

Vanmeersscheite, A new mineral species for the Palermo Mine and for New Hampshire

Don Dallaire & Tom Mortimer

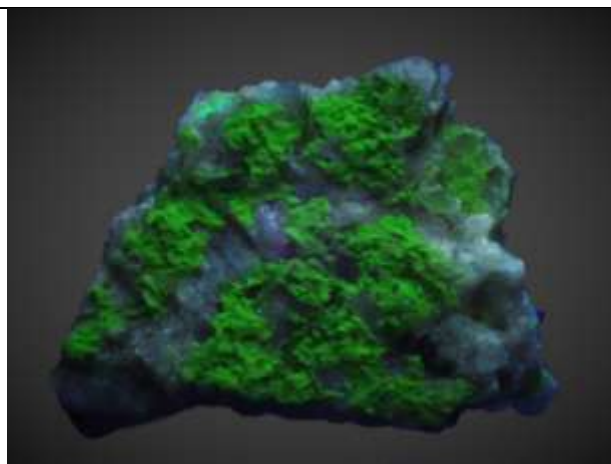
An August, 2020 EDS analysis by Al Falster at the Maine Mineral Museum, Bethel, ME has confirmed a new uranium mineral for the Palermo Mine, N. Groton, New Hampshire. The species is vanmeersscheite, $U^{6+}(UO_2)_3(PO_4)_2(OH)_6 \cdot 4H_2O$.

Don emailed me [tm] in mid-August announcing this find: My "sight id had it as uranophane since it was yellow and radioactive. It appeared to be a crust when I found it but with a better microscope than what I had at the time I saw balls of radiating crystals. I was also suspicious however since it fluoresced a bright green (uranophane has weak fluorescence if any at all). I brought it up to Al Falster on my monthly trip to the museum and he analyzed it. The EDS scan showed uranium and phosphorous and nothing else (no Na, Ca, Zn, Ba, Pb, Al, Sr, Fe, Cu, K, Mn, Mg or Nd). There were only 5 minerals that fit this. Four were quickly eliminated by other physical characteristics. The crystal is pseudo-hexagonal in outline but actually is orthorhombic. He tested the refractive indices and all 3 were greater than 1.7 (didn't have liquids for higher). All this info fits the mineral vanmeersscheite." We should note that dehydrated vanmeersscheite = metavanmeersscheite, $U^{6+}(UO_2)_3(PO_4)_2(OH)_6 \cdot 2H_2O$, cannot be differentiated with the acquired EDS data.

Don stated this was a self-collected specimen from a June, 1983 field trip. He explained that the specimen had split nearly in half when being readied for EDS analysis and that he would gift me half for the NH species display. I was most grateful for the "misfortune" of the specimen split and appreciative to be the recipient of the orphaned chunk. I picked up the offered half on September 8 and immediately attempted some photos to capture the fine crystal structure. The individual crystals are very tiny and one needs to find spots where the individual crystals protrude into the contrasting matrix. The first row of photos below are by Don.



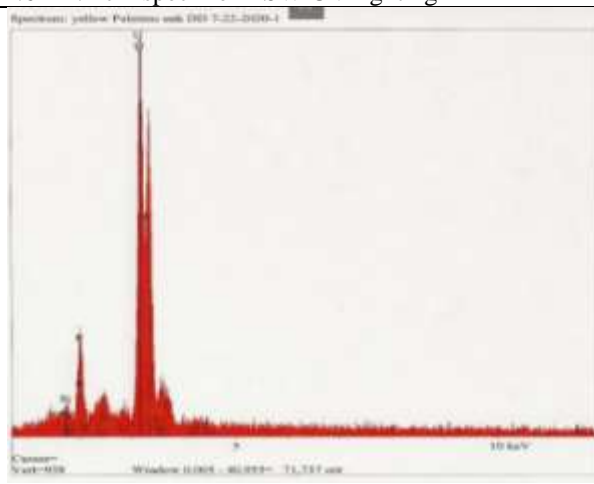
VANMEERSSCHEITE Palermo #1 Mine, Groton, NH
1.6 x 1.4 cm specimen Daylight



VANMEERSSCHEITE Palermo #1 Mine, Groton, NH
1.6 x 1.4 cm specimen SW UV lighting



VANMEERSSCHEITE Palermo #1 Mine, Groton, NH
0.4 mm field of view



VANMEERSSCHEITE EDS analysis plot
Al Falster, Maine Mineral Museum laboratory