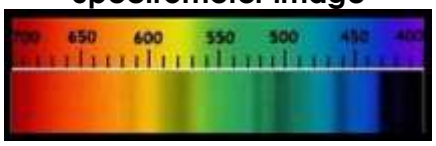
Warning: this version has been completed with Google Translate, it certainly contains errors or inaccuracies.

Technical sheet - general: Almandino (garnet)

<table>
<tr><td>Gemma - names</td><td>(Italian - Almandino)
(English - Almandine)
(French - Almandin)
(Spanish - Almandina)
(Portuguese - Almandina)
(Thai - อั ล มันดี น X ạ l M ạ nDīn)</td><td>(German - Almandin)
(Arabic - ألماندين 'almandin)
(Russian - Альмандин Al'mandin)
(Mandarin -铁铝 榴 石 Tiě lǚ liú shí)
(Swahili - Almandine)
(Hindi - अलमांडाइन alamaandain)</td><td>photo
  </td></tr>
<tr><td>Colors</td><td colspan="2">The almond is a garnet of iron and aluminum, of an intense red color, tending to purple. Its colors can range from pure red, to reddish orange and slightly purplish red to dark, brownish red. and usually dark in tone .</td><td></td></tr>
<tr><td>Cause of Color</td><td colspan="3">Almandine garnet is the most common type of garnet. Its red color is caused by iron (Fe $^{2+}$) in distorted cubic coordination. The almandine is a member at one extreme of a series of the garnet classification, while at the other extreme is the pyrope. When magnesium replaces iron, the series tends to pyrope.
Idiochromatic Gem</td></tr>
<tr><td>Classification</td><td>Mineral class
Nesosilicates</td><td>Species - Group (mineral)
Almandine - garnets</td><td>Variety
-</td></tr>
<tr><td>Optical properties</td><td>Specific Gravity:
3.95 - 4.31
Municipality: 4.19</td><td>RI: 1,790 (1,750 to 1,830)
Polariscope : SR (with ADR)
Double refraction: -</td><td>Character optical
/
Pleochroism
Absent</td></tr>
<tr><td></td><td colspan="2">Luster (luster) - luster of the fracture
sub-adamantine-v itreus - vitreous , sub - vitreous , resinous</td><td>Dispersion (fire)
0.027</td></tr>
<tr><td>Light</td><td colspan="2">Fluorescence
SWUV (254 nm) : Inert
LWUV (365nm) : Inert</td><td>Phosphorescence
NA</td></tr>
<tr><td>Form</td><td>Crystalline dress
Trapezoidal, dodecahedral

Melting point: 1315 ° C</td><td>Phenomenal optical effects
Catitude (rare) with 4,6 or 12 rays.
Color change (USA)</td><td>Crystalline system
Isometric (cubic) - Hexoctahedral
Crystal class</td></tr>
<tr><td>Chemical formula</td><td colspan="2">Iron and aluminum silicate

$Fe^{2+}_3 Al_2 (SiO_4)_3$</td><td>Spectrometer image
 
Typical bands at 504, 520 and 573 nm, with faint lines at 423, 460, 610 and 680-690 nm.</td></tr>
<tr><td>Fracture</td><td>Flaking
Indistinct</td><td>Breaking- Parting
1 direction
(generally not very visible)</td><td>Fracture
Concoidal</td></tr>
<tr><td>Durability</td><td>Hardness (Mohs) - Absolute
7-7.5; 100-150</td><td>Toughness
Fragile</td><td>Stability (heat, light, chemicals)
Good</td></tr>
<tr><td>Clarity - characteristics</td><td colspan="3">Typical inclusions: Asbestos inclusions are common. Other inclusions: rutile needles that intersect in different planes (70 ° - 110 °), low relief rounded crystals, zircons with tension slits, features called fingerprints, apatite. 

Almandine is typically clearer than most other garnets and is usually clean on visual inspection.</td></tr>
<tr><td></td><td>Type II
Normally included</td><td colspan="2">Transparency (commercial) - transparency
Transparent to translucent</td></tr>
</table>

Deposits - types of rocks	Almandine is at one end of the mineral class of garnet, the ferrous one. It represents an important group of silicates that form the main rocks that make up the outer part of the planet: the earth's crust, the upper mantle and the transition zone. The almond commonly forms at the borders of the converging lithic plates where **regional metamorphism occurs** . In this context, the chemical bonds are broken due to the high temperatures and pressures triggered by the subduction / collision of the masses of material, causing the mineral structure to recrystallize in such a way as to be stable in the new environment. The almondine is often found within a **matrix** that formed **into a shale** (metamorphic rock characterized by a regular arrangement, in roughly parallel planes) during the regional metamorphic process. Shale is formed when temperatures rise from about 200 to 400 degrees centigrade and with an increase in pressure due to depth **(between about 8 and 15 kilometers**). Almandine is also found in metamorphic rocks such as mica schists, associated with minerals such as **staurolite, kyanite, andalusite and others** . **Geological age** : Sometimes over a billion years.
Characteristics of rough stones	Massive, lamellar, with a distinctly foliated fine grain. Granular, they generally appear as anhedron (without defined shape) to matrix subhedral crystals.
Main deposits	The main deposits are found in **Asia** (mainly India). Other sources: **Afghanistan, Australia** (Northern Territories), **Austria** (Tyrol), **Brazil** (Minas Gerais, Bahia), **Canada** (Nunavut, Baffin Island, British Columbia), **Ethiopia** , **Greenland** , **Japan, India** (Andhra Pradesh, Rajasthan), **Solomon Islands** , **Italy** (Valle D'Aosta, Piedmont, Trentino-Alto Adige), **Kenya** (southern), **Madagascar** (Alaotra-Mangoro Anosy Ihorombe), **Mozambique** (province of Manica) **, Myanmar** (Mandalay Region), **Norway** , **Pakistan** (Khyber Pakhtunkhwa Province, Swat Valley), **Czech Republic** , **Russia** (Republic of Karelia), **Sri Lanka** (Sabaragamuwa Province), **Thailand** , **Tanzania** , **Turkey** (Aydin Province), **Uruguay** , **USA** (Alaska, Idaho, Montana). **Vietnam** , **Zambia** (Mazabika River).
Year of discovery	**4th millennium BC:** In ancient **Egypt,** the Naqada culture (3500 - 3100 BC), which succeeded the Badarian one, made great strides in the manufacture of beads. The beads of this period acquired a more regular shape and included semi-precious stones such as, for example, **garnet almandine** (but also of carnelian, quartz and enameled soapstone). These details show clear progress in crafting techniques. Alluvial gold, abundant in southern Egypt, began to be used more often. Bracelets, necklaces and bracelets are produced in the Badarian tradition but a new ornament appears: the ornament of the forehead.
History	Archaeologists have recovered garnet necklaces and talismans from **ancient Egyptian tombs and mummies** . Some garnets (perhaps almandines or pyropes) were found in the tomb of the Egyptian princess **Sithathoryunet** (Middle Kingdom Egypt, ca. 1887-1878 BC). One of his jewels, a breastplate was made up of carnelian, lapis lazuli, turquoise **and garnets set in gold** . Exceptional **garnet beads** (almandine and pyrope) have been found in an elite mound dated to the **4th century AD** . and located in the **Hagar el-Beida cemetery in the Upper Nubian region of the Nile Valley.** The source of raw materials for pearls found in Nubia has not been identified with certainty, but it may be native to deposits in Portugal and Nigeria and suggests a connection with similar garnets from Merovingian contexts (457-751 AD) The ancient **Greeks and Romans** used **rings, with garnet seals,** to seal important documents, as well as mounted them on a variety of jewelry with decorative function (cabochons or cut into cameos and carvings, depicting classical figures or deities). Red gemstones, identified primarily as garnets (carbuncles), were generally found in 5th-6th century Europe as an inlay decoration of fine metal objects. **The most important source is, and has been for thousands of years, India** . Most likely the garnets, which the Romans thought came from Carthage, Ethiopia and Alabanda, were actually of Indian origin and had found their way into the Mediterranean via the Silk Road. Interestingly, Indian garnet deposits are found in the north of the subcontinent (for example, in Rajasthan), while most other Indian gemstones are found in the southern states (Orissa, Tamil Nadu and Karnataka). Historically, the harder species of garnet, such as almondine, were, even in ancient times , used to create **abrasives and abrasive powders** . **Byzantine almandine** garnet engraved with a Christian motif and dated **between the late 6th and 8th centuries** offers insight into trading practices in antiquity. The gem probably came from the large deposit of Garibpet, in **the state of Telangana, India** . Byzantine carving thus provides evidence **of the transport of garnet from the east coast**

of India to the Mediterranean world during the High Middle Ages. In doing so, it supports the interpretation **of a 6th century text by** the Greek merchant and traveler ***Cosmas Indicopleustes*** (died around AD 550), which describes the export of " **alabandenum** " from ports on the southeastern coast of India along the ancient Maritime Silk Road. This idea is further reinforced considering that garnet from the Garibpet field was used for the production of beads. Some of them were recovered in the archaeological site of Arikamedu, in south-east **India** . Garnets (especially almandine and pyrope) played a significant role in the cloisonné jewels of Merovingian manufacture (the Merovingians were the first dynasty of the Franks) of the early Middle Ages **from the fifth to the seventh century of the Christian era** . The two predominant types of almandine used in **cloisonne jewelry** show different mineralogical characteristics from those used in India. In 2009, a large collection of Anglo-Saxon metal artefacts decorated with gems, including garnets (almandines), was recovered from farmland in England by a man using a metal detector. The 3,500 items, referred to as **the Staffordshire Treasure** , were manufactured during **the 6th and 7th centuries** and included weapons, religious artifacts and jewelry.

In the Middle Ages, Anglo- **Saxons** used almandines and pyrope as assemblages of geometric shapes and nobility and by European clergy they often used them for their jewelry: small, simple, domed or angular stones that provided decorative embellishment to brooches, pendants and buckles.

Large deposits of red garnet were discovered in central Europe (Bohemia) **around the sixteenth century** , which caused this gem to become common in jewelry during the **eighteenth and nineteenth centuries** . Bohemian garnet from the Czech Republic continues to be mined today.

Starting in the **17th century, Pegu,** a former kingdom in what is now **Myanmar** (Burma), was believed to be the source of this gem. However, as there are no significant deposits of garnet throughout that area, the rare stones, which are occasionally found, are rather desaturated brownish-red in color, it can be assumed that the famous Pegu almandine is indeed Indian. Most likely Pegu was just a renowned lapidary center of the time.

In **the Georgian period** (1714 to 1830–1837), garnets were the jewels of the day in England and its colonies. Their popularity was due to 3 factors: they were **affordable** , they matched almost **any complexion** and the almandine color gave a feeling of royalty in the flat cuts and closed collar frames. In this era, the preferred styles were *aigrette* , parure of leafy and naturalistic motifs with necklaces that split into two bracelets, removable pendants, hair ornaments and earrings from day to night, which offered almost an entire wardrobe of jewelry. Motifs such as Maltese crosses, pansies, witch hearts and portraits and commemorative medallions with round edges of flat-cut red garnet were the most popular of the era, first set in silver **in the early 1700s** and then in gold.

The largest garnet mine in the world is located near **North Creek, New York** and is operated by Barton Mines Corporation (the second oldest continuous mining operation in the United States under the same management, started by HH Barton, Sr. in **1878**) which supplies about 90% of the world's industrial garnet.

Another significant moment in the history of the almandino took place in **Australia** . At the end of the **nineteenth century** , large quantities of garnets (precisely almandines and pyropes) were found in the rivers of the Northern Territory, which were initially mistaken for rubies. This obviously triggered a rush. In no time at all 24 companies of rubies were founded, but they all collapsed immediately, when the true nature of the stones was officially ascertained.

In northern **Pakistan, between 1889 and 1892** , the Hunza used **almandine shells** to fight the British. They believed that garnets would be more effective bullets than lead because they were red, like blood.

Name : The name is a corruption of ***alabandicus*** , the name applied by Pliny the Elder to a stone found or worked in Alabanda, a city in Caria today part of the Anatolian area of Turkey. The word ***garnet*** derives from the Latin *granatus* , from *granum* ("grain, seed"). This is perhaps a reference to mela granatum or even pomum granatum ("pomegranate", Punica granatum), a plant whose fruits contain abundant and vibrant **red seed covers (arils)** , which are similar in shape, size and color to some crystals. of garnet.

the **gem)** , sometimes mistakenly called **almandite (the mineral).** Garnet (including almondine) was once known as *carbuncle* (although almost **all red gemstones** were originally known by this name). The term " **carbuncle** " comes from the Latin meaning " *live coal* " or "burning coal", due to the color of the stone. Although no longer used

	professionally by gemologists, the term "carbuncle" persisted into the 19th century and came to refer **to cabochon-cut red gems** , most commonly almandine garnets. **Other trade names:** Australian Ruby, Ceylon Ruby, Oriental Garnet, Almandine Ruby and Carbuncle. **Variety** : When the color tends to a purplish hue, the stone is often called ***Syriam garnet*** , which comes from Syriam, the ancient capital of the province of Pegu about 90 KM north-east of Yangoon. Most **color-changing garnets** have a pyro-spessartine composition. However, **pyrope-almandine from Idaho (USA)** can exhibit a strong color change from red to purplish red under incandescent and LED light.
Property attributed	Mystical and ancient cultures such as the **Sumerians and Egyptians** buried their dead with a **garnet stone** . Perhaps this was in the hope that even the cold claws of Death would be kind to the souls of their deceased loved ones, as well as to protect them from the unknown apparitions of the Hereafter. These gems have long been considered a **traveler's stone** : **Noah's Ark is said to** have a garnet lantern to help navigate through the night. In classical Hellenic mythology, often represented in paintings and sculptures of the time, we find the story of Persephone, (also called Kore or Cora), daughter of Zeus and Demeter. She became the queen of the underworld after her abduction by her uncle Hades, the king of the underworld. Among the earliest testimonies are the inscriptions on a tablet found in Pylos dated 1400-1200 BC. In them, *Preswa* , who could be identified with Perse, daughter of Oceanus was probably an ancient version from which the myth of Persephone developed. There is probably a link, both visual and symbolic, between the legend and the gem. When **Persephone** left the Underworld to be freed from the grip of **Hades** , the God of the Underworld found a curious way to protect the potential prospect of their reunion: He handed her **a handful of pomegranate seeds** . Garnet crystals **resemble the seeds of this fruit** and likewise share a connection with protective energies. The energy within the garnet stone is of a projective nature and the projective stones lend themselves easily to protective purposes. These pomegranate seeds marked Persephone's fate - or perhaps her rebirth - and as she consumed them her fate was sealed as the consort of Hades and Goddess of the Underworld. **In ancient Persia** this gem was considered a talisman that originated from the forces of nature such as storms and lightning. Many believed that garnet could signal an oncoming danger, turning pale. In ancient times, as well as in the **Middle Ages** , it was believed that the cosmos was reflected in precious stones. Garnet was assigned to the planets Mars, Mercury and Pluto. The esoteric movement of the 70s-80s revived some ancient beliefs and immediately the jewelry sector took the opportunity and made it a marketing tool for some precious stones, including garnets. This gem has been used for generations to attract luck in love, but also to **calm the soul** and cure some physical ailments. Wearing an almandine makes a person charitable and compassionate. It has a highly regenerative healing quality that stimulates endurance and strength. Its effects also touch the root and crown chakras and encourage compassion and charity in you, facilitate meditation and inner growth and development, and promote a feeling of community. Provides energy to eliminate unhealthy inhibitions, acting as a powerful support in personal transformation. It will stare and protect you, both physically and emotionally. It is said that it can also activate **Kundalini energy.** This stone gives the natural resources to **enjoy the pleasurable things in life** . This gem can be very useful in treating **heart disease** and in ailments affecting the **liver** , **pancreas and eyes** and to deal with sexual dysfunction and libido problems. It can connect with its energy to cellular functions and regeneration. It also serves as a **protective talisman against damage and** negative psychic attacks. The almond carries within itself the silbolism of an **intimate and deep love** , but it is traditionally also linked to **commitment and devotion** , which are primary characteristics in lasting relationships. Its healing energy pushes to cultivate a sense of abundance, safety and protection. If placed in a place south of a building or a chosen object, according to **Feng Shui** , the almond brings success. Connecticut (USA) has designated it as an official state gem.

	Planet: Mars, Mercury and Pluto **Month:** January **Zodiac sign:** Aquarius **Chakra:** Root (7) and Crown (1)		
Treatments	Like most garnets, almond is not normally treated or enhanced to change its appearance. There is an exception, a rather rare procedure: heating an almandine-spessartine garnet in an oxidized environment at 920 ° C produces a metallic coating of dark gray hematite on its surface. Metallic coatings **have been noticed on garnets since 1975** . Since then, almandine pyrope with a metallic coating have been marketed as the so-called **"Proteus garnets" (now almost unobtainable).**		
Synthetic counterpart	There are pure synthetic almandine crystals and almandine-pyrope blends produced by the hydrothermal method. These stones are present in the gem market, but they are not common. More well known are other types of synthetic garnet, such as YAG and GGG, used as a replica of numerous precious stones (less common today, replaced mainly by moissanite and CZ).		
It can be confused with	Most of the **dark red garnets** available on the market can be both pyrope and almandine. It can be very difficult to distinguish one from the other, although the second is usually darker and **heavier than the first** . àùò is the Almandine garnet and pyrope garnet can be imitated by the same gems: tourmaline, spinel, ruby, any other reddish garnet and synthetic paste, however, it is more common to see an amandine / pyrope imitate a ruby and a red tomaline than the opposite , as the latter tend to be much more expensive.		
Indicative gemological tests	The almandine species can be difficult to distinguish from other types of garnet by color alone. Generally it shows darker tones than other red gems, but there are also high quality specimens that have similar colors to those of the ruby. A powerful **neodymium magnet makes** it possible to distinguish garnet from other precious stones. Magnetic susceptibility in conjunction with its refractive index can be used to distinguish specific garnet species. Almandine garnet has a **distinctive diagnostic absorption spectrum** with typical bands at 504, 520 and 573 nm and faint lines at 423, 460, 610 and 680-690 nm. With a spectroscope, 3 (or sometimes 5) bands can be seen in all almandines, as well as in most garnets with a significant almandine component.		
Value (2021)	**High :** 50 $ / ct **3 carat +**	**Medium:** $ 20 / ct **1-3 carats**	**Low:** $ 1 / ct **below the carat**
Typical cut	Almandine garnet is sometimes hollowed out internally to let more light into the stone and give it a less dark appearance. If the bottom of the gem is covered with a jewelry setting, to determine if it is hollow just check its weight. Its lightness betrays the intervention.		
Famous stones	Jewels such as the central gem of a ring with an Eros walking and proudly carrying the weapons of **Heracles** (lion skin, mace, bow and quiver) engraved on almandin garnet, dating back to the **first century BC** , can be seen in various museums such as the Metropolitan in New York. In 1939 a **7th-century** tomb was discovered in **Suffolk** during an excavation of a funeral ship. It contained a decorated helmet. Consisting of an iron cap, neck protector and face mask, decorated with copper alloy images of animals and warriors and **studded with red garnets** . The **Hungarian Holy Crown** is one of the oldest and most famous artifacts to be embellished with almandine garnets and is probably **over 1000 years old** .		
Record stones	The United States produced extraordinarily large, well-formed crystals weighing up to 9 kg. The "Subway Garnet" is a 4-pound rock that was discovered on 35th Street, between Seventh Avenue and Broadway, or nearly 3 meters below the road, during a sewer excavation **in August 1885** . It is estimated to be **430 million years old** and its nickname was bestowed by reporters who no doubt thought a subway excavation would be a more stately provenance than a sewer trench. (The garnet was actually unearthed years before Manhattan's underground train tunnels were excavated.)		