

*Renaissance*<sup>™</sup>  
The Rebirth of The Diamond





# LAB OF LUXURY

People have been fooling around with gemstones to improve their colour and quality for thousands of years. So why all the fuss now that scientists are producing gem-quality diamonds in hi-tech laboratories? Relax—this is seriously cool stuff, says STEVE KING

**Y**ou can make a diamond out of peanut butter. Truly. It has been done. (The diamond was green, because of all the nitrogen in the peanut butter.) Or out of cremated human remains. That has been done too. With the right equipment and know-how you can make a diamond out of pretty much anything you like, as long as it has some carbon in it.

For the past five years or so, three American companies have been producing gem-quality synthetic diamonds that are chemically and physically identical to the “real” thing. Indistinguishable to the naked eye. They just come out of a lab, not out of the ground. Their arrival has made waves—and not only within the \$60 billion natural-diamond industry. For ordinary jewellery lovers, they raise interesting questions about the nature of precious stones and our attitudes towards them: how we value them, why they matter to us, what we do and do not want to know about them.

Most of us are aware that the stones we buy did not pop out of the earth looking as they do when we find them in the jeweller’s shop. We take it for granted that they have been through various processes and treatments, starting (and, we would probably imagine, ending) with cutting and polishing. Which is fine. Rough stones are charming but nobody wants them dangling from their ears or strung around their neck. Cutting and polishing is an artificial process—indeed, an art—but one that is perfectly acceptable to us all.

Certain other processes and treatments, like growing cultured pearls or bleaching them to make them whiter, are similarly well known and inoffensive. Some, though, are less familiar and can seem a bit shocking. How about blasting

gems with nuclear radiation to improve their colour? Or pumping molten glass into them to fill up fractures? Or plonking near-worthless bits of “fish-tank gravel” into home-made furnaces, cranking the heat up to 2,000 degrees Fahrenheit and thereby turning the stones, by an amazing kind of backyard alchemy, into magnificent trophy sapphires?

Enough to raise an eyebrow, at least. Yet it is no exaggeration to say that without such processes and treatments the jewellery business as we know it would not exist. More than 90 percent of the gems on the market have been treated in one way or another. Naturally coloured precious stones are very, very rare and therefore very, very pricey. Unless you are a serious (and seriously rich) collector, you are unlikely ever to own a completely untreated ruby, sapphire or emerald of any significant size.

**S**ynthetics producers are confident that within a few years most of us will be fairly relaxed about wearing a diamond that was plucked not from a mine in the Kalahari but from a lab in Florida. And why not? Think of diamonds as orchids. If an orchid is grown in a suburban greenhouse, rather than the depths of a remote jungle, does that make it any less of an orchid?

Moreover, synthetics have a particular magic of their own. Scientists had dreamed of turning graphite into diamonds ever since Smithson Tennant, an English chemist, confirmed that the two were made of the same stuff in 1796. By the early 20th century synthetic emeralds and rubies were available—several lots in Christie’s 2006 auction of Princess Margaret’s jewellery contained synthetic stones, all of which sold for more than three times their estimate.

But it was not until 1954 that a team from General Electric—the peanut-butter boffins—proved that proper diamonds could be produced in a lab. Three years later G.E. was marketing

“Manmade Diamonds” for use as abrasives in industry as an alternative to the natural industrial diamonds sold by De Beers. By the 1990s the technology had advanced far enough to produce gem-quality stones.

Today there are three main players in the synthetics market: Gemesis, Chatham Created Gems and Apollo Diamond. Apollo is the only one making colourless stones, using a process called C.V.D. (chemical vapour deposition). Most synthetic diamonds are coloured and are created in big boxes that look a bit like old-fashioned washing machines, using another process, H.P.H.T. (high pressure/high temperature), which is quicker and less expensive than C.V.D. A one-carat natural pink diamond might retail for \$100,000. A one-carat pink synthetic by Chatham Created Gems, by contrast, costs about \$4,000.

This is not the first time that human ingenuity has found a way around the scarcity of coloured gems in nature. It has long been known that strange things happen to stones at high temperatures: Pliny the Elder commented on it in the first century AD. As the science writer Burkhard Bilger explains: “Most gems owe their colour to chemical impurities... Because these impurities break down at different temperatures, some gems change colour when they’re heated.” For hundreds of years “cookers” have wrapped stones in balls of lime and clay and dropped them into open fires. To increase the temperature, they puff on the flames with blowpipes. Sometimes nothing happens. Sometimes the stones are ruined. But sometimes they are transformed into breathtakingly lovely gems. At about 800 degrees Fahrenheit aquamarine turns from blue-green to blue; between 900 and 1,100 degrees purple amethyst turns to orange citrine; at 2,200 degrees a purple sapphire can turn into a red ruby.

By the 1970s, cooks in Thailand—said to be the best in the world—had figured out that cheap, ugly, low-grade



## CULTURED PEARLS WERE INTRODUCED IN THE 1890s. LIKE SYNTHETIC DIAMONDS, THEY WERE BRANDED AS FAKES BY NATURAL-PEARL MAGNATES. EVERYBODY ELSE WAS DELIGHTED

corundum could be turned into coloured sapphire at between 2,500 and 3,000 degrees Fahrenheit. This they could achieve by lining a 50-gallon barrel with furnace bricks and hooking it up to a diesel burner and an oxygen pump: "A flamethrower wrapped in an oil drum with an Aqua-Lung attached," as one gem dealer put it in a conversation with Bilger. Not subtle (or safe), but effective.

There have been flurries of concern when batches of shabbily treated stones, often dyed, have turned up, undeclared, and foxed the dealers. But these wobbles have been few and far between, and their main effect has been to drive consumers back into the arms of reputable jewellers. Some, such as Tiffany & Co, publish information about where their stones come from and how they have been treated. Customers, it seems, are either pleased or merely undeterred; either way they continue to buy.

**T**he matter of disclosure will be essential to the success of synthetics as well. For now, there are too few synthetics available to put much of a dent in the natural-diamond market or to legitimise fears of widespread fraud. Nevertheless, De Beers has developed a machine that can spot synthetics, and has introduced the "Forevermark", a tiny logo etched into natural diamonds. The main synthetics producers have an equivalent mark and provide paperwork explaining their stones' lab-made status. But as Jack Ogden, chief executive of the Gemmological Association, points out, producers can only do so much: "Jewellers need to keep up-to-date on new developments, and consumers should perhaps start asking more searching questions."

It would help, too, if the industry could agree on what exactly to call these man-made stones. The term "synthetic" is widely used and, gemologically speaking, accurate. But producers do not care for it, arguing that it smacks of "fake" and is therefore misleading and off-putting. They would

prefer "cultured", which in turn enrages traditionalists, perhaps because it sounds a little too respectable. It is likely that some other, clumsier, term such as "laboratory created" will prevail.

Meanwhile, demand for synthetics is getting stronger. Gemesis, Apollo Diamond and Chatham Created Gems are having no trouble selling everything they produce. Even in America their stones are not easy to find and in Britain it is almost impossible: most would-be buyers have to join online waiting lists.

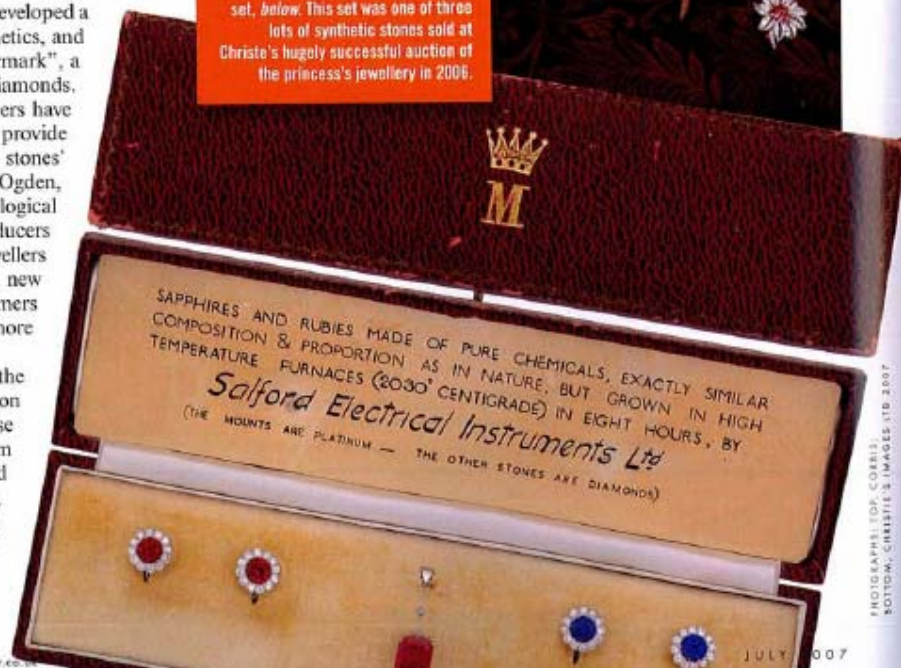
Whether or not synthetics one day give naturals a run for their money remains to be seen. But it is worth remembering how enthusiastically consumers took to cultured pearls in the early 20th century. Cultured pearls—real pearls grown around an artificially inserted nucleus—were introduced by Kokichi Mikimoto in the 1890s. Like synthetic diamonds, they were branded as fakes by natural-pearl magnates. Everybody else was delighted and today they coexist with

natural pearls as an accepted feature of the fine-jewellery landscape. Mikimoto prided himself on having pioneered pearls for the people. If synthetic diamonds catch on, perhaps they too will become a gemstone of the masses—the greenhouse orchids of the jewellery world. And even if they do not, they will become a huge part of our everyday lives, because it turns out they also make superb semiconductors. So once the technology is finessed, it will be goodbye silicon, hello synthetic diamond.



### ROYAL TREATMENTS

Right, Princess Margaret wearing synthetic ruby earrings, part of a set, below. This set was one of three lots of synthetic stones sold at Christie's hugely successful auction of the princess's jewellery in 2006.



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