

## 10 Gemstones Much Rarer Than Diamond

by Robbie Gonzalez

Many people know that diamond is actually pretty common when it comes to gemstones (you can find millions of them in your typical candle flame), but who among us can actually name any that are rarer? Here, we present to you a collection of ten of the rarest gemstones on Earth.

### 10. Painite

In 2005, *The Guinness Book of World Records* called painite the world's rarest gemstone mineral. First discovered in Myanmar by British mineralogist Arthur C. D. Pain in the 1950s, for decades there were only two known crystals of the hexagonal mineral on Earth; by 2005, there were still fewer than 25 known specimens.

Today, painite isn't as rare as it used to be. According to Caltech's division of geological and planetary sciences, the identification of a new painite repository in Myanmar, "the recent discovery of the actual source of the original stones," and "the subsequent discovery of two major new localities in the Mogok area" have all led to the recovery of several thousand crystals and fragments, but painite nevertheless ranks among the rarest minerals on Earth.



[Photo Credit: Rob Lavinsky | CC BY-SA 3.0]

### 9. Alexandrite



[Photo Credit: David Weinberg | CC BY-SA 3.0]

Alexandrite is renowned for its strange optical properties – it can actually undergo dramatic shifts in color depending on what kind of light it's in. To be clear: this color change is independent of your viewing angle; a gemstone that shifts colors when you rotate it in your hand is said to be pleochroic, and while alexandrite *is* strongly pleochroic, it can also change colors independently of viewing angle when viewed under an artificial light

source. (In natural sunlight, the gem appears greenish blue; in soft incandescent light, the gem appears reddish purple, instead.) A variety of Chrysoberyl, alexandrite belongs to the same family of gemstones as emerald. Its color-changing properties (and its scarcity relative to diamond) is due to an exceedingly rare combination of minerals that includes titanium, iron and chromium.

## 8. Tanzanite

The catchphrase you hear tossed around about tanzanite is that it's 1000 times rarer than diamond, which it very well may be, considering that it's found almost exclusively in the foothills of Mount Kilimanjaro, and in limited supplies. Like alexandrite, tanzanite exhibits dramatic color shifts that are dependent upon both crystal orientation and lighting conditions. In this figure you can see how the tanzanite changes color when viewed in vertically polarized light, unpolarized light, and horizontally polarized light, moving from left to right. According to Caltech's geology division, these color variations are largely due to the presence of vanadium ions.



[Figure via Caltech]

## 7. Benitoite

This striking blue stone has only been found, as its name suggests, near the head waters of the San Benito River in San Benito County, California ( some sources say it has also been unearthed in limited quantities in Japan and Arkansas, but that these specimens are not "gemstone quality"), and is also the state's official gem.

One of the most distinctive features of benitoite is how positively *awesome* it looks under a UV light, where it fluoresces a brilliant color reminiscent of glowing blue chalk. What's strange is that, even though it was first described at the turn of the twentieth century, and we've known its chemical composition for decades, the origin of its color and its fluorescent properties still aren't well understood.



[Photo Credit: Parent Géry]

## 6. Poudretteite



The first traces of poudrette were discovered in the mid 1960s in the Poudrette quarry of Mont Saint Hilaire, Quebec, but it wasn't officially recognized as a new species of mineral until 1987, and wasn't thoroughly described until as recently as 2003.

According to some sources, it's likely that few people will ever encounter a poudretteite specimen in person, and many will likely never even hear of it.

[Photo Credit: Scott Davies, courtesy of The Gemology Project | CC BY-NC-SA 2.5]

## 5. Grandidierite

This bluish-green mineral is found almost exclusively in Madagascar, though the first (and, presumably, only) clean faceted specimen (described here) was recovered from Sri Lanka. Like alexandrite and tanzinite, grandidierite is pleochroic, and can transmit blue, green, and white light.



[Photo Credit: Don Guennie | CC BY-SA 3.0]

## 4. Red Diamonds

Technically speaking, red diamonds *are* diamonds, but they serve to highlight the fact that diamonds actually come in a range of colors. They are, in order of rarity: yellow, brown, colorless, blue, green, black, pink, orange, purple and red. In other words, the clear diamonds you're liable to encounter at your local jeweler aren't even rare as far as *diamonds* go.

As a point of reference, the largest red diamond on Earth — The Moussaieff Red, pictured here — weighs just 5.11 carats (about 1 gram). The largest traditional diamonds — such as those cut from the 3,106.75-carat Cullinan diamond — weigh in at well over 500 carats.



[Photo Credit: The Gemological Institute of America]

## 3. Musgravite



This mineral was first discovered in 1967 at the Musgrave Range in South Australia, but has shown up in limited quantities in Greenland, Madagascar, and Antarctica. The very first specimen that was actually large and pure enough to be cut to shape (like the one pictured here, courtesy of the Gemological Institute of America) wasn't reported until 1993, and, as of 2005, only eight such specimens are believed to exist.

[Photo Credit: De Agostini/Getty Images]

## 2. Jeremejevite

First discovered in Siberia at the end of the 19th century, gem-quality crystals of jeremejevite (i.e. minerals large and clear enough to be cut to shape) have since been recovered in limited supplies in Namibia. Pictured here is jeremejevite that has formed in a rare, clear-crystal form the largest faceted jeremejevite on Earth.



[Photo Credit: [Fred Kruijen](#) | CC BY-SA 3.0]

# 1. Red Beryl

Red beryl (aka bixbite, "red emerald," or "scarlet emerald") was first described in 1904, and while it is closely related on a chemical level to both emerald and aquamarine, it is considerably rarer than both. (The mineral's red color is due to the presence of  $Mn^{3+}$  ions.)

The mineral's known distribution is limited to parts of Utah and New Mexico, and has proven exceptionally difficult to mine in an economically feasible fashion. As a result, some published estimates say rubies of similar quality (rubies being a rare gem, themselves), are roughly 8000 times as plentiful as any given red beryl specimen. Consequently, prices on red beryl have been known to reach as much as 10 grand per carat for cut stones.



[Photo Credit: Rob Lavinsky | CC BY-SA 3.0]

Author's Note: *University of Arizona mineralogy and crystallography; the RRUFF Project; Caltech GPS's Mineral Spectroscopy Server; The Smithsonian Department of Mineral Sciences A version of this article previously appeared in 2012*

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