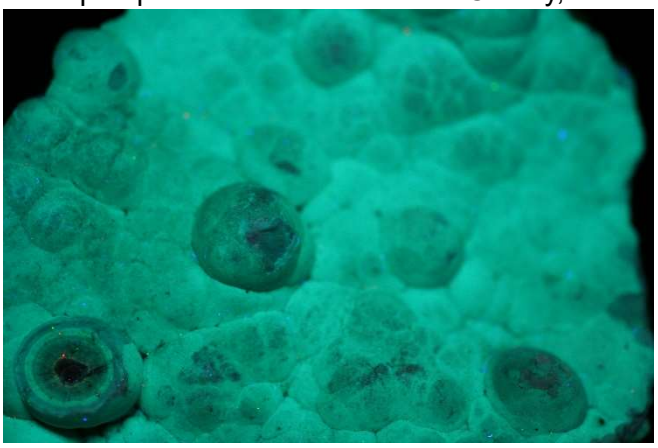
Fourmile Creek Fluorite Occurrence, Fremont County, Colorado

by Bob Carnein

Fluorite is a favorite of mineral collectors at all levels of sophistication. It occurs in so many colors, crystal habits, associations, and localities that some mineral lovers amass large collections of fluorite, to the exclusion of everything else. Fluorescent mineral collectors love fluorite's often colorful response to shortwave, midwave, and longwave UV. In fact, fluorescence was named for fluorite by George Stokes in 1852. Some fluorite even fluoresces in blue light and sunlight.

Most fluorescent mineral aficionados think of red-fluorescing fluorite as especially rare and desirable. Only 7 or 8 localities are known, world-wide, for this scarce material. However, even less abundant is fluorite that fluoresces bright green and orange in SWUV, which occurs in a small prospect in northern Fremont County, near Sand Gulch campground. According to Eckert (1997), this locality and a nearby, related prospect, were developed in the early1980s by Don Knowles (1937-1997), an avid Colorado field collector and proprietor of Golden Minerals, in Golden, Colorado (Mineralogical Record Biographical and Label Archive, accessed April, 2024). On Mindat.org (accessed April, 2024), the locality is described as an unnamed fluorite occurrence near Fourmile Creek, Fremont Co., Colorado. I have also heard it called the "lower Fox prospect."



The lower Fox prospect is accessed via the Shelf Road to the Sand Gulch campground, about 12 miles north of Cañon City. Beyond the campground, the road (as of April, 2024) is extremely rough and requires a high-clearance 4WD vehicle (preferably with a low 4WD option) or an ATV.

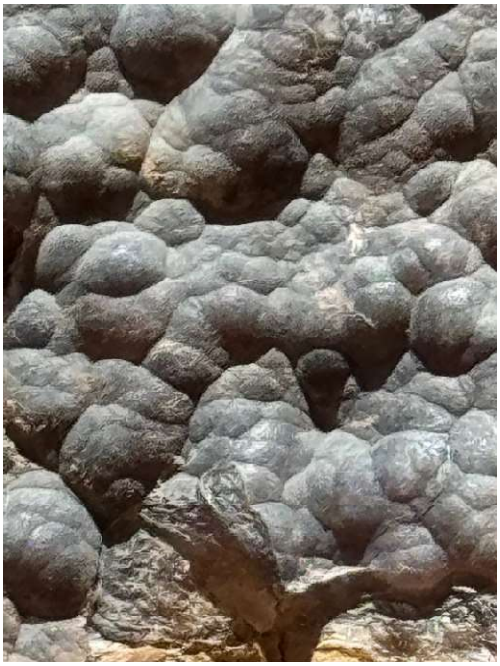
Photos of the quarry at the lower Fox claim. The quarry follows a fracture system, with fluorite coating the fractures. Rob Martinez photos, April 2024.

The locality consists of a narrow quarry in the Fremont Formation, an Upper Ordovician pink to gray fossiliferous dolostone and dolomitic limestone. Satellite imagery shows the Fremont Fm. is cut by several fracture systems along a N10ºW trend over 750m long. At least one fracture in the quarry clearly displays slickensides, features that a geologist can use to determine the movement direction along a fault. The slickensides in the quarry show left-lateral strike-slip offset. This means that the wall toward the observer (which is missing) moved horizontally to

the left, compared with the surface displaying the slickensides. Unfortunately, there is no clear indicator of the amount of movement at this spot.

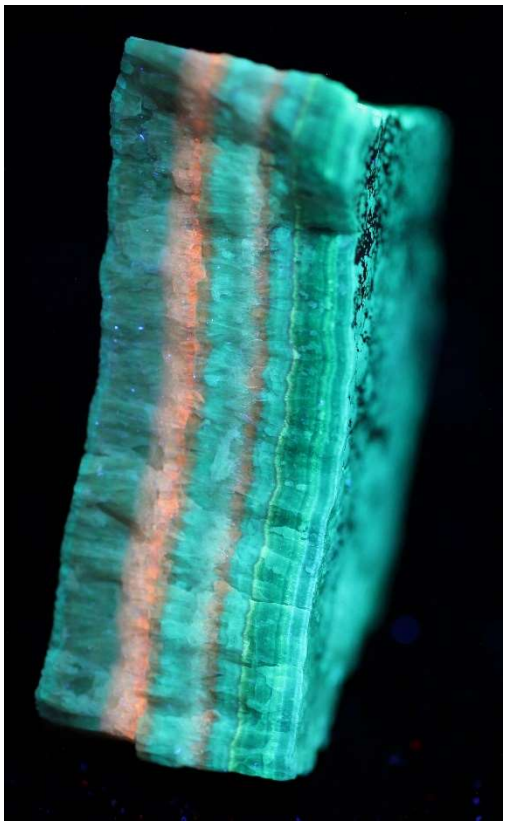
The host rock is tough, and collecting from the quarry walls requires a sledge hammer and chisels (and possibly a ladder!). There is limited space for a group of people to collect in the quarry, but occasional openings can be exposed that may contain fresh fluorite and rare calcite

Botryoidal grayish purple fluorite on a fracture surface (left) and in cavities exposed in the walls of the quarry in the lower Fox claim (right). Photos by Rob Martinez, April, 2024.



crystals. Easier collecting can be done on the dumps adjacent to the parking area, with good specimens available to a person willing to do some digging with a pick or small shovel. Even surface collecting still produces some good results.

Fluorite from the lower Fox quarry occurs as grayish or greenish purple to white veins from a few mm to 5 cm thick. The veins are banded and have fibrous structure perpendicular to the vein surfaces (they are cross-fiber veins). Where open spaces developed along fractures, the fluorite forms botryoidal ("bubbly"-looking) masses. Most of the fluorite fluoresces an attractive pale to moderate apple- to somewhat bluish-green color in SWUV. More rarely, some bands fluoresce a moderate orange color. Although the activators (impurities that cause fluorescence) are not known for certain, some collectors have suggested that small amounts of uranium (the U^{+5} ion) may cause the green response. The orange fluorescence is unexplained. The fluorite's response to LWUV is even more varied, ranging from dim olive to blue to bright orange to a moderate greenish cream color. The dim olive and orange responses generally (but not always) correspond with the apple green and orange SW fluorescent areas. Unfortunately, the LW fluorescence could be described as "underwhelming."



Photos of a cross-fiber vein section in white light (left) and shortwave UV (right). Carnein photos

A kilometer or so (longer by road) to the north of the lower Fox claim is another small quarry, sometimes called the upper Fox claim. Here, massive dark to pale purple fluorite occurs as veins and breccia fillings between Fremont Fm. fragments. The purple fluorite does not fluoresce in SW or LWUV. Locally, tiny (~1 mm) yellow fluorite crystals occur as thin druses on pale, sandy host rock. These fluoresce a dull, yellow to brown color in LWUV and a faint yellowish green in SWUV. In places, they are partially coated with golden-brown goethite. There are also local cross-fiber veins and botryoidal fluorite like that seen at the lower Fox claim, but of a much smaller size.

Yellow fluorite from the upper Fox claim. Note goethite-coated edges on the cubic crystals. Carnein photo.

Although most collectors visit these claims to collect fluorite, watch for rare platy to bladed yellowish baryte and occasional small, patchy coatings of malachite at the upper Fox claim and pale greenish cream calcite crystals and excellent dendritic coatings (manganese

oxides?) at the lower Fox claim. None of these make spectacular specimens, but they are interesting, nonetheless. Given the presence of malachite, careful observers may encounter other copper minerals in the upper quarry. Keep your eyes open and enjoy collecting in these very special localities!

Baryte crystals from the upper Fox claim (left) and calcite crystals from the lower Fox claim (below right). Carnein photos.

Dendrites of possible manganese oxides, lower Fox claim. Rob Martinez photo.

Reference cited: Eckley, E.B., *et al*., 1997, *Minerals of Colorado (updated and revised)*: Golden, Colorado, Fulcrum Publishing.