

## Case 6: Green Minerals

### Highlights of this case include:

- Peridot (olivine) in basalt
- Vivid green uvarovite garnet
- Transparent, cubic green fluorite
- Layered green calcite



### What makes minerals green?

Some minerals only ever appear in shades of green. Olivine, malachite, and conicalcrite are good examples. Their mineral composition inherently includes some ion which affects the wavelengths of light they reflect (for olivine, Mg and Fe, for malachite and conicalcrite, Cu).

Other minerals can be a range of colors depending on what trace impurities are present within the mineral. Fluorite and calcite are great examples. No particular ion in their inherent structure is responsible for their color, so any impurities can affect the shade. Tiny amounts of chrysolite, chromium, or iron can turn calcite or fluorite green.

### What are green minerals used for?

- Uvarovite is the rarest of all gem garnets and therefore is highly prized for decorative purposes.
- Olivine is used as a gemstone (peridot) but also in the manufacture of heat-resistant bricks.
- Malachite has been used as a pigment in art throughout history. Malachite may be one of the first ores humans learned how to smelt; heating it in a fire reduces it to native copper.
- Fluorite (which can come in many colors including green) is a major source of fluorine, used in manufacturing for everything from cooking utensils to high-octane fuels.



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**Images:**

**1. Conicalcrite** Gold Hill, Tooele Co., Utah

**2. Calcite** Mexico

**3. Garnet variety Uvarovite** Saranovskiy Mine, Ural Mountains, Russia

**Information from:**

**Mindat.org** – The world’s largest online mineral database.

**“Rock and Gem: The definitive guide to rocks, minerals, gemstones, and fossils”** by Bonewitz, R. and the Smithsonian Institute, New York, NY: Dorling Kindersle. 2008.

**“Simon and Schuster's Guide to Rocks and Minerals”** – edited by Martin Prinz, George Harlow, and Joseph Peters. New York: Simon and Schuster, 1978.

\*available for reference in the Dice Mineralogical Museum

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