

## THE GEM DETECTIVE: COLOURLESS GEMSTONES



IMAGE COURTESY OF BRENDAN MCCREESH, O'NEILS AFFILIATED

**Sparkling, colourless gemstones may appear similar to the naked eye but they can vary significantly in identity, rarity and value. Making such distinctions requires the detective skills of a qualified gemmologist. Megan Austin reports.**

Identifying nameless colourless gemstones can be tricky. As the famous sleuth, Sherlock Holmes, said, "Eliminate all other factors and the one that remains is the truth." There are too many colourless gemstones to list here, so this column will look at commercially-available, transparent, faceted gemstones.

First off the ranks is diamond, a uniquely hard (10 on Mohs scale) and durable gemstone with generous flashes of spectral colour caused by the dispersion of light. Its high refractive index and brilliant adamantine lustre set it apart from other natural colourless gemstones such as topaz, quartz, beryl, sapphire, spinel and danburite.

People love to assume that their great grandma's solitaire engagement ring contained a natural diamond by virtue of its age but they should think again. Synthetically-produced sapphire, spinel and quartz have been in commercial production since the early to mid-20th century.

Before large quantities of diamonds were discovered in South Africa in the late 19th century, other colourless gemstones were used as diamond substitutes. A special type of high-quality lead-rich glass called 'paste' was developed by George Strass in the 18th century and used in antique Georgian jewellery. Variations of colourless glass continue to be used to imitate diamonds to this day.

Fast forward to the 1960s and 1970s and the birth of synthetic colourless garnets: YAG (Yttrium-Aluminium Garnet) and GGG (Gadolinium-Gallium Garnet). These were

superseded in the 1970s by a man-made gemstone called cubic zirconia that is still the most popular and common diamond imitation in modern jewellery due to its low cost, high dispersion and good hardness (8.5 on Mohs scale).

Another man-made gemstone called synthetic Moissanite was introduced as a diamond simulant in the late 1990s. Although synthetic Moissanite tests positive on a diamond tester, it is easily distinguished from diamond by a property called double refraction, detected using a 10x loupe. This property is also displayed by zircon, a natural gemstone with a sub-adamantine lustre.

Complicating the process of identification are treatments that may affect the value of gemstones. For example, a laser may be used to drill down to a dark diamond inclusion and remove it using acid in a process called laser drilling. Also common is fracture filling, where a high refractive-index lead glass is used to fill surface-reaching fractures to make them less visible. Fortunately, both of these treatments are easily identified using a loupe or microscope.

Some off-coloured diamonds may be whitened using High Pressure High Temperature (HPHT) treatment or may appear whiter by the application of a blue-coloured ink or varnish to the pavilion facets. Synthetic diamond and HPHT diamonds are readily available and advanced spectroscopic analysis is usually required for conclusive identification.

The information here is no substitute for the services of a professional qualified gemmologist or registered NCJV Valuer but detectives should now know there are a world of possibilities when faced with a colourless gemstone. ✱

**ALTHOUGH SYNTHETIC MOISSANITE TESTS POSITIVE ON A DIAMOND TESTER, IT CAN BE DISTINGUISHED FROM DIAMOND BY DOUBLE REFRACTION**

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