

TRANSPARENCY AND SYNTHETIC DIAMONDS



In recent months, the trade press has covered developments involving near-colorless synthetic diamonds—highly sophisticated, high-purity synthetics that cannot be detected using magnification and other traditional means. These stories resonate powerfully with members of the industry, causing some to wonder: Can laboratories still distinguish between natural and synthetic diamonds?

After the development of synthetic diamonds in the mid-1950s, the next major breakthrough happened in 1970, when General Electric announced the first gem-quality synthetic diamond (examined in the Summer 1971 *G&G*, pp. 302–314). Over the next two decades, these products were manufactured in presses using the HPHT (high-pressure, high-temperature) growth method.

The stones were mostly small, and the manufacturers—namely GE, Sumitomo, and De Beers—did so for industrial applications and research purposes. But as the quality and size of these goods improved to jewelry standards, a new paradigm emerged.

So did another method of diamond synthesis: chemical vapor deposition (CVD). In this process, carbon atoms from a gas such as methane (CH_4) are deposited onto a small seed platform. The latest generation of CVD products are even more difficult to detect than HPHT synthetics. But even the most sophisticated synthetics can be detected with the advanced analytical tools and expertise found in a handful of gemological laboratories worldwide.

As gem-quality synthetic diamond continues to mature, interesting wrinkles have developed. Faster growth rates and lower production costs. A host of new manufacturers with varying degrees of transparency about the nature of their products. Post-growth treatments intended to enhance color. The possibility of synthetic melee smaller than the cost-effective threshold for grading natural diamonds. Detection measures led to increasingly sophisticated, often secretive countermeasures, a cycle that has escalated into something of an arms race.

For more than 40 years, *Gems & Gemology* has been on the front lines of identifying synthetic diamonds. This issue continues that tradition with three informative articles on the subject. The first is a study by Dr. Wuyi Wang and coauthors on the latest near-colorless CVD synthetics from Florida-based Gemesis Corp. Accompanying it are an overview of the CVD growth process and a report on the world's first “diamond sphere”: a synthetic nano-polycrystalline diamond fashioned with pulsed lasers. You'll also find timely features on a recent sapphire rush in Sri Lanka and the emerging Micronesian cultured pearl industry, plus a wide-ranging assortment of Lab Notes and Gem News International updates.

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Ultimately, the identification of synthetic diamonds stands at the core of the gem and jewelry industry, and at the core of GIA's mission of ensuring the public trust in gems and jewelry: While some consumers are drawn to the undeniable beauty and affordability of today's mass-produced synthetics, many others insist on diamonds created by nature. But all buyers, regardless of their position on synthetic diamonds, have the right to know exactly what they're purchasing.

Cheers,

A handwritten signature in black ink that reads "Jan Iverson".

Jan Iverson | Editor-in-Chief | jan.iverson@gia.edu