THESE AREN'T. WE WANT TO CREATE A CLEAR SEPARATION"

For his clients, lab-grown diamonds are just another type of diamond, he adds. “Some flowers are grown in a field, and some are grown in a greenhouse. This is the same thing. Chemically, it’s the same.”

The Federal Trade Commission (FTC) seems to agree: In July 2018, it updated its definition of “diamond,” removing the word “natural” and thereby legally establishing that any stone with the same “optical, physical, and chemical properties as mined diamonds” could be called a diamond.

The price is right

So far, says Prager, the Lightbox initiative has gone well. “Since we launched in September on e-commerce...we’ve seen our traffic increase month on month on month, and week on week.”

The line’s biggest selling point, of course, is the price. An average 1-carat loose mined G-color, SI1-clarity stone runs about \$7,400, according to the Rapaport Price List.

By that rubric, lab-created diamonds would appear to be more cost-effective.

\$94M

DE BEERS’ ESTIMATED
INVESTMENT IN ITS
LAB-GROWN PRODUCTION
FACILITY IN OREGON

“Most lab stones graded by [the International Gemological Institute (IGI)] are about half the price of a natural mined,” says Swanson. “But that’s for ideal-cut diamonds.” Most retailers then sell the stones for about 30% to 40% less than mined, based on common discounts to the Rapaport Price List.

Still, Swanson believes the prices of Lightbox’s mounted jewelry “won’t have any impact at all on natural. There was a race to the bottom [in terms of price, and online jeweler Blue Nile] finally hit it, and that’s it.”

Ronnie VanderLinden, owner of New York-based wholesaler Diamex Inc., concurs. “The only thing that will affect the price of natural is the economy. Is it strong or weak?”

Nonetheless, smaller and lesser-quality mined goods may find it challenging to compete with their lab-created counterparts.

“The fear is that the lower-cost lab-grown diamonds will drag down prices of natural diamonds,” says Edahn Golan, founder of Edahn Golan Diamond Research & Data, which provides consultancy services for the global diamond industry. “So the hope is that creating a clear distinction between the two products [as De Beers is doing] will protect prices of natural diamonds.”

Golan sees Lightbox as setting a new price point for lab-grown product, and predicts that other suppliers will need to follow suit. When Lightbox arrived on the market last year, he says, its pricing structure “had a chilling effect on lab-grown diamonds. Huge markups were erased nearly overnight. Prices kept declining until September, when they stabilized at a new level, [and] this new price level will probably be long-lasting.”

How low can it go?

VanderLinden, who is also president of the Diamond Manufacturers and Importers Association of America (DMIA), agrees that Lightbox prices have set a new standard. “De Beers brought their [lab-grown] prices down to what they thought was a realistic price,” he says. “Now anyone who wants to compete with them will have to restructure their pricing based on that.”

But the change may not be quite so dramatic. Just as Swanson doesn’t expect Lightbox to affect natural prices, he reports that “we haven’t seen any change in the larger loose lab-grown-diamond prices.” Regardless, he says, “Lightbox is mounted stuff, and I don’t think other lab-grown companies will change their price structure based on this.”

Indeed, even in the jewelry sphere, the impact may be limited. Lab-grown producer Diamond Foundry, for example, was already pricing some



*A utility fitter assembles
a press at De Beers'
Element Six industrial-
diamond-growing unit.*

Lab-grown stones from
Diamond Foundry.



of its mounted stones similarly to Lightbox (see box). And many lab-created products are certified — a category that, like loose diamonds, isn't on Lightbox's agenda.

"We're not grading [Lightbox stones]," Prager states. "The idea of grading a mass-produced product simply is nonsensical to us."

At the very least, VanderLinden doesn't expect the price of mounted lab-growns to fall any further than current Lightbox rates. He stresses that "\$800 a carat for lab-grown is the bottom. I don't see how it'll go below that, because there's still the fixed cost of labor and polishing, plus growth, and wages aren't going back down, either."

Plans for the future

Are other high-end jewelry brands likely to follow De Beers into the lab-grown space? Prager doesn't believe they'll want to.

"I think Tiffany has such a fabulous brand, is well regarded and trusted as another byword for diamonds," he says. "And I don't see a time when you're going to see that Tiffany brand linked to lab-grown diamond, in the same way you're not going to see the De Beers name linked to Lightbox."

For consultant Golan, the question is what mid-market retailers will do.

"Currently, Blue Nile and Signet are not offering lab-grown diamonds, but they may change their minds," he says. "I won't be surprised if Signet decides to make the jump if it finds that it is missing out on a category that independent jewelers across the country are benefiting from."

Yet even De Beers stresses that Lightbox will only play a small role in its overall operations. "De Beers has always been a natural-diamond company and will always be a natural-diamond company," declares Prager. "When you look at the investment we're making in Lightbox...you can't even compare the two."

Of course, that investment is far from small. "Over the next four years, we'll spend about \$94 million in building our [lab-grown diamond] production facility in Oregon, just outside of Portland. It'll be able to produce 500,000 carats of rough a year. So it's a serious statement of intent."

But to put those numbers in perspective, he continues, "the natural-diamond industry mined many, many times that — 34 million to 36 million carats, I think, was our latest production. Obviously, the majority of that is industrial-quality. And over the next five to seven years, we'll spend something in the order of \$10 billion in capital investments bringing mined diamonds to market and marketing mined diamonds."

So while Lightbox may be "gaining people's attention and headlines," he says, "for us, it's never going to rise to the level of our natural business."

It is, however, enough to make the industry question its relationship with luxury lab-grown diamonds.

"This is here to stay," says VanderLinden. "And those who were highly against it are now involved with it. Things change, and if you're not involved with lab-grown, you're going to miss an opportunity." ■

DIAMOND FOUNDRY: OVERWHELMED WITH DEMAND

The announcement of Lightbox was encouraging news for Martin Roscheisen, CEO of California-based lab-grown producer Diamond Foundry.

"De Beers was long fearful of manmade diamonds in jewelry," says Roscheisen. "So their entry into the market really signified that this was a segment that would not go away and could not be ignored. De Beers' entry into the market has instantly multiplied our business. We are truly overwhelmed with demand now."

In fact, demand is "increasingly outstripping supply," he reports.

One way the company, which has been in business since 2012, plans to address the supply-chain issue is through the new foundry it opened late last year in Wenatchee, Washington. "This will produce an additional 1 million carats," says Roscheisen. "We believe this will barely meet the demand, based on existing orders."

The company's products fall into two main categories: program diamonds — which are cut to spec for jewelry manufacturers — and certified uniques. The latter, which make up 93% of Diamond Foundry stones, "have certification and warranties associated with them that program diamonds do not," Roscheisen explains. "As a result, the pricing is different."

Value judgments

Are synthetic-diamond prices going up or down? Producers and industry studies are split on the answer. By Joshua Freedman



*Olya Linde,
partner at Bain &
Company.*

When analysts say synthetic-diamond prices are falling and likely to keep doing so, it's almost a given that producers of the stones will shout the opposite.

Several such companies are betting on the truth of their own narrative: that prices will remain strong, or even increase. Yet with the rate of production going steadily up, that looks like quite a gamble. Lab-grown polished output is rising 15% to 20% per year due to a drop in production costs, according to a December 2018 report by consultancy firm Bain & Company. Under the usual rules of supply and demand, that means prices should be declining unless demand increases at a faster pace — and indeed, wholesale prices for 1-carat, G-color, VS-clarity lab-grown polished goods have slumped about 70% over the past two years, the report says.

“Individual lab-grown-diamond producers could see significant growth in demand for their products due to an attractive marketing campaign or an attractive product, but overall, we see prices of lab-grown diamonds have decreased at retail and wholesale,” says Olya Linde, a partner at Bain & Company and one of the report’s authors.

“The simple reason for that is, as technology is improving and the cost of production is decreasing, the barriers to entry are not as big,” she continues. “We saw this with industrial synthetic diamonds

50 years ago. When they started production, costs were high, but they came down significantly as the technology improved and the efficiencies kicked in.”

Analysts’ view: A steady slide

Bain’s findings dovetail with those of diamond analyst Paul Zimmisky, who observed a decline in lab-grown prices last year due to improvements in production capabilities. The price of a generic 1-carat lab-grown diamond fell to a discount of 42% relative to natural stones in late November 2018, when Zimmisky published his report, compared with 29% in January of that year.

“Lab-grown diamonds are a product of technology, and as we’ve seen with synthetic sapphires, rubies and emeralds, as the technology advances, products become more affordable,” De Beers CEO Bruce Cleaver said when the company launched its Lightbox fashion jewelry line last May.

Notably, it priced Lightbox pieces at a fixed \$800 per carat, undercutting many other producers’ lab-grown goods. In offering this rate irrespective of size and quality, De Beers also rejected the standard practice of selling synthetics at a certain discount to natural diamonds. Dynamic pricing exists for natural stones because different categories have different levels of availability, which is less of an issue for synthetics, as laboratories can pump them out as per the operator’s wishes.

Growers’ view: Plentiful demand

Yet synthetics-only producers say supply is harder to come by than one would think — and that demand is on the rise.

California-based Chatham Created Gems & Diamonds — which grows at least 100,000 carats of rough diamonds annually — has enjoyed buoyant demand in the past five years, according to Tom Chatham, its outspoken CEO. He also reports a dearth of supply.

“Contrary to some industry pundits, increased production, in view of the huge potential market, is not going to affect prices for [1-carat-plus] stones,” he maintains. “There are only a handful of companies in the world that can grow large white rough. It is not, as some would lead you to believe, just a matter of leaving the production equipment running longer.”

In fact, a production shortage and expectations of burgeoning consumer demand prompted Diamond Foundry, one of the largest lab-grown producers, to raise wholesale prices 15% on January 1.

“We see demand increasingly outpacing supply,” the California-based firm said in a note on its website in December. Boosting its stone output is more difficult than mining, the company argued, as the diamond-growing technology involves significant expense and expertise.

And while the company admits there was some fluctuation in prices last year, its outlook is still positive. “Prices fell in August, but there is presently a massive shortage in the supply of lab-grown diamonds, which is causing a price increase,” CEO Martin Roscheisen tells *Rapaport Magazine*. “We believe this shortage will persist for several years.”

In a testament to that optimism, Diamond Foundry began production at a new facility in Wenatchee, Washington, in November. The plant will increase the company’s output to 1 million rough carats per year by the end of 2019, compared with the 100,000 carats it currently grows.

Aiming too high?

Unlike De Beers, Diamond Foundry prices its lab-grown diamonds as luxury products. Its higher-end stones, which it calls “certified uniques,” carry a recommended retail price of 55% off the Rapaport Price List.

That may be cheaper than the equivalent natural diamonds at major online retailers, but it still means a 1-carat engagement ring from the company costs more than \$2,000 for a round stone, and upward ▶

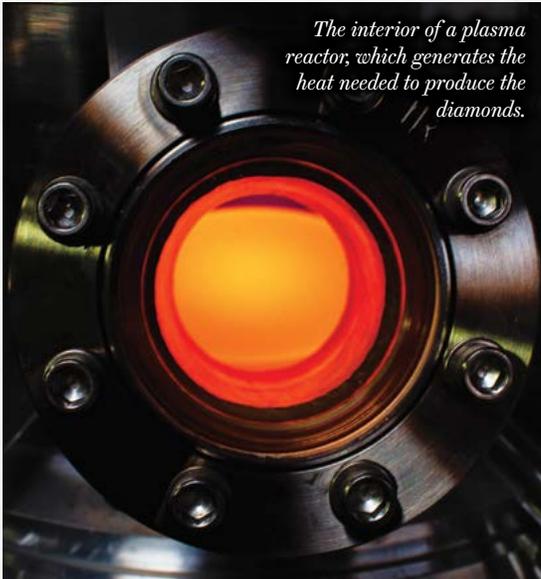
“AS TECHNOLOGY IS IMPROVING AND THE COST OF PRODUCTION IS DECREASING, THE BARRIERS TO ENTRY ARE NOT AS BIG”



Machines at Diamond Foundry's facility in San Francisco, California.

70%

THE APPROXIMATE DROP IN WHOLESALTE PRICES FOR 1-CARAT, G-COLOR, VS-CLARITY LAB-GROWN POLISHED GOODS OVER THE PAST TWO YEARS



The interior of a plasma reactor, which generates the heat needed to produce the diamonds.

“PRICES FELL IN AUGUST, BUT THERE IS PRESENTLY A MASSIVE SHORTAGE IN THE SUPPLY”

of \$3,000 for a fancy shape, excluding the setting. Several items on the Diamond Foundry site are priced at more than \$15,000.

For a relatively nascent company, the higher end is a challenging market to be in, given how much luxury prices rely on long-term branding clout. While major jewelry houses can afford the weighty costs associated with marketing non-essential products, Zimmisky notes that the expense can be a barrier for new entrants.

“If the ‘higher-price-point lab-grown-diamond’ companies do, in fact, prove overwhelmingly successful this year, I would be quite surprised,” he comments. “While some of these companies have been successful with social and traditional media, there is no significant lab-grown-diamond marketing campaign that I am aware of...outside of Lightbox.”

There’s significant consumer demand for 1-carat synthetic diamonds below \$1,000, but not for those costing \$4,000 or \$5,000, Zimmisky adds.

“I’m sure there will be some specialty companies and retailers that can be successful selling at the higher price point, but I think they will be few and far between,” he says.

Driving a hard bargain

So is affordable fashion jewelry where the synthetics market is heading? For the most part, the answer seems to be yes.

But whether De Beers’ \$800 per carat will become the going price for all synthetics is another question.

The vast majority of Lightbox’s stones are much smaller than 1 carat, and when you’re talking about an earring with a 0.17-carat center stone surrounded by pavé, \$800 per carat is suddenly not so cheap. It may even be more expensive than some small natural stones are.

In that vein, a recent Diamond Foundry web post called De Beers’ attempt to paint synthetics as a low-cost product “brilliantly misleading” and “fake news.”

Chatham, too, is unimpressed. De Beers’ move “was disruptive initially, but when it turned out that Lightbox would not sell 1-carat stones but only total-weight melee, the disruption dissipated,” he says.

Chatham’s claims aren’t quite accurate: Lightbox sells 0.50-carat and larger stones, though the only full 1-carat stone on its site, a princess cut in a pendant, was sold out at press time. The retailer has “plenty of satisfied customers” who have bought the piece, and plans

to restock it soon, according to Lightbox chief marketing officer Sally Morrison.

Diamond Foundry, meanwhile, suggests retail prices of \$250, \$750, or \$1,000 per carat, depending on size, for its own range of Lightbox-style synthetic stones between 0.25 and 0.85 carats — a category it calls “program diamonds.”

A clash of data

Whatever the price is now, the recent analytical reports indicate the products will lose value. A likely result is that natural and synthetic diamonds will become two distinct markets, says Bain’s Linde — a scenario that closely matches how De Beers has presented the two categories.

“If the prices of lab-grown diamonds continue to go down at the rate they’re going down, the markets will separate themselves,” she predicts. “There’s a high potential for them to do that.”

Asked why Diamond Foundry’s expectations differ so drastically from the consensus, CEO Roscheisen argues that industry surveys like Bain’s are based on the previous year’s data.

“The lab-grown industry continues to change and evolve quite quickly,” he says, adding that “we are able to see our actual demand data,” not just economic forecasts.

For the time being, at least, it seems the two sides in this debate will continue to see the world from opposite vantage points. ■

THE GEMSTONE EXAMPLE

If the diamond industry wants a case study, it need only look to the rise of other lab-grown gemstones.

Synthetic emeralds, which came on the market in earnest in the early 1990s, slumped in price during that decade due to increased competition among manufacturers, an anonymous former wholesaler told consumer website The Diamond Pro last year.

“One day, we were selling lab-created emeralds for hundreds of dollars a carat,” the gem trader reportedly said. “The next day, the price was in the \$40-per-carat range.”

In contrast, prices of natural, unmodified rubies and sapphires have climbed in the past few years due to focused marketing and high-end demand for authentic products, according to Olya Linde of Bain & Company.

“Synthetic sapphires are widely available and sold at the same retail locations as jewelry with natural stones, and still the price of natural stones has held and [even] grown,” she says. “There’s a category of people who are wealthy enough, and who are attracted to differentiated luxury products, that are willing to spend the money.”

Language lessons

With new standards out for gem terminology, the Jewelers Vigilance Committee (JVC) is helping translate them into practical advice for the industry. Here are the highlights from the latest Federal Trade Commission (FTC) guidelines. By Joyce Kauf

DIAMONDS

THE DEFINITION OF 'DIAMOND'

- *What's new:* The term "natural" has been dropped from the definition of "diamond." The new language reads: "A diamond is a mineral consisting essentially of pure carbon crystallized in the isometric system. It is found in many colors. Its hardness is 10; its specific gravity is approximately 3.52; and it has a refractive index of 2.42."
- *Practical difference:* The change simply reflects that diamonds can now be made in multiple ways. It does not alter the requirement to disclose laboratory-grown diamonds.

TERMS TO DESCRIBE LABORATORY-GROWN DIAMONDS

- *What's new:* Under the previous guidelines, only the terms "laboratory-grown," "laboratory-created," "[manufacturer name]-created," or "synthetic," immediately preceding the word diamond, could be used to describe this product category. The revised version allows use of the first three or "some other word or phrase of like meaning...so as to disclose clearly the nature of the product and the fact that it is not a mined gemstone."

In addition, the new standards prohibit the use of "cultured" to describe such diamonds unless the term is qualified by a clear and conspicuous disclosure.

- *Practical difference:* For natural diamonds, traders may use the word "diamond," unqualified. However, laboratory-grown diamonds must have one of the above-recommended modifiers in front of the word "diamond."

REGARDING THE TERM 'SYNTHETIC'

- *What's new:* The FTC has removed this term from its recommended list for describing laboratory-grown diamonds, but has not prohibited its use.
- *Practical difference:* "Synthetic" may be an appropriate term to use in some instances, especially when translating scientific documents from other languages.

EDUCATION EFFORTS

Since the FTC issued its revised guidelines last July for describing gems and jewelry, the JVC has been working to educate industry members on how the changes will impact them – and on the importance of compliance.

"The trade should remember that these guidelines have teeth and are enforceable under the FTC Act and other legal avenues," says JVC CEO and president Tiffany Stevens.

"Not only could the FTC come after the trade, but a competitor, a consumer or groups of consumers could also file suit."

The guidelines apply to both traditional and digital marketing formats. Disclosures "must be made to a consumer before the decision to purchase a product," notes JVC senior counsel Sara Yood. "On the internet, this means the disclosure must be made conspicuously before the 'add to cart' or 'purchase' button."

Besides releasing a publication outlining the changes, says Yood, the JVC plans to hold seminars at trade events.

However, traders should be careful not to use it in a disparaging way or to imply that laboratory-grown diamonds are not actually diamonds.

OTHER GEMSTONES

When describing products made with gemstone material and any amount of filler or binder (such as lead glass or a polymer), it is deceptive to use the unqualified gemstone name or simply "treated [gemstone]." The FTC also considers it deceptive to use the language for laboratory-grown gemstones ("laboratory-grown," "laboratory-created," "[manufacturer name]-created") to describe this product. Instead, marketers may use "composite [gemstone]," "[hybrid] gemstone" or "manufactured [gemstone]," as long as the terms are clearly and conspicuously qualified to convey that the product does not have the same properties as the named stone, and that it required special care.

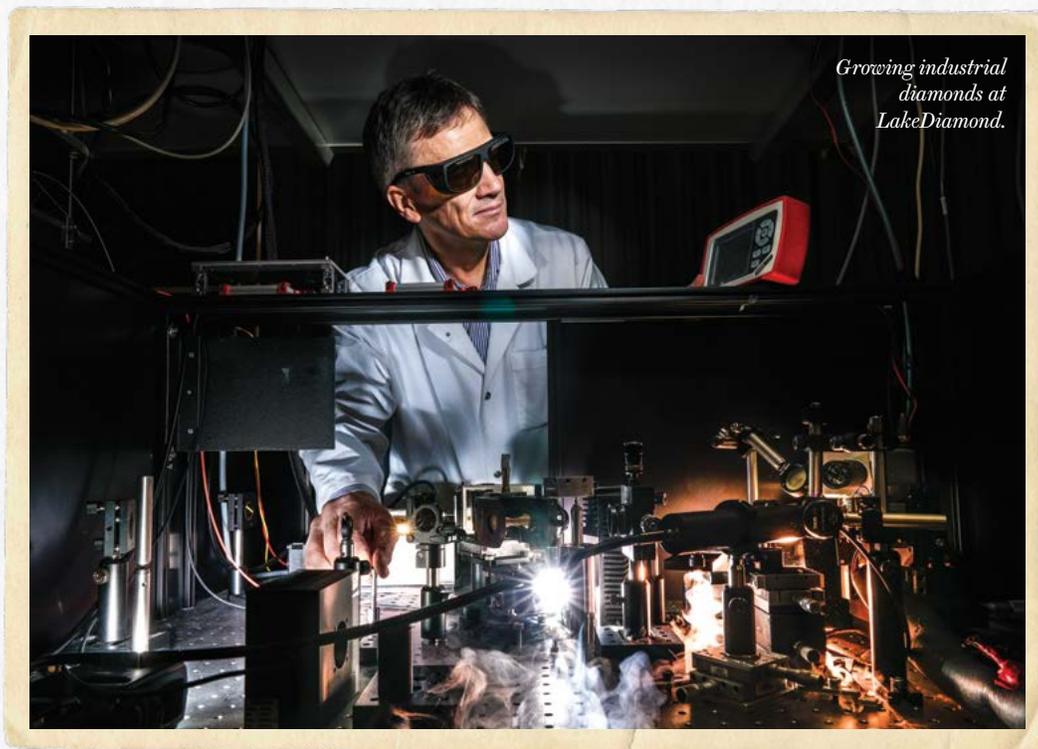
PRECIOUS METALS

There is no longer a 10-karat minimum threshold for referring to a product as "gold," but fineness must be disclosed for anything under 24 karats. There is also no minimum threshold for silver, as long as fineness is disclosed (e.g. "750 PPT silver"). Standards for platinum remain unchanged.

USE OF 'REAL,' 'NATURAL,' ETC.

The revised guidelines continue to prohibit the use of the words "real," "genuine," "natural," "precious," "semi-precious" and similar terms to describe a manufactured or artificial product. The JVC advises the trade not to use any of these terms to describe lab-grown diamonds. ■

"THE TRADE SHOULD REMEMBER THAT THESE GUIDELINES HAVE TEETH"



Growing industrial diamonds at LakeDiamond.

The new industrial revolution

Synthetics are gaining attention in the jewelry sector, but high-tech, military and other markets have been using them for decades. By Leah Meirovich



Pascal Gallo, CEO of LakeDiamond.

Lots of ink has been spilled on how De Beers and the Federal Trade Commission (FTC) — via the release of the Lightbox lab-grown collection and an updated definition for diamonds, respectively — have boosted synthetics' acceptance in the jewelry world. But in other fields, lab-created diamonds have been not just acceptable, but sought-after, for a long time. Their gemological properties make them valuable in sectors as diverse as military technology, aerospace engineering and health care.

Not only are lab-grown diamonds exceptionally hard, they can also run hotter than most other industrial materials without degrading in performance, and can tolerate higher voltages

before breaking down. They use energy more efficiently than previous resources, have unmatched clarity in sound reproduction, and are chemically and biologically inert, meaning they can withstand extreme chemical, physical and radioactive environments that would destroy other materials.

With such a wide range of attributes, lab-grown diamonds qualify as a “supermaterial,” according to Jason Payne, founder and CEO of San Francisco-based retailer Ada Diamonds, which specializes in synthetic-diamond jewelry.

Of course, different methods of production create diamonds suitable for different purposes. High Pressure-High Temperature (HPHT) involves imitating the natural conditions in which diamonds form. This type of diamond — first commercially

manufactured in the 1950s — is largely used in the construction industry for drill tips and abrasives. In contrast, chemical vapor deposition (CVD) — which entails growing a diamond layer by layer in a chamber filled with ionized gas — has been prevalent since the late 1980s and produces diamonds that work well in the high-tech and medical industries.

Natural may not cut it

This begs the question: Wouldn't natural diamonds have the same attributes? The answer is no, according to Pascal Gallo, CEO of Switzerland-based synthetic-diamond producer LakeDiamond.

Mined stones lack many of the characteristics that make lab-grown ones useful for industrial purposes, he explains. "Naturally-mined diamonds have limited potential because their quality is inherently uneven. Ultra-pure lab-grown diamonds, however, present no such restraints. They can be engineered consistently, under controlled conditions and at scale."

The market potential for lab-created diamonds is significant, he adds, thanks to advancements in diamond purity, miniaturization, doping (to reveal the diamonds' semiconductor properties), and carbon isotopes. These enable the stones to meet the requirements of increasingly sophisticated applications. In fact, the potential for long-term growth and profitability is higher for industrial synthetics than it is for gem-quality lab-growns, according to Bain & Company's 2018 global diamond report.

Approximately 15 billion carats of lab-created diamonds per year go toward industrial use, the consultancy group estimates, and that number is expected to grow exponentially over the next 10 to 15 years as companies identify new applications for these stones.

Innovations under way

De Beers' Element Six division is perhaps the best-known producer of industrial synthetic diamonds, with departments devoted to technological and abrasive uses. But it's not the only one with projects under way.

LakeDiamond, for instance, is in the process of launching a sustainable solution for energy

distribution. Power beaming — which uses a lab-grown-diamond-bearing laser to transmit energy — will make it possible to convey electricity wirelessly, at the speed of light, over long distances so it can reach underdeveloped areas, the company explains. The technology has the potential to create job opportunities and cultural development.

Meanwhile, when it comes to many optical and electronic applications, lab-grown diamonds surpass other substances in the "wide-bandgap" class of materials, notes Mark Newton, professor of experimental physics at the University of Warwick in Coventry, England. Together with some of the university's PhD students, Newton runs a research group dedicated to identifying the properties and uses of lab-grown diamonds.

Another party interested in industrial synthetic diamonds is the government of Flanders, Belgium, which plans to invest EUR 2 million (approximately \$2.3 million) in creating a production facility for such stones, according to Philippe Muylers, the region's minister for economy and innovation. The project is a joint venture with Indian synthetics producer Heyaru Engineering, which will contribute \$27.5 million.

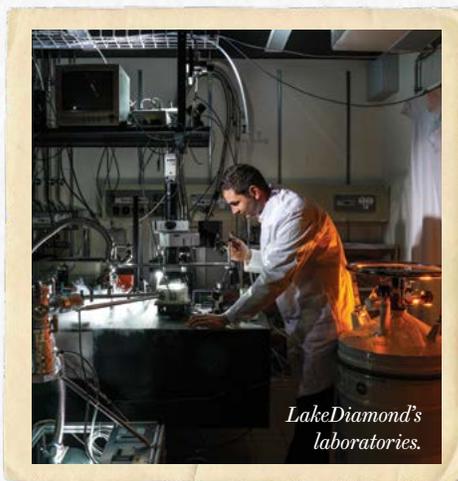
The idea is to create "a knowledge cluster" that would let companies share their information on the potential implementations

of lab-grown diamonds, says Muylers.

Getting ambitious

The versatility of lab-grown industrial diamonds means producers can be "ambitious" when it comes to future plans, says Gallo. While LakeDiamond currently grows 15,000 synthetic-diamond plates per year, it expects to multiply that number to 300,000 by 2020.

"Today, we transform diamonds into micromechanical parts for the Swiss watchmaking industry. We are also developing diamond-based lasers and have embarked on research into diamond transistors. Our long-term vision extends to R&D on diamond-based semiconductors and biotech applications," he states. "With their extraordinary properties, these diamonds significantly improve efficiency, productivity and value, and could revolutionize energy management, telecommunications, medicine and computer science." ■



SOME USES FOR LAB-GROWN

MILITARY TOOLS

In lasers for warfare, radar and communication systems, as well as in body armor.

SWISS WATCHES

As mechanical parts that allow for higher power reserves, a longer lifetime and greater accuracy.

HEALTHCARE/BIOTECH

In surgical instruments for fields including ophthalmology and neurosurgery.

INDUSTRIAL DRILLING

For drill bits that are more rapid, break less easily, and can handle rock formations that other materials like tungsten carbide cannot.

ELECTRONICS

For transistors, autonomous vehicles and power tools.

CONSTRUCTION

As a surface layer for road mending, lasting 40 times as long as asphalt or concrete.

WASTEWATER TREATMENT

Using a synthetic diamond to pass a current through a water-based fluid can generate reactive radicals that can attack pollutants and disinfect drinking water, swimming pools and industrial cooling water.