



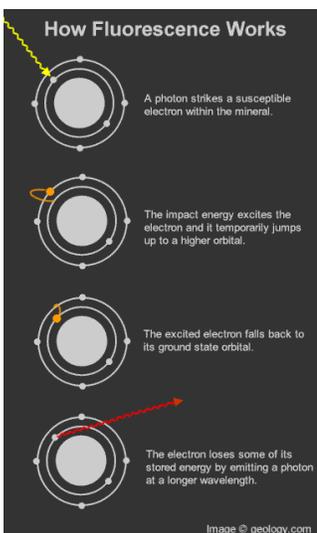
■ One mineral, three colors: calcite under incandescent light, longwave UV & shortwave UV.

FLUORESCENT FACTS

from the *Fluorescent Mineral Society* <http://uvminerals.org/fms/minerals>

Of the 3,600 identified mineral species, over 500 of them are known to fluoresce visibly in some specimens. About 90% of those glow under shortwave UV light, while about 10% glow under longwave UV.

Light is a form of energy. To create light, another form of energy must be supplied. There are two common ways for this to occur, **incandescence** and **luminescence**.



Ultraviolet Wavelength Range		
	Wavelength	Abbreviations
Shortwave	100-280nm	SW UVC
Midwave	280-315nm	MW UVB
Longwave	315-400nm	LW UVA

Incandescence is light from heat energy. If you heat something to a high enough temperature, it will begin to glow. When an electric stove's heater or metal in a flame begin to glow "red hot", that is incandescence. When the tungsten filament in an incandescent light bulb is heated still hotter, it glows brightly "white hot" by the same means. The sun and stars also glow by incandescence.

Luminescence is "cold light" that can be emitted at normal and lower temperatures.

Fluorescence is a type of luminescence. An energy source kicks an electron of an atom out of its lowest energy "ground" state into a higher energy "excited" state; then the electron returns the energy in the form of light so it can fall back to its "ground" state.

Phosphorescence is a specific type of photoluminescence related to fluorescence. When exposure to radiation is stopped, fluorescent minerals stop glowing. However, a phosphorescent material does not immediately re-emit the radiation it absorbs. Excitation of electrons to a higher state is accompanied

with the change of a spin state. Once in a different spin state, electrons cannot relax into the ground state quickly, so the material continues to glow after the light is turned off.

Most minerals do not fluoresce when pure. It takes certain impurities in certain quantities to make the mineral fluoresce. Such impurities are called **activators**. Different activators can make the same mineral fluoresce in different colors. Different minerals require different activators, and in different quantities.

There are also impurities called **quenchers**, notably ferrous iron, that can prevent fluorescence despite the presence of an activator. Because activators and quenchers may or may not be present in any given specimen, different specimens of the same mineral (especially from different locales) may vary in color and degree of fluorescence.

There are a few minerals that will fluoresce when pure. These are called **self-activated** minerals, and include scheelite, powellite, and several uranium minerals. Others suspected of being self-activated include benitoite, cerussite, and anglesite.

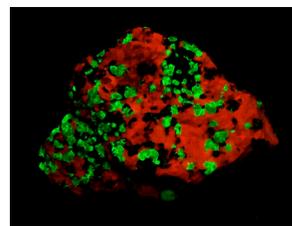
Franklin, New Jersey FLUORESCENT CAPITAL

Franklin, New Jersey is known as the "fluorescent mineral capital of the world." Together with nearby Ogdensburg, it is the source of at least 260 minerals, of which at least 56 are fluorescent. Many of these minerals are found nowhere else in the world. Many of the fluorescents are uncommonly bright.

Only the Franklin mine provided specimens with 5 or more different colors of equally bright fluorescence from as many minerals in one specimen. Willemite and calcite specimens, glowing yellowish-green and orange-red, respectively, are the most common fluorescents from this

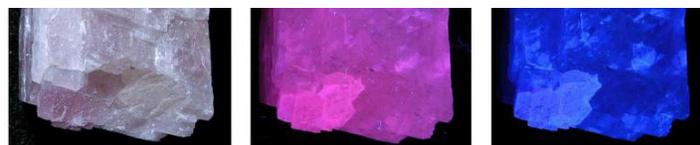
area; sometimes these combine with hardystonite (fluorescing deep blue-violet), clinohedrite (fluorescing orange), and maybe even esperite (fluorescing yellow) for a rainbow fluorescence.

Unfortunately, both the Franklin and Ogdensburg mines have been closed. The Sterling Hill mine at Ogdensburg, though the deep levels are flooded, has recently reopened as a museum. The surrounding marble formations still supply many fluorescent specimens, but no more of the rarest combinations are found. *from the Fluorescent Mineral Society*



■ The black is franklinite, the red is calcite and the green is willemite.

TERLINGUA CALCITE



Ambient Light

Long Wave Ultraviolet Light

Short Wave Ultraviolet Light

Calcite may fluoresce red due to lead and manganese or green due to uranyl ion traces. However, calcite from the mercury mines at Terlingua, Texas, and just across the border into Muzquiz, Coahuila, Mexico, is a favorite due to its unique properties. It fluoresces pink under longwave UV and bright blue under shortwave UV, with a uniquely bright blue phosphorescence after the UV lamp is removed. *from the Fluorescent Mineral Society* <http://uvminerals.org/fms/minerals>

HOPE DIAMOND www.sciencedaily.com

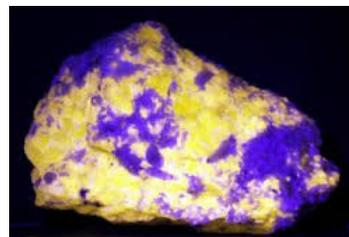
Shine a white light on the Hope Diamond and it will dazzle you with the brilliance of an amazing blue diamond. Shine an ultraviolet light on the Hope Diamond and the gem will glow red-orange for about five minutes.



This phosphorescent property of blue diamonds can distinguish synthetic and altered diamonds from the real thing, and it may provide a way to fingerprint individual blue diamonds.

Wernerite illustrates "hot" concept THERMOLUMINESCENCE

Scapolite (wernerite) from Ontario and Quebec, Canada, fluoresces a vivid orange-yellow color under longwave UV, while shortwave UV inspires a long-lasting phosphorescence that can be markedly brightened by holding it under a running hot water faucet, illustrating **thermoluminescence**. *from the Fluorescent Mineral Society*





INEXPENSIVE LIGHTS

Professional grade UV lights can cost hundreds, if not thousands of dollars. However, here are a couple inexpensive options to get you started!



\$35

Shortwave light

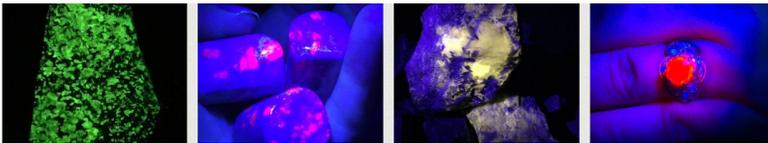
90% of all fluorescent minerals need a shortwave light source. This is not your standard "black light." HomeScienceTools.com offers a \$35 dual long/shortwave light that several of our members recommend. It is low light and works best in dark conditions, but it is about the least expensive shortwave light you can get.



Longwave light

About 10% of fluorescent minerals show up under longwave light. Inexpensive (\$5-12) longwave lights are readily available at a wide variety of locations such as Walmart, Meijer, Menards, Lowes, Amazon, etc. Be sure that they are labeled as UV lights and not just LED flashlights.

\$5-15



≡ GLOWING ≡ MINERALS & GEMS

Adamite	Benitoite	Dryhead Agate	Ruby	Wernerite
Alexandrite	Calcite	Fluorborite	Sapphire	(Scapolite)
Amber	Cancrinite	Fluorite	Septarian	Willemite
Angelsite	Cerussite	Nepheline	Sheelite	Zircon
Apophyllite	Citrine	Opal	Sodalite	
Aragonite	Diamond	Powellite	(Hackmanite)	
Autunite	Diopside	Quartz	Tremolite	

📖 MORE ITEMS TO CHECK OUT

<https://www.thoughtco.com/what-glow-under-a-black-light-607615>

- ✓ **White paper** is treated with fluorescent compounds to help it appear brighter. Sometimes forgery of historical documents can be detected by placing them under a black light. White paper made post-1950 contains fluorescent chemicals while older paper doesn't.
- ✓ Modern US **\$20 bills** contain a security strip near one edge that glows bright green under a black light.
- ✓ Many **body fluids** contain fluorescent molecules. Forensic scientists use ultraviolet lights to detect blood, urine or semen.
- ✓ Manufacturers purposely include fluorescent additives in **antifreeze fluid** so that black lights can be used to find antifreeze splashes to help investigators reconstruct automobile accident scenes.
- ✓ Some of the **whiteners in detergent** work by making your clothing a bit fluorescent. Even though clothing is rinsed after

washing, residues on white clothing cause it to glow bluish-white under a black light. Bleaching agents and softening agents often contain fluorescent dyes, too.

<https://sciencenotes.org/list-of-things-that-glow-under-black-light/>

- chlorophyll – glows red
- scorpions – glow blue or green
- Irish Spring soap – green
- Mr. Clean liquid cleaner
- most types of fishing line
- some plastics
- white paper – white or blue-white
- passports
- some cosmetics
- some animals, plants, and fungi
- petroleum jelly – glows blue
- uranium glass or vaseline glass
- rock salt
- some flowers
- certain postage stamps
- highlighter pens – variety of colors
- cotton balls
- pipe cleaners – usually glow blue-white

Go ahead, play with your food

🍴 FLUORESCENT FOODS

<https://sciencenotes.org/food-glow-black-light/>

Do you want food that glows in the dark? With the exception of certain types of phosphorescent fungi, edibles don't tend to glow. However, there are some foods that glow under a black light.

Here is a list of foods that glow and the color of the light that is produced. Tonic water glows the brightest. You can use it in place of water in certain recipes to make foods light up. Try it in white frosting, gelatin, & drinks. You can also add a bright glow to food by mixing in vitamin B12.

Foods That Glow Under Black Light

- tonic water (bright blue because of the quinine in it)
- vitamin B12 (bright yellow)
- cooking oil (yellow to greenish-yellow)
- olive oil (orange)
- eggs (shell is dark violet-red, egg white is bright pale yellow)
- honey (golden yellow)
- turmeric (bright yellow)
- pineapple (vivid blue fruit, mostly reflected light, outside doesn't glow)
- ketchup (yellow – not bright)
- milk (pale yellow)
- vanilla ice cream (yellow)
- yogurt (yellow for vanilla, possibly pink for flavored)
- banana spots
(blue ring around spots, some color if you cut the banana)
- sliced lettuce or other greens (dull red from the chlorophyll)
- sliced peppers (dull red)
- sliced squash (yellow)
- some energy drinks (if they have enough B vitamins)

Foods That Reflect Black Light

Most white foods (except for egg whites) don't glow or fluoresce under black light, but they do reflect back the light so they appear bright blue or purple. Examples of reflective foods include:

- marshmallows
- white bread
- pasta
- rice
- potato chips
- tortilla chips