Alexandrite Synthetics and Imitations

"My husband gave me a necklace. It's fake. I requested fake. Maybe I'm paranoid, but in this day and age, I don't want something around my neck that's worth more than my head."

Rita Rudner (US comedian)

Since many of the most popular gemstones are so expensive, there is always a strong market for stones that look the same but cost much less. Especially in large sizes the costs of the most popular natural gemstones are prohibitive for the average consumer.

More information
* Methods of producing synthetic alexandrite * Synthetic gemstone growth techniques * The Alexandrite Laser

Manmade gemstone imitators can be classified as simulants or synthetics. A simulant looks like and may be used in place of a gemstone but does not share any of the chemical or physical properties with that gemstone. Conversely, a synthetic is a manmade gemstone with the same appearance, chemical formula, and crystallographic structure as the natural gemstone it is imitating.

Glass, plastics, and ceramics are the most common and least expensive simulants and they are used as substitutes for many kinds of popular gem materials like diamonds, turquoise, coral, jade, pearls, sapphires, rubies, sapphires and emeralds. Since diamonds are so valuable and popular, the market for diamond impostors is huge, and many additional simulants like cubic

See Alexandrite Tsarstone collectors guide, Alexandrite Synthetics and Imitations http://www.alexandrite.net/viewpage.html?id=ALXS-002-0010 (Guide to synthetic alexandrite production, alexandrite imitations and the differences between natural and synthetic alexandrite) (as of).

zirconia, GGG, YAG, strontium titanate, synthetic rutile, and moissanite have been created over the last 50 years.

Heirloom jewelry

Fig. 18.: First synthetic color-change corundum was grown in 1909 and used as an alexandrite imitation. A lot of alexandrite

Simulated gemstones have been around since ancient times. Records indicate that the Egyptians were producing a glass-like compound called faience to simulate turquoise and lapis before 4500 BC. Synthetics have only been available since 1902 when the first synthetic ruby was created in France by Auguste Verneuil.

Although many gem materials have been synthesized experimentally, few are available commercially. Many gemstones have been produced for military and laser applications. The most common commercially available synthetic gemstones include diamond, opal, sapphire, ruby, emerald, spinel, quartz and alexandrite.

Synthetic and simulated gemstones are accepted and popular in certain segments of the market and much of this may also be due to the recognition of these gemstones for their own merits and not just as substitutes for natural gemstones. Even people that can afford the natural product often like synthetics because they look great and are affordably priced. They may also be more comfortable wearing them because they don´t have to worry much about theft. In the case of alexandrite, the synthetic version is not only much more affordable, but it is actually available in a variety of calibrated sizes and shapes which could never be offered in natural stones.

In the U.S.A., according to Federal Trade Commission regulations, only natural mineral and organic materials can be sold and advertised as "gemstones". Other terminology, such as "syntheticot", "cultured", "created", or "laboratory grown" must be used to describe manufactured materials. In practice however, many resellers don't address the issue at all

and create their own trade names or branding for their product. Consumers are led to believe that they are buying some new kind of gemstone but they don´t really know if the material is a manmade or a natural product.

Sometimes, synthetic materials are used to imitate other gemstones. The most prominent example is synthetic color change sapphire, which has been sold as an alexandrite impostor for years. This material should be more accurately described as simulated alexandrite rather than synthetic alexandrite.

Knowing the difference between a synthetic and a natural alexandrite requires both experience and knowledge but most impostors are easy to spot. In the case of alexandrite, the size and the clarity of a stone are important clues in the determination of its origin. Since large clean alexandrites are so rare in nature, it is unlikely that a large stone offered for a few dollars in a pawn shop or on a beach or a street corner by a native seller could ever be a natural alexandrite. Although large stones cannot be discounted altogether, any large gem represented as a natural alexandrite should be examined by an experienced gemologist or tested in a lab.

Synthetic and simulant alexandrites

Flux grown synthetic alexandrite	Pulled synthetic alexandrite	Vanadium laced corundum

See Alexandrite Tsarstone collectors guide, Alexandrite Synthetics and Imitations, http://www.alexandrite.net/viewpage.html?id=ALXS-002-00010 (Guide to synthetic alexandrite production, alexandrite imitations and the differences between natural and synthetic alexandrite) (as of).

Fig. 19.: Flux grown alexandrite contains particles of flux, resembling liquid feathers with a refractive index and specific gravity that echo that of the natural material.

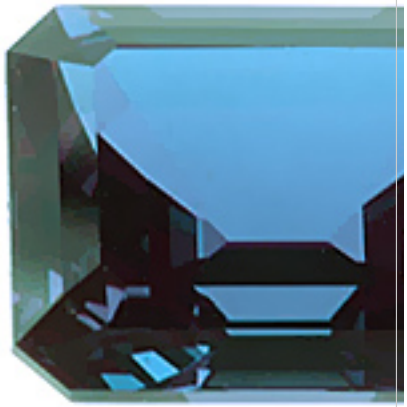

Fig. 20.: Czochralski or pulled alexandrite looks very clean, but contains curved striations visible with magnification and stone color is bluish under the daylight.

Fig. 21.: Synthetic corundum laced with vanadium have refractive index of 1.759 - 1.778 , contains gas bubbles and shows a characteristic purple-mauve colour change.

Most gemstones described as synthetic alexandrite are actually synthetic corundum laced with vanadium to produce the color change. This alexandrite like sapphire material has been around for almost 100 years. The material shows a characteristic purple-mauve colour change which although attractive, it doesn´t really look like alexandrite because there is never any green. The stones will be very clean and may be available in large sizes. Gemological testing will reveal a refractive index of 1.759 - 1.778 (corundum) instead of 1.741 - 1.760 (chrysoberyl).

Under magnification, gas bubbles and curved stria may be evident. When examined with a spectroscope a strong vanadium absorption line at 475 nm will be apparent.

Many of these stones were sold to tourists in Mexico and in Egypt, Alexandria (alexandrite is not mined in alexandria), after the Second World War and still exist in private collections or as inheritances. Gemologists still receive many inquiries about these old and now inherited alexandrite bought by an aunt or a grandmother in Egypt or someplace else and almost all of them are synthetic alexandrite like corundum.

Today, several labs can produce synthetic lab grown stones with the same chemical and physical properties as natural alexandrite and these stones are more difficult to identify. Since synthetic alexandrite share the same chemical and physical properties with natural alexandrite and normal gemological tests for density and refractive index will be of little use and gemologists must use magnification to study the inclusions in order to determine the origin of the material. Synthetic alexandrite may contain curved striations, flux inclusions, triangular metallic platelets, or gas bubbles, depending on the growth technique used.

Flux grown alexandrite is more difficult to identify because the inclusions of un-dissolved flux can look like natural inclusions. Alexandrite grown by the flux-melt process will contain particles of flux, resembling liquid feathers with a refractive index and specific gravity that echo that of the natural material. Layers of dust-like particles parallel to the seed plate, and strong banding or growth lines may also be apparent. Some stones contain groups of parallel negative crystals. Flux grown alexandrite, are more difficult to spot because the colors are convincing and because they are not clean. These stones are expensive to make and are grown in platinum crucibles. Crystals of platinum may still be evident in the cut stones.

Czochralski or pulled alexandrite is easier to identify because it is so clean. Curved striations visible with magnification are a dead give away. The color change in pulled stones has seen change from blue to red. Although the stones look nice, the colour change doesn´t resemble alexandrite from any deposit. Seiko synthetic alexandrite have a swirled internal structure characteristic of the floating zone method of synthesis. They have tadpole inclusions (with long tails) and spherical bubbles.

The Inamori synthetic alexandrite had a cat´s eye variety, which showed a distinct colour change. The eye was broad and of moderate intensity. Specimens were a dark greyish-green with slightly purple overtones under fluorescent lighting. The eye was slightly greenish-bluish-white and the stones were dull and oily. They appeared to be inclusion-free and under a strong incandescent light in the long direction, asterism could be seen with two rays weaker than the eye. This has not been reported in natural alexandrite. Under magnification, parallel striations could be seen along the length of the cabochon and the striations were undulating rather than straight, again not a feature of natural alexandrite.

The jewelry industry officially insists on full disclosure regarding the nature of the gem material being sold and the major producers of synthetic gems actively support these policies. And although synthetic alexandrite is widely used for jewelry, it is predominantly used as a laser.

Alexandrite lasers were initially researched and developed by AlliedSignal Corp. The company invested over $100 million in developing alexandrite laser systems and in the growth of high-quality laser material. They were first developed for military and government applications.

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