



Chameleon diamonds

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Once Upon a time ...

... in the 1940's, there was a diamond cutter who noticed that a dark green diamond seemed to briefly take on a lighter yellowish colour after having been in contact with a very hot polishing wheel. The subsequent owner of the jewel kept it in a closed jewellery box. When she opened the box again after a period of time, the diamond was no longer dark green but light yellow. The owner brought the diamond back to the jeweller, not knowing that she in fact owned a very valuable diamond, probably worth much more than she had paid for it.



The Chameleon Phenomenon

In this newsletter, we will address the remarkable behaviour described in the story above. The background of this tale is just as fascinating as it is worth knowing.

One of the best-known and highly valued properties of an untreated natural diamond is that its colour never changes, regardless of external circumstances. Chameleon diamonds, discovered not too long ago, are the only diamonds actually capable of temporarily changing colour. The

change is due to light and temperature. This astonishing phenomenon was documented for the first time by the GIA in the 1940s, and it is not surprising that its discovery caused great excitement.

The exact cause behind the colour change has still not yet been determined scientifically, although several gemmologists suspect that among other factors, a higher than normal number of hydrogen atoms in the structure of these diamonds plays a role. All Chameleon diamonds have certain characteristics in common:

First and foremost, they are very rare and no one diamond is exactly like another. The colour of Chameleon diamonds is never pure; there is always a main colour and one or, more generally, several secondary colours. These combinations always include one of the following colours: green, yellow, brown or grey, creating subdued mixed colours, like olive green, and excluding "Intense" or "Vivid" hues for Chameleon diamonds. The colours of such stones can range from light orangy-yellow to dark olive green. When Chameleon diamonds are exposed to UV radiation, they become fluorescent. Additionally, they are always natural stones; their behaviour cannot be reproduced and there is no known treatment to produce the same effect in other diamonds.



Generally speaking, Chameleon diamonds are usually relatively small. The largest known cut Chameleon diamond weighs 31.310 ct. The larger the stone, of course, the easier it is to observe the colour change. Upon close inspection, however, it is also possible to see the change in much smaller stones. When a stone that has been kept in the dark is exposed to bright light, the colour change usually takes place within seconds. Reaction time can, however, vary depending on the stone. Once the colour change has taken place, the stone has to be stored in the dark before the phenomenon can be observed again.

The colour of Chameleon diamonds can change from dark to light. There are two different, natural processes leading to a change in colour.

Photochromic colour change occurs if a stone that has been stored in a dark place like a jewellery box temporarily changes takes on a lighter colour. When the diamond is then exposed to light again, it returns to its darker, original colour.

In the case of thermochromic behaviour, the diamond changes to a lighter colour when exposed to a temperature rise to 140°C. When the stone cools down, it slowly returns to its darker, original colour.

Because of their rarity and exceptional ability to change colour, Chameleon diamonds are very valuable and highly sought after. This is why they are more expensive than "normal" olive green diamonds which are also very popular.

From Our Collection

Marquise / 0.42 ct / SI1 / 6,87x3,74x2,57mm
Fancy Deep Brownish Greenish Yellow

[GIA certificate - DOWNLOAD](#)



Brilliant / 0.23 ct / PQ / 3,91x3,93x2,39mm
Fancy Dark Gray Green

[GIA certificate - DOWNLOAD](#)



Other Chameleon diamonds from our collection:

- **Pear shape / 0.15 ct / SI / Fancy Deep Grayish Yellowish Green**
4,72x2,91x1,82mm / [GIA certificate - DOWNLOAD](#)
- **Brilliant / 0.21 ct / VS / Fancy Dark Gray Green**
3,86-3,91x2,29mm / [GIA certificate - DOWNLOAD](#)
- **Pear shape / 0.25 ct / SI / Fancy Deep Brownish Greenish Yellow**
5,24x3,57x2,19mm / [GIA certificate - DOWNLOAD](#)
- **Marquise / 0.33 ct / SI1 / Fancy Brownish Greenish Yellow**
7,70x3,29x2,23mm / [GIA certificate - DOWNLOAD](#)
- **Cushion / 0.42 ct / SI2 / Fancy Grayish Yellowish Green**
4,15x4,12x2,73mm / [GIA certificate - DOWNLOAD](#)
- **Radiant / 0.46 ct / VS1 / Fancy Dark Gray Yellowish Green**
5,58x3,55x2,55mm / [GIA certificate - DOWNLOAD](#)
- **Marquise / 0.51 ct / SI2 / Fancy Deep Brownish Greenish Yellow**
7,50x4,19x2,75mm / [GIA certificate - DOWNLOAD](#)
- **Radiant / 0.54 ct / PQ1 / Fancy Dark Gray Yellowish Green**
4,46x4,31x3,07mm / [GIA certificate - DOWNLOAD](#)

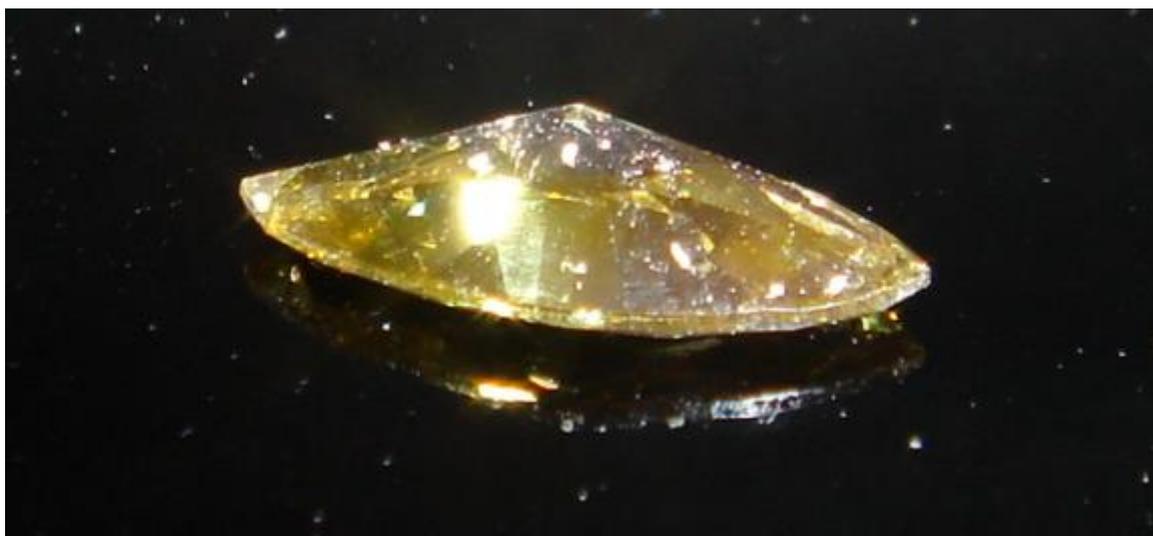
Chameleon Diamonds under Ultraviolet Light

Chameleon diamonds can be identified by their spectroscopic properties as well as variations if compared with "normal" diamonds when exposed to ultraviolet light. The colour of each diamond is caused by impurities at the atomic level in the crystal lattice. Using infrared spectroscopy, it is possible to determine the amount and type of impurity based on the

absorption lines. For example, observing nitrogen impurities and a large number of hydrogen atoms may indicate a Chameleon diamond.



All Chameleon diamonds are fluorescent. Colour irregularities can often be observed on close examination under long-wave ultraviolet light.



In this example, a microscopic examination of the stone in question shows that the bluish fluorescent zones correspond to the least colourful areas of the stone, whereas the yellowish fluorescent zones cover the "Chameleon" areas. It is interesting to observe exactly where the colour change is located in this diamond, even if the physical mechanism behind this effect remains unknown.

News – Rare Beauty

The Argyle Mine in Australia made a surprising discovery last year, although Rio Tinto has only just recently this year made the announcement. An exceptional rough diamond, weighing 9.17 ct when it was extracted from the mine, has since been cut down to a 2.83 ct oval. The diamond's sensational colour is the reason for the great interest shown. With its "Fancy Deep Grayish Blue Violet" colour grading, it is the largest violet diamond ever found in this mine. Its rarity and value are comparable to those of red diamonds and its sales price is estimated at about seven million dollars. The diamond which is now called the "Argyle Violet" will be the star at this year's Argyle Pink Diamond Tender. The deadline for bids is 12 October 2016.



You will receive our next newsletter in autumn 2016.

Earlier editions of our newsletter may be found in our [newsletter-archive](#).

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