

Photos by Grant Halverson for USA TODAY

A girl's second-best friend: DeAnna Dorris shows off her synthetic stone ring. Man-made gems are making increased headway into the jewelry market.

## Man-made gems flash alluring facets

By Dan Vergano  
 USA TODAY

Headed to the jewelry store, fiancé in tow, DeAnna Dorris had one goal in mind for her engagement ring.

"I wanted the big one," says the Research Triangle Park, N.C., computer programmer. Her fiancé, and now husband, wanted out of the store as soon as he saw the \$20,000 price tag on the big one. "I practically had to scoop him off the floor," says Dorris, 39.

Instead of heading for the exit, though, the couple decided on an alternative increasingly common in jewelry stores, a man-made gem. Spurred by scientific advances and rising prices for natural stones, synthetic jewels now account for about \$500 million of the nation's \$22 billion diamond jewelry market, according to one maker, Chatham.

Dorris' spouse-to-be purchased the newest kid on the synthetic block, a white gemstone called Moissanite (pronounced MOY-san-nite) for her nearly 2-carat engagement ring. "To casual observers it certainly looks like a diamond," says Bob Thomas, head of Charles & Colvard of Morrisville, N.C., the artificial gems marketers.

However, his company studiously avoids the comparison. It prefers to market the product as a separate niche item, to calm jewelers' jitters that the gems will undermine diamond sales.

Only slightly less hard than diamonds, the silicon carbide gems actually sparkle with more "brilliance," a jeweler's term of art, than genuine diamonds, says Joseph Schubach, a Phoenix jeweler. They also



**More sparkle, less bucks:** Moissanite has more brilliance than a regular diamond, and a lower price.

can cost about one-tenth as much.

Even so, the top-of-the-line man-made gems sold alongside their natural counterparts at jewelers can cost thousands and represent a great deal of effort to manufacture, requiring a bit of alchemy to come out of the oven correctly, experts say. "Crystal growth is kind of a black art," says Tom Chatham. His San Francisco-based company, Chatham, offers perhaps the best-known line of man-made precious stones. "We never know if we've succeeded until the end," says Chatham.

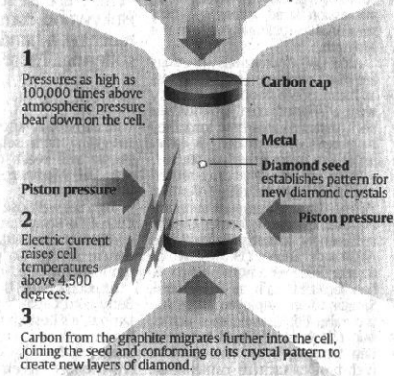
It's been that way since the 1800s, when methods for creating rubies by melting jewel material into crystals first came into play, a process still used for inexpensive stones like those in high school class rings.

For jewelry, the Federal Trade Commission mandates that gems sold as "synthetic" must match the chemistry and structure of natural gems. Today, creating high-quality synthetic jewels typically starts with a "seed" gem, a natural stone the size of a salt grain, used to set a pattern for further crystal growth. The pattern is necessary because the trans-

### A jewel of an idea

Diamond makers need to re-create pressure and temperatures felt deep inside the Earth to fuse carbon atoms together to make a diamond.

To start, developers place a small "seed" diamond, surrounded by metal and capped with graphite carbon, inside a pressure cell.



Source: USA TODAY research

By Sam Ward, USA TODAY

parency of a gemstone arises from the rigid order of chemical bonds between its atoms, a structure that leaves empty space inside a jewel that the eye sees as translucence.

For rubies, crystal growers may spend 10 months adding aluminum oxide, and a hint of chromium for redness, to a seed gem placed under high pressure and temperature. In that time a stone can grow from an inexpensive 20 grams to a pricey 50 grams in weight. Chatham stresses that conditions inside the gem-growing cell mimic those deep in the Earth's mantle, where natural stones form. "Almost every gem has a synthetic counterpart," says Gary Roskin, an editor with *Jeweler's Circular Keys-*

*zone*. Even natural diamonds, which make up about 40% of gemstone sales nationwide, have lab-grown rivals. Alongside Moissanite, a silicon carbide crystal used in cellphone semiconductors, synthetic diamonds made from carbon have been around since 1954, when General Electric scientists first created them.

Tracy Hall, one of those scientists, is still in business, running Provo, Utah-based Novatek. Along with some Russian labs, his company produces yellow diamonds for a number of jewelry firms, most notably Lucent Diamonds of San Francisco. Chatham also plans to join the synthetic diamond business, citing the growing excellence of the gems.

Production of synthetic diamonds requires extreme conditions; about 500 tons of pressure and 2,600-degree temperatures brought to bear on a seed gem over hours or days. Even then, developers didn't achieve success until they started coating the developing crystal with metal and dribbling carbon, the stuff of diamonds, onto the developing stone in a very slow, controlled fashion.

On top of that challenge, nitrogen trapped inside synthetic diamonds turns the stones brown, a problem researchers continue to grapple with. And then there are tiny bits of metal that can end up inside the synthetic diamond. Heating a finished synthetic stone to 3,600 degrees for a full minute releases some of the nitrogen, turning the diamond yellow, a very marketable color.

A Gainesville, Fla., company, Gemesis, started making colorless artificial diamonds in 1999. The company enlisted help from some Russian technologists and University of Florida researchers led by Reza Abbaschian, using lower pressures over longer times (up to three days) in novel presses that lack moving parts. The gems should appear on the market this year, and some jewelers await their advent with apprehension, asking whether it will destroy demand for natural diamonds.

"It's a legitimate question," says Chatham, who suggests synthetic diamonds will occupy a sales niche between Moissanite and natural diamonds for jewelry buyers. He suggests they pay high prices for gems because of their beauty, not for the millions of years they spent in the ground. "From my point of view, if nobody can tell the difference, what difference will it make?"