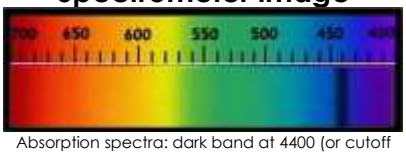
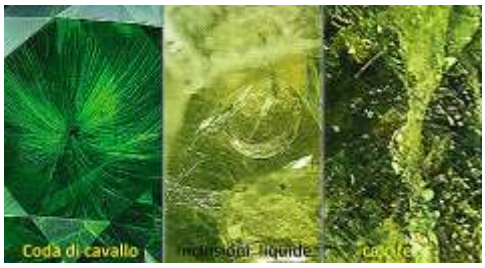
English version made by online translation; it may contain mistakes.

Technical data sheet – general: Andradite-Demantoid

Gemma – names	(**English** - Andradite-demantoide) (**English** - Andradite-demantoid) (**French** - Andradite-démantoïde) (**Spanish** -) Andradita-demantoide (**Portuguese** - Andradita - demantóide) (**Thai** - อันดราไดท์ -เดมันทอยด์ Xạn drā dịth -de mạn thxy d)	(**German** - Andradit-Demantoid) (**Arabic** - أندراديت-ديمانتويد'andiradit-dimantuid-) (**Russian** - Андрадит-демантоид Andradit-demantoid) (**Mandarin** -钙铁榴石 - 翠榴石 Gài tiě liú shí - cuì liú shí) (**Swahili** - Andradite-demantoid) (**Hindi** - एंड्राडाइट - डिमांटोइड endraadait - dimaantoid)	**photo** 
Colors (GIA)	Andradite, variety depending on the color: **Melanite** - A **black** variety of andradite. **Topazolite** - A **yellow-brown** variety of andradite. **Demantoid** - A green variety of andradite, with shades of green, from a **slightly yellowish green** to a **brownish green** with golden reflections. Especially valuable is an intense **emerald** green, although this occurs only very rarely. Equally rare is a **dark red/brownish coloration**.		
Cause of Color	Andradite or ferrino garnet, is a mineral, mainly orthosilicate of calcium and iron, structurally belonging to nesosilicates and the garnet group. Yellow-green is induced by the presence of $^{Fe3+}$ in octahedral coordination; **green (demantoid),** chromium **($^{Cr3+}$) in octahedral coordination**. Yellow (topazolite), to black (melanite) are activated by various processes of charge transfer and absorption of dispersed ions involving iron and titanium (Fe and Ti). Multi-colored stones owe their appearance to diffraction. **Allochromatic Gem**		
Classification	**Mineral class** Nesosilicates	**Species** – **Group (mineral)** Andradite – Garnet(s)	**Variety** Demantoid
Optical properties	**Specific Gravity:** 3.70 – 4.10 **Municipality:** 3.84	**RI:** 1,855 to 1,940 (typical 1,888) **Polariscope**: SR – ADR **Birefringence: NO** (rarely anisotropic due to internal stress of the crystals)	**Optical character** Isotropic / **Crystalline system** Cubic-isotmetric exoctahedral **Crystal class**
	Luster (shine)– *luster of the fracture* Vitreous, sub-metallic, adamantine **-** *vitreous*		**Dispersion (fire)** 0.057
Light	**Fluorescence** **SWUV**: inert **LWUV**: inert		**Phosphorescence** NO
Form	**Crystal clear dress** Euedral, typically shows a rhombic dodecahedral shape, but trapezohedra are not uncommon and octahedra are seen in some rare specimens. Massive and granular forms also occur. **Melting point:** about 1570 °C	**Phenomenal optical effects** The reddish-brown variety may show **gatteggiamento** and, in other cases, **iridescence** caused by geminated planes	**Crystalline system** Cubic-isotmetric monometric exoctahedral **Crystal class**
Chemical formula	Silicate rich in calcium and iron $Ca_3Fe_2(SiO_4)_3$		**Spectrometer image**  Absorption spectra: dark band at 4400 (or cutoff below); can also show lines at 6180, 6340 and 6850 and 6900
Fracture	**Cleavage** Indistinct	***Break-Parting*** Indistinct	**Fracture** Concoidal
Durability	**Hardness (Mohs) - *Absolute*** 6.5-7; *86-100- am*	**Toughness** Fragile to good	**Stability** (**heat, light, chemicals**) Excellent

Clarity-characteristics	**Typical inclusions:** Russian demantoids often contain inclusions of bissolite (fibrous amphibole) or chrysotile, which is a type of asbestos. These fibers radiate from a very small crystal of chromite and consist of feathered golden threads that tend to curve and resemble the tail of a horse, and are therefore referred to as horsetail inclusions. Other internal features include liquid inclusions and crystals of various kinds (diopside, wollastonite, quartz, calcite and sphalerite). 
	Type II Normally included — **Transparency (commercial) - diaphanity** From transparent to translucent
Deposits-types of rocks	In *skarn* (metasomatic rocks that form in contact between a silicate rock or a magmatic spindle and a carbonate rock) by contact with metamorphosed impure limestones or calcium igneous rocks; in chlorite shale and serpentinites; in alkaline igneous rocks, then typically titaniferous. **Geological age**: 10+ million years
Features of rough stones	It is frequently found in the form of rhombic dodecahedral crystals, measuring from millimeters to centimeters, scattered in the rocky matrix that incorporates them. Most often as dodecahedral crystals and groups of intergrowth dodecahedral crystals. It is also grainy, massive and in dense agglomerates and pointed crystal balls.
Main deposits	**Canada** (Québec, Yukon), **Iran** (Kerman Province), **Italy** (Lombardy), **Japan** (Nara Prefecture), **Madagascar** (Diana), **Mali** (Kayes Region), **Mexico** (Sonora), **Myanmar** (Mandalay Region), **Namibia** (Erongo Region), **Russia** (Chelyabinsk Oblast, Sverdlovsk Oblast), **Sri Lanka** (Sabaragamuwa Province) **. Turkey**
Year of discovery	**1853 (or 1868):** In 1853, in the settlement of Elizaventinskoye, it seems that a group of children found green pebbles along the Bobrovka River. The stones were initially identified as chrysolite or olivine (peridot). Nils von Nordensheld, a visiting Finnish mineralogist, stated that the stones were actually a new mineral. In February 1864, the geologist spoke before the St. Petersburg Mineralogical Society declaring that the new mineral was a variety of andradite garnet, containing significant amounts of chromium.
History	In **1853**, demantoid garnet was in the Russian Urals Demantoid, bright green andradite garnet was discovered. In **1878**, the term demantoid was first introduced and published. The name was accepted by Russian mineralogists and jewelers, but rejected by the people of Elizaventinskoye, who continued to call it "chrysolite of the Urals" as demantoid sounded like a vulgar word in the local dialect. A second discovery was made about 90 km south of Ekaterinburg, on the western slopes of the Ural mountains. This area produced gems of equal or superior quality to those of Elizaventinskoye. The demantoid gained popularity in Russia between **1875 and 1920**. The fabulous creations of **Peter Carl Faberge** contributed to this increase in visibility. and other court jewelers. Although most of these gems remained exclusively in the Russian market, which particularly leaned towards brownish or yellow-green stones, some specimens made their way to Western Europe. By the **1880s**, demantoid garnets were set commonly in jewels throughout Europe. London jewelers could buy such jewels from famous names such as eg r example that of E.W. Streeter. The **Edwardian (1901-1910) and Belle Epoque (1871-1914)** art movements were literally dotted with demantoid garnets. Edward VII of England (1841-1910), in fact, had a penchant for all green gems and demantoids made their way among his favorites. Deep green buds began to be bought at exorbitant prices. Mining activities ceased in the Russian region where these gems were mined during the Bolshevik revolution of 1917. That same year, it marked the end not only of the Romanovs, but also of the Fabergé family. The Bolsheviks took control of the Fabergé workshops and all production was shut down. At that point Peter Carl Fabergé and his family fled Russia.Tiffany & Co gemologist Dr. **George Frederick Kunz** loved rare gems and was enchanted by demantoid garnets. The famous connoisseur bought for Tiffany & Co, some of the largest demantoids of his time that were then incorporated into some important pieces of the famous American company, at the beginning of the twentieth century. The green shades of the demantoid were perfect for making jewelry with designs of reptiles and insects, creating a surge in the popularity of brooches in the form of animals

	such as frogs, lizards and dragonflies. Other stones were found in the Bobrovka River in **the 70s and 80s.** Around **1999** there was very limited production in the Central Urals. Many of the stones found then are on sale today. Mining takes place today along rivers, but some mining activities are still carried out in secret. A significant new discovery of demantoid and andradite took place in Namibia in **1996** in what is now nicknamed the "Green Dragon" mine In **2009** there was probably one of the most important discoveries, about this gem, in the north-west of Madagascar. Near a small seaside village known as Nosy Faly, in a mangrove swamp, a large deposit of demantoid garnet was discovered. The extraction is **curiously linked to the trend of the tides**. When the water recedes, the mines look like any other artisanal mine, with bamboo fences and handmade winches, but when the tide rises, the miners rush to the nearby hillsides and in less than an hour their entire mining installation is one meter underwater. There are said to be 600 or 700 small mines in an area less than a third of a square mile and I was told that some of these mines are now 10 to 20 meters below the surface. **Name:** Although garnets have been known since ancient times, the demantoid variety was not discovered until 1853 in the central-western Urals of Russia. The find was an alluvial deposit about 110 kilometers from Yekaterinburg, northwest along the Bobrovka River, near the village of Elizavetinskoye. The miners were stunned by the highly refractive nature of the gemstone material, atypical for garnet. It was named by Nils Gustaf Nordenskiøld from the archaic German word *Demant*, from the Middle High German *Diemant*, from the ancient French *diamant* which meant "diamond" in allusion to its rather high brilliance reminiscent of that of a diamond. **Andradite**: Named in 1868 by James Dwight Dana in honor of José Bonifácio de Andrada e Silva [June 13, 1763 Santos, Brazil - April 6, 1838 Niterói, Brazil], Brazilian mineralogist, who first described and gave the name to what Dana (1868) called a subvariety of andradite. D'Andrada had previously discovered, in 1800, a yellowish-gray mineral from a mine (Wirum?) near Drammen, Buskerud, Norway. He described and named this mineral by the name of ***allocroite*** (d'Andrada 1800), **from the Greek αλλος**, other, and χροια, color, due to the change in color of the heated product (with sodium ammonium hydrogen phosphate, reagent in the analysis of the blowpipe) during cooling. **Other trade names:** Siberian emerald, chrysolite (Archaic term for green to yellow-green gems that has been applied to peridots such as chrysoberilli and prehnites) Siberian and Ural Chrysolite **Variety**: demantoid is a variety of garnet (group) andradite (species).
Attributed properties	Demantoid garnets are sometimes used to aid **intimate relationships and increase wealth growth** through their power to amplify manifestation and prosperity. Its action to increase personal abundance applies to all levels of life as it is powerful to offer you the abundance of many things you desire. Physically, the stone helps with the **vista, blocked arteries, immune system and respiratory system** (especially diseases such as bronchitis and pneumonia). Like other garnets, it can be used to improve bone marrow, relieve arthritis and rheumatism, and assimilate vitamin A. They are also thought to help with **liver** problems, arthritis and varicose veins, increase vitality, relieve fear, insecurity and feelings of loneliness. Garnets have long been used as talismans to protect travelers and were thought to keep evil spirits away. All green grenades are known to activate the heart chakra, **arousing charity and compassion**. **Planet:** Mars (all garnets) **Month:** January **Zodiac sign:** Aquarius **Chakra:** Heart
Treatments	Around **2003**, reports began to circulate that some Russian demantoid grenades were regularly subjected to **heat treatment** to improve their color. It is considered that such treatment is carried out at relatively low temperatures and is not detectable by gemological tests. The resulting stones are stable under normal wear conditions.
Synthetic Counterpart	There are no commercial synthetic versions of demantoid garnet, however, sometimes inexpensive imitations such as **glass, YAG** (an artificial garnet distinct from andradite) or **green cubic zirconium**, can be passed off as demantoids. Another convincing imitation is **Nanosital** (hardness 7, produced in Thailand), an optically transparent polycrystalline material formed by the crystallization of glass with corresponding

	chemical composition and has superior physical and chemical properties compared to the original glass.
Can be confused with	For many years the demantoid was persistently called by the *trade olivine*, which is actually the mineralogical name of the peridot. To avoid further confusion, gemologists have discontinued the term *olivine* even in its proper context. **Tsavorite** (another type of garnet, with more intense green and different spectrum) **Green sapphire** (can be separated by: appearance, RI, hardness, birefringence), **Chromed Diopside** (can be separated by: hardness (5.5-6) appearance, RI, SG, birefringence, gloss), **Green tourmaline (verdelite)/mint/chrome** (can be separated by: appearance, RI, SG, birefringence, gloss), **Chromed Chalcedony** (can be separated by: appearance/transparency, RI, hardness, SG, birefringence, shine). **Williamsite** (can be separated by: appearance/transparency, RI, hardness (3.5-4), SG, birefringence, gloss), **Chrysoprase**, the apple green variety of microcrystalline quartz, (can be separated by: appearance/transparency, RI, hardness, SG, birefringence, gloss), **Peridot**: (can be separated by: appearance, RI, hardness, SG, birefringence, gloss, spectrum), **Actinolite:** (can be separated through: appearance/transparency, RI, hardness, SG, birefringence, gloss), **green fluorite**, (can be separated by: appearance, RI, hardness (4), SG, birefringence, gloss), **Chrysoberyl**, (can be separated by: appearance/color, RI, SG, birefringence), **Sphene** (can be separated from: appearance, RI, hardness (5-5.5), SG, birefringence), **Gem quality idocrasium** (rare, it can be separated by: appearance, RI, hardness, SG, birefringence, gloss, transparency), **Prehnite** (can be separated by: appearance, RI, hardness (6-6.5), SG, birefringence, gloss), **Amblygonite**, usually white or cream-colored, but also occurs in pale yellow, brown and green. (can be separated by: appearance/color, RI, hardness, SG, birefringence, gloss) **Oligoclase** (can be separated by: appearance, RI, hardness, SG, birefringence, gloss) **Brasilianite** (can be separated by: appearance, transparency, RI, hardness, SG, birefringence, gloss)
Indicative gemological tests	Garnet is a singularly refractive stone, this feature separates it from many other similar-looking gems. While the refractive index can only help to exclude stones with lower values (glass for example). Magnetism can help, although it is not a specifically indicative feature. Generally, the appearance and combination of the other gemological characteristics identify these gems with relative simplicity. The presence of such chrysotile inclusions is considered "diagnostic" for the natural bud (that is, these inclusions are not found in any other green bud).
Value (2021)	**High:** $5,000+ /ct **3 carat+** | **Average:** $1,000/ct **1-3 carat** | **Low:** $200/ct **under the carat**
	Some precious stones are more valuable for their inclusions, and "horsetails (ponytails)" can be considered desirable elements in the crystal, since they are considered an indication of the prestigious Russian origin, although some precious stones from other locations (such as Italy and Iran) may also contain "horsetails", which are considered characteristic of a serpentinitic geographical origin, and, on the other hand, not all Russian stones actually contain "horsetails".
Typical cut	Once cut, only a few stones weigh more than two carats, and most of them hardly exceed one. And even if you find one set in a jewel, it's always likely to be a small stone. In the market, demantoids are mainly found as **bright round or cushion cuts**. Demantoids cut into cabochons are not often seen. The lack of pleochroism means that orientation is not a problem, and the equidimensional shape of the rough generally provides good yields from raw to cut, as long as there are no particular inclusions that may require greater care in the direction of the facet. The cutting of old Russian demantoids has, in the past, led to improve the appearance of older faceted stones Lowering the angle of the crown **below 30 degrees** takes advantage of the high dispersion possible in this material.
Famous stones	The *Surprise Basket* is a platinum jewel full of anemones and gold flowers adorned with demantoid garnets and studded with 1,378 diamonds. The Winter Egg from the Fabergé' collection, designed by Alma Pih, is famous for its decoration of diamond snowflakes made of carved crystal, engraved and decorated with platinum and diamonds to resemble frost. The flowers are made **of white quartz, nephritis, gold and demantoid garnets**, and the moss from which they emerge is green gold. Its total height is 14.2 cm.It has 3,246 diamonds. The egg was sold at a Christie's auction in New York in 2002 for $9,600,000 USD.

Record stones	A cushion-cutting demantoid, above, is a world-class gemstone and one of the largest and finest faceted demantoids known. The **11.24 carat** gem was mined in Russia in the late 90s and exhibits the precious intense and vivid emerald green color. The gem became part of the Smithsonian Gem and Mineral Collection in 2011. Another oval demantoid of **6.96 carats**, comes from the Green Dragon Mine in Namibia and shows a medium dark yellowish-green color. It was purchased on behalf of the Smithsonian in **2014** with funds from the Tiffany & Co. Foundation. In **2008**, a ring with a **5.5-carat** Russian demantoid garnet was sold at Christie's auction in Hong Kong for the staggering **$170,876 ($50,000 more than the estimated maximum price).**