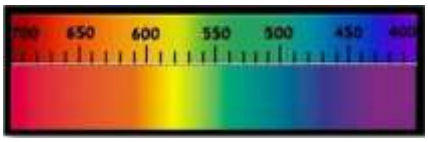
Warning: this version has been completed with Google Translate , it certainly contains errors or inaccuracies.

Technical details - general: Green Diamond

<table>
<tr><td>Gemma - names</td><td colspan="2">(Italian - Diamond)
(English - Diamond)
(French - Diamant)
(Spanish -Diamond)
(Portuguese - Diamond)
(Thai - เพชร phechr)</td><td>(German - Diamant)
(Arabic - الماس almas)
(Russian - Алмаз Almaz)
(Mandarin -钻石 zu à nsh í)
(Swahili - Almasi)
(Hindi - हीरा heera)</td><td rowspan="2">photo
  </td></tr>
<tr><td>Colors (GIA)</td><td colspan="3">Green diamonds can be found with a single pure color, but most often they contain one or even two secondary hues. The various harmonic colors of a green diamond are most common green , yellowish , blue , bluish , brown , brownish , gray, greyish , yellowish gray and greyish yellowish .
The diamonds fancy greens come classified using the terms: Faint Green, Very Light Green, Light Green, Fancy Light Green, Fancy Green, Fancy Intense Green, Fancy Vivid Green and Fancy Deep Green.</td></tr>
<tr><td>Cause of Color</td><td colspan="4">The radiations that lead to this color are of the following type: 1. superficial / Alpha (with positive nitrogen ions), 2. superficial / Beta (with negative ions) - both produce a low saturation - or 3. deep / Gamma (the color penetrates inside the gem) due to extensive exposure during long geological periods. It is known that this radiation, when of natural origin, is acquired later: after formation, the gems, first "shot" from the mantle towards the surface, are reabsorbed inside the earth's crust, less than 30 km depth and then radiated at a temperature below 600 degrees C. If this process occurs at greater temperatures and depths, only yellow-brown stones are obtained .
The color of many of these diamonds appears in spots and only on the outside of the crystals (therefore the cut of the stone plays a primary role in enhancing the green). In general, its presence and intensity inside the stone are linked to one of the following causes:
1. The GR1 groups (with vacant atomic space), generated by natural or induced radiation: these stones can exhibit intense and uniform green or green-blue coloration .
2. H3 (NVN) groups sometimes cause fluorescence which can contribute to a green or yellowish green, even intense, appearance in certain diamonds.
3. Hydrogen can cause a low saturation greyish-green color (process not yet well understood).
4. Nickel can induce a low saturation yellowish green color (tending to yellow).
5. H2 groups (rare), similar to H3 centers but with negative atomic charge.
6. The chameleon damans they are a variety that has a green color but can change from brown to yellow, depending on exposure to light and heat. If heated or kept in the dark, they can temporarily turn a bright yellow. As they cool or are gradually exposed to light, they return to their original green hue . There is also the Inverted Chameleon Diamonds showing the opposite effect.
Allochromatic Gem</td></tr>
<tr><td>Classification</td><td colspan="2">Mineral class
Native non-metallic, mineral</td><td>Species - Group (mineral)
Diamond</td><td>Variety
Green diamond</td></tr>
<tr><td rowspan="2">Optical properties</td><td>Specific Gravity:
3,516-3,525
Common: 3.52</td><td colspan="2">RE: 2.417
Polariscope : SR
Birefringence: The birefringence of polarized light is normally present in diamonds</td><td>Character optical
Isotropic</td><td>Pleochroism
NO</td></tr>
<tr><td colspan="3">Luster (luster) - luster of the fracture
Diamantina - adamantine</td><td colspan="2">Dispersion (fire)
0.044</td></tr>
<tr><td>Light</td><td colspan="3">Fluorescence
SWUV (254 nm) : inert
LWUV (365nm) :</td><td colspan="2">Phosphorescence
Red</td></tr>
</table>

<table>
<tr><td>Form</td><td>Crystalline dress
Octahedral, dodecahedral, cube-octahedral, spherical or cubic
Melting point: 4.027 ° C, Burns above 700 ° C in air.</td><td>Phenomenal optical effects
/</td><td>Crystalline system
Cubic
Monometric
Crystal class</td></tr>
<tr><td>Chemical formula</td><td colspan="2">Carbon (typically 99.95%)
C.</td><td>Spectrometer image
 
Not indicative</td></tr>
<tr><td>Fracture</td><td>Flaking
Distinta - octahedral (4 directions)</td><td>Breaking- Parting
. Twinning law of the common Spinel (which produces "macle")</td><td>Fracture
Complex, irregular</td></tr>
<tr><td>Durability</td><td>Hardness (Mohs) - Absolute
10; 1600
(with variations in directional hardness)</td><td>Toughness
Fair-good</td><td>Stability (heat, light, chemicals)
Excellent</td></tr>
<tr><td>Clarity - characteristics</td><td colspan="3">Typical inclusions: Typical inclusions related to all other diamonds (fractures, feathers, crystals, dots, thin veils, grain etc.), radiation spots visible in raw crystals are rarely visible in cut gems, possibly they can be left as patches of color aimed to give a certain look to the finished stone.
 
</td></tr>
<tr><td></td><td>Guy:
NA</td><td colspan="2">Transparency (commercial) - transparency
Transparent</td></tr>
<tr><td>Deposits - types of rocks</td><td colspan="3">Green diamonds are found practically only in alluvial deposits. The color comes from radiation, in most cases. Natural irradiation occurs when diamonds come into close contact with radioactive uranium in rocks near the earth's surface. In rare cases, this radiation can be found in groundwater sources. This makes natural green diamonds extremely rare as conditions must be perfect and extremely fortuitous to unite these two rare phenomena. The shallow nature (about 20 µm thick) of the spots and green areas indicates that the radiation damage is caused mainly by alpha particles, most likely from the decay of uranium. These spots have been experimentally shown to rapidly change from green to brown at temperatures of 550-600 ° C, indicating that diamonds with green radiation damage must have resided at depths of less than 25 km (assuming an average geothermal gradient of 25 ° C / km).
Geological age :
Type II (two): Type II diamonds are in turn divided into two subgroups: IIa (absence of trace elements) and IIb (presence of B). Type II diamonds are significantly rarer in nature. They form at greater depths and can be large in size (almost all very large colorless diamonds are type IIa). In some classifications, type IIaAB diamonds (sometimes referred to as IIc) are found, i.e. those containing measurable quantities of hydrogen (H).</td></tr>
<tr><td>Characteristics of rough stones</td><td colspan="3">Most rough diamonds have a speckled color confined to the surface, the color does not survive the polishing process .</td></tr>
<tr><td>Main deposits</td><td colspan="3">Main deposits : India (Golconda), Brazil, Central African Republic, Guyana, South Africa and Zimbabwe.</td></tr>
<tr><td>Year of discovery</td><td colspan="3">Beginning of the 18th century: the beginning of their history coincides with that of one of the most representative examples, the Dresden Green.</td></tr>
</table>

History	There were very few stones of this color until a few decades ago. Their history is linked to the rare known specimens. The most famous green diamond is the Dresden Green, the largest natural green diamond weighing approximately 41 carats. The Dresden Green has a legendary history. It probably originated in the diamond mines of the Golconda district of India and was **brought to London around 1726** . It was purchased that same year by Frederick Augustus I, elector of Saxony and later set in a specially commissioned badge **of the Order of the Golden Fleece** (the Order was founded in 1429 to "encourage and reward virtue and faith among men of high lineage "). The first documented treatment to produce green diamonds was an experiment done by Antoine-Henri Becquerel, shortly after his **discovery of radioactivity in 1896** . Becquerel irradiated some diamonds to see if they would be altered **and their color changed to green** . In 1904, Sir William Crookes kept some diamonds left to rest in radioactive salts. When removed from the salt, the diamonds had a green color on the surface that extended just below it. This diamond treatment method is not used today because diamonds can be contaminated with radioactivity that does not decay to safe levels within a reasonable period of time. The most common laboratory treatment used today to produce a green color in diamonds is the irradiation of polished diamonds with a **low-energy electron beam.** This treatment has been used **since the late 1940s** and can modify nearly colorless or yellow diamonds to produce diamonds with a green color. **Name** : The name diamond comes from the ancient Greek ἀ δάμ ας (adámas), "unalterable", "indestructible", "indomitable", from ἀ - (a-), "un-" + δα μdam (damáō), "I overwhelm ", or I" tame ". In India and surroundings: Etymology: Vai = Mouth, Ra = Light, Vaira = Portal of Light. In Sanskrit it also took on the meaning of diamond club or scepter. The term vajra indicated 2 distinct things: the "diamond" or the "lightning bolt". It also referred to a kind of battle weapon used by the god Indra. In Tibetan Buddhism this same object-stone-weapon is indicated by the name of Dorje . **Other trade names: /** **Variety** :
Property attributed	These gems are so rare that the symbolic values assigned to them are of modern matrix. Green diamonds are the symbol of the natural world and harmony. but also symbolize abundance, long life, prosperity and strength. **Planet: NA** **Month: NA Zodiac sign: NA** **Chakra: NA**
Treatments	The green color essentially comes from exposure to radiation. This can happen both in nature, when diamonds that have already reached the surface are reabsorbed by the earth, 30-60 km below its surface and are exposed to different radioactive agents, only to re-emerge after a rather long time. The period and intensity of these emanations obviously have an impact on the appearance and color of the stone. These same processes can be replicated in the laboratory. In some cases, the origin of this radiation (and the consequent color) is difficult to identify even by the best equipped gemological authorities. Here are some types of radiation and their consequences on diamonds: **Bombardment of protons and neutrons via cyclotrons** : This is, nowadays, of infrequent application as not all diamonds are cut equally and their color may be stronger in some areas than others. If the stone has been " cyclotroned " through the back of the diamond, a darker colored "hat" will be clearly visible across the top (the crown) of the gem. If the stone was irradiated through the crown, you will see a dark ring around its central edge (girdle). Side-treated stones will have a more intense color on one side. *Cyclotroned* diamonds take a **green to blue-green color** limited to the surface of the diamond. Subsequently, they are sometimes heated to 800 ° C to produce a **yellow or orange color** . Importantly, using this method, irradiated diamonds remain radioactive for only a few hours after treatment. **Gamma-ray bombardment by exposure to cobalt-60:** Gamma-ray treatment is also not very common, because although it is the safest and cheapest method of irradiation, effective treatment can take several months (and high costs). The color produced ranges from **blue to blue-green** which **penetrates the entire stone** . These diamonds are not heated. Most gamma-ray treated diamonds were originally yellowish in color. The greater the yellow component , the more evident the final greenish shade will be.

	Neutron Bombardment Through Nuclear Reactor Stacks : One of the two most common irradiation processes, this process produces a **green to black color** that **penetrates the entire stone** . Any heating of these stones, from 500–900 ° C, produces an **orange, yellow, brown or pink color** . Blue to blue-green stones that are not heated are separated from natural stones in the same way as gamma-treated stones. Because many green diamonds get their color from radiation exposure in a laboratory (a process known as irradiation), there have been concerns about their safety when used in jewelry. However, they have so far been regarded as safe for use in jewelry. Another treatment for producing green diamonds today is applying **a thin silica coating to the surface of the polished gemstones** . The coating can produce an attractive appearance, but it is very thin and can eventually be worn by abrasion from normal wear.		
Synthetic counterpart	There are 2 types of single crystal synthetic diamonds: **CVD** (chemical vapor deposition) diamond and **HPHT** (high pressure and high temperature) diamond. For now, lab-made green diamonds are rare and expensive to produce. Because of this, they can be extremely expensive, even not as expensive as natural ones. The processes in which natural and synthetic green diamonds are produced are so similar that most green diamonds undergo the GIA to test their "color origin" before being sold on the market. One way to distinguish natural green diamonds from synthetic ones is **from the green or brown radiation spots** found in natural green diamonds. These spots cannot be copied in a simulated environment. These stains only appear on the surface of a stone and are easily removed through faceting and polishing. However, polishers often leave the stains intentionally as it indicates that the stone is natural. Synthetic diamonds with a **light green color and a greenish yellow color** are produced when small amounts of nitrogen and boron are incorporated into the diamond.		
It can be confused with	**Moissanite synthetic (separable through: doubling, dispersion, inclusions), Zircon colorless** (separable through: double regenerative), **Cubic Zirconium / CZ** (separable through: optical character, spectrum, splitting), **Strontium titanate** (separable through: dispersion, SG, inclusions), **YAG** . (separable through: SG, dispersion), **GGG** (separable through: SG, luster), **Synthetic rutile** (separable through: optical character, dispersion, splitting), **Sapphire / Natural / synthetic spinel colorless** (separable through: optical character, luster, dispersion), **doublets / triplets** (separable through: inclusions, luster).		
Indicative gemological tests	Separating **green diamonds from simulants** (imitations such as CZ, moissanite, etc.) is an operation that can be done through common gemological tools (even just a Diamond Tester, if reliable). To understand whether they are treated or synthetic stones, it is, in most cases, safer to send them to a specialized laboratory. The origin of the green color cannot be determined with certainty for every diamond. It can be difficult or impossible to separate a naturally irradiated green diamond from a laboratory irradiated green diamond. In cases where the gemological authority (such as GIA, HRD, IGI etc.) is unable to confirm the origin of the color they will report that the cause of the color is "unknown" or "undetermined".		
Value (2021)	**High : 2M +** $ / ct **10 carat +**	**Medium:** $ 200,000 / ct **1-2 carats**	**Low:** $ 50,000 / ct **below the carat**
	The price of each carat depends on the intensity (saturation) and purity of the color. Diamonds with a pure green tint are generally more appreciated, each secondary chromatic nuance can drastically reduce the price per carat (even a tenth or less). Some shades are more sought after than others (for example blue compared to yellow or gray).		
Typical cut	Natural green, which has characteristics such as to appear uniform after cutting, is very infrequent in diamonds (between 0.1% and 0.4% of all those extracted). These gems are especially popular when they don't have a secondary tint. It is not always possible to determine whether the color is due to radiation from the earth or that generated in a laboratory. Most natural colored green diamonds have a color that is only skin-deep. This prevents many of them from being cut into faceted gems that retain a distinct green color. Diamonds with a green color distributed evenly across the stone are exceptionally rare. When the green color is confined to a thin layer just below the natural surface of the rough, the shape of the finished diamond must be **carefully planned to preserve the green color as much as possible** . Often the diamond is cut to preserve the green color around the stone's girdle or sometimes around its apex (the strong refraction of the stone can create an optical effect through which the color is perceived throughout the stone,		

	when viewed from certain angles, such as through the crown). With a small volume of color in the beginning and sometimes only a portion remaining, these green diamonds present a special challenge to cut and often have low color saturation.
Famous stones	**Famous stones and record prices: Dresden Green** (type IIa / two A), 40.70 carat; **Ocean Dream** (blue-green) from 5.51 carats; **Aurora Green Diamond** , 5.03 carats, sold for 16.8 million dollars in 2016. The **Gruosi Green** is a diamond of about 25 carats, with a cushion cut and of South African origin, purchased by the house of the same name in 1998.
Record stones	To date, the Dresda Green is the largest natural green diamond found, weighing in at 40.70 carats in its pear-shaped cut. The most expensive, however, is the Aurora Green sold for **3.3 million per carat** .