Mineral Mite Articles Win EFMLS and AFMS Trophies

Two articles about uranium minerals in *The Mineral Mite* were honored by the Eastern Federation of Mineralogical and Lapidary Societies (EFMLS) and the American Federation of Mineralogical Societies (AFMS). The articles were written by Michael Pabst, Treasurer of the Micromineralogists of the National Capital Area (MNCA). The articles describe secondary uranium oxide minerals with photomicrographs and commentary. Michael describes his trip to Tulsa to receive the AFMS award below:

"Thanks to prompting by our *Mineral Mite* Bulletin Editor, Kathy Hrechka, Karen and I decided to make the journey to the American Federation of Mineralogical Societies meeting in Tulsa this July. An important motivation was to visit old friends in Memphis on the way. On Friday and Saturday, we enjoyed the show and vendors and talks, as well as some sights of Tulsa. We did not realize that Tulsa had old oil money, and were pleasantly surprised by the wonderful buildings, homes, and museums that we saw there. On Sunday morning we decided to attend the Bulletin Editors Breakfast and Awards ceremony, figuring we should get a better breakfast there than the freebie grub in our cheap motel. I also figured that I had a 100% chance of getting at least 5th Place in the Adult Articles category, based on an email from AFMS to Kathy that said I was one of five finalists.

I was surprised and delighted to find out that I had won First Place! I got a nice plaque and certificate and pin. Because I was actually present, unlike most people who won awards, I was photographed with the AFMS president, Richard Jaeger, and congratulated by all our new friends at the meeting.

I was surprised to find that my winning article was the Fourmarierite article, rather than the article about Becquerelite and Kasolite that had earlier won the first place award at the EFMLS competition.

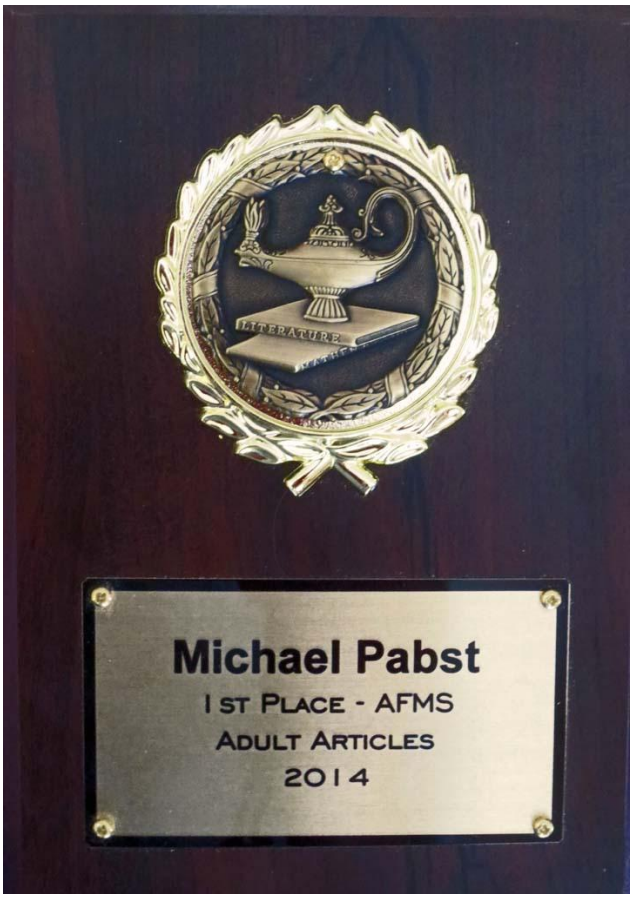
So, thanks, Kathy, for submitting my articles to the competition. On my own, I would never have thought to enter a competition.

I am glad that I did not know I was competing when I wrote the articles,
or my writing might have gotten stiff and formal. This has been a real treat for me, validating my second career as "amateur mineralogist."

Photo Michael & Karen Pabst

To celebrate these awards, we are reprinting the winning articles here (Part I and Part II on pages 5-6), and Michael has added a new article (Part III). All the articles are about secondary uranium oxides, which are such a beautifully colorful suite of minerals that we hope you will all enjoy seeing them again.

Part I: The following article won First Place in the Adult Articles competition at the American Federation of Mineralogical Societies AFMS competition in Tulsa this July.



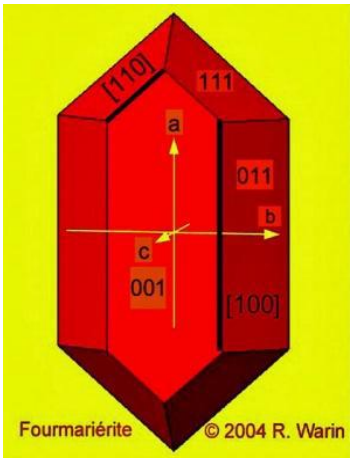
Fourmarierite

By Michael Pabst
(Reprinted from 9/2013)

(Our editor, Kathy Hrechka, asked me to coordinate a monthly column featuring a favorite micromineral, with a pretty picture and a short description. Because my collection is limited, I hope that our members will help me by contributing a photo of one of their favorites, or by bring in a favorite for me to photograph. Together we can add some background text, and create a short illustrated article. Let us also continue to provide Kathy with the Photo of the Month.)

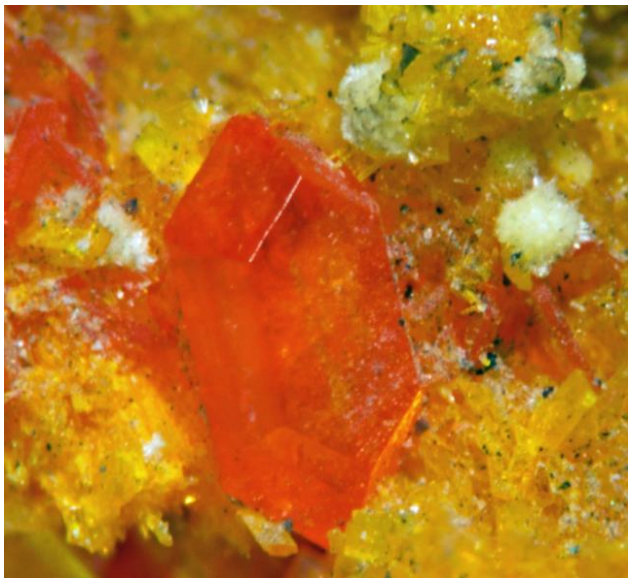
Recently, I have been studying secondary uranium minerals, of which Fourmarierite is a beautiful example. Fourmarierite was discovered at the famous uranium mine at Shinkolobwe, which is located in the Katanga Copper Belt of the present Democratic Republic of Congo, formerly Belgian Congo or Zaire.

It was discovered and named by Henri Buttgenbach in 1924 to honor Paul Fourmarier (1877-1970), Professor of Geology at the University of Liége, Belgium. The chemical composition of Fourmarierite is: $Pb(UO_2)_4O_3(OH)_4 \cdot 4H_2O$ It features uranium in a +6 oxidation state, giving it a bright orange color. Lead is also an essential element, which, together with uranium, contributes to the high density and high refractive index. Fourmarierite is orthorhombic, but its exact crystal structure has only recently been clarified. One ideal form is illustrated here:



Complete crystals of this form are rare, judging by the photos on www.Mindat.org and in the *Photo Atlas of Minerals*. Most specimens show only the top half of the form, so I hope that everyone will enjoy seeing this specimen:

This Fourmarierite crystal is nestled among other secondary uranium minerals, but I can only guess at their identity, probably Uranophane, Becquerelite, and Studtite. The whole assemblage is on a matrix of black uraninite (not visible). (Field of view of the picture is 2.5 mm, so the crystal is about 1 mm wide. This was taken through a stereomicroscope, and I used the image-processing program Combine ZP to stack 6 images to improve depth-of-field.)

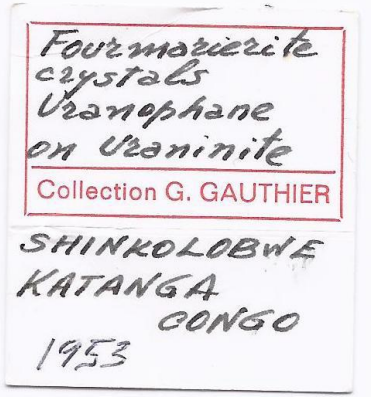


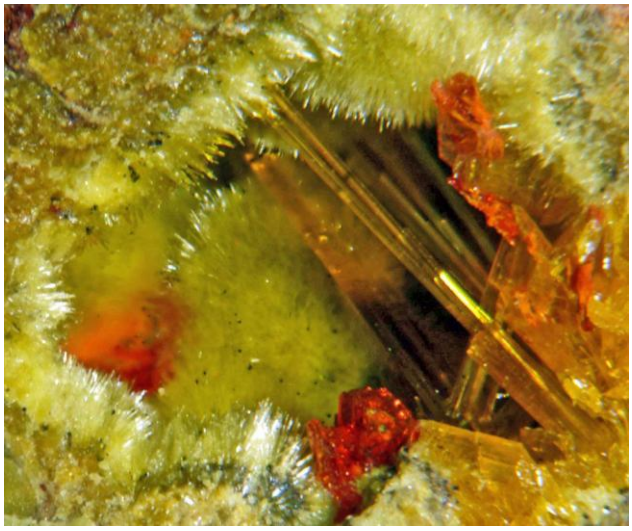
Fourmarierite photo courtesy of Michael Pabst

Page 6 shows a picture from another specimen shows "half" crystals of Fourmarierite (red-orange), along with prisms of Becquerelite (orange), and sprays of Uranophane (yellow), all in a vug in black uraninite:

(Field of view is 8 mm. Photographed through a stereomicroscope, using CombineZP to stack 10 pictures.)

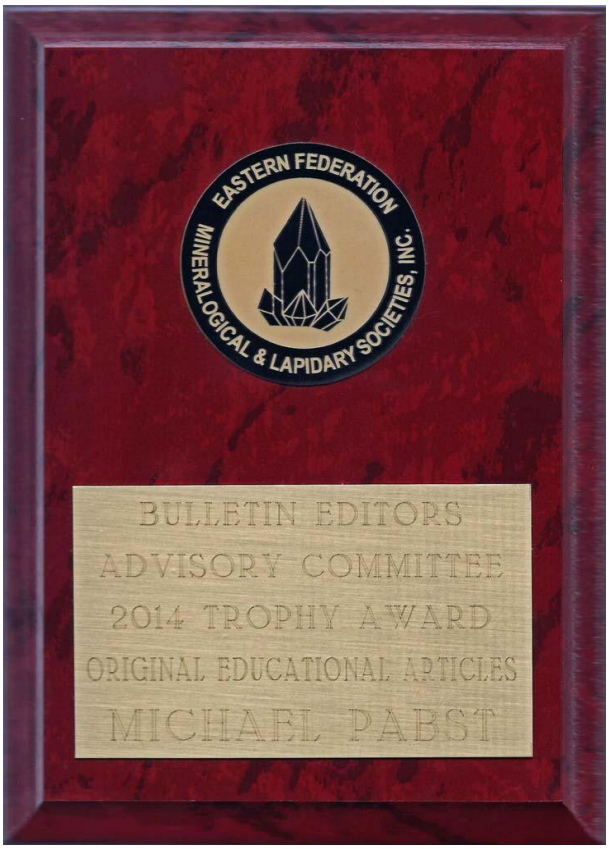
I purchased these specimens at different times many years ago from the Belgian dealer Gilbert Gauthier (1924-2006), who worked at Shinkolobwe as a geologist. He was a wonderful man whose charm helped to offset his prices!





Fourmarierite (red-orange), along with prisms of Becquerelite (orange), and sprays of Uranophane (yellow), all in a vug in black uraninite
Shinkolobwe, Katanga, Congo
Photomicrography by Michael Pabst

Part II: The following article won the Bulletin Editors Advisory Committee Trophy Award from the Eastern Federation of Mineralogical and Lapidary Societies (EFMLS) in the category of Original Educational Articles.



Becquerelite & Kasolite

By Michael Pabst
(Reprinted from 11, 2013)

In the September *Mineral Mite*, we saw pictures of Fourmarierite, and one of the pictures included Becquerelite as well. These are both hydrated secondary uranium oxides. Their chemical composition and crystallography are similar:
*Fourmarierite: $Pb(UO_2)_4O_3(OH)_4 \cdot 4H_2O$
Red Orthorhombic, *mm*2 - pyramidal
*Becquerelite: $Ca(UO_2)_6O_4(OH)_6 \cdot 8H_2O$
Orange Orthorhombic, *mm*2 - pyramidal
*Kasolite: $Pb(UO_2)[SiO_4] \cdot H_2O$
Yellow, Orange Monoclinic, 2/*m* - prismatic, β = 104.33° Another potential cause for confusion is that Becquerelite commonly contains Pb as an impurity. Nevertheless, good crystals of these two minerals are fairly easy to distinguish, because of the intense red color and unusual pseudohexagonal crystal habits of Fourmarierite.

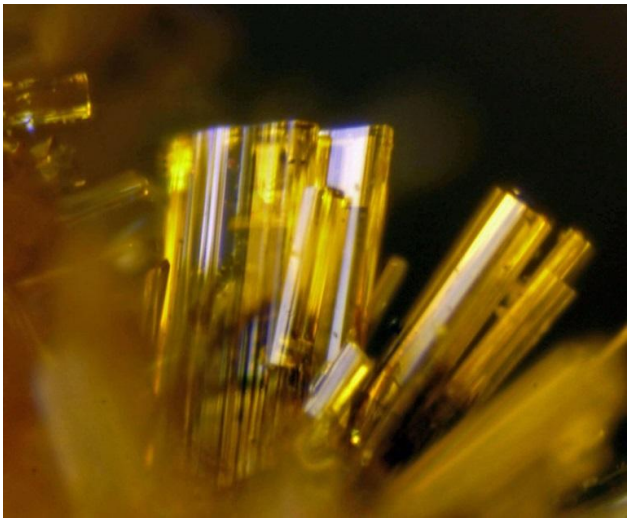
A more likely case for misidentification involves the third mineral in the table, Kasolite. Although Kasolite is a silicate, not an oxide, and Kasolite is monoclinic, rather than orthorhombic, the microcrystals of the three minerals look similar. Looking at tiny crystals through a microscope, it is difficult to distinguish an orthorhombic crystal with an angle $\beta = 90°$ from a monoclinic crystal with β = 104.33°. None of the other secondary uranium minerals is as red as good Fourmarierite, but less ideal crystals can be golden red or brown. Becquerelite is usually amber-yellow or lemon-yellow, but it can be yellow-orange. Kasolite shows many colors including yellow, orange, reddish orange, amber and brown. So color is not definitive for identification.

The type locality for all three of these uranium minerals is Shinkolobwe, Katanga, D R Congo. Two or three of these minerals can be found together on any given specimen. A host of other secondary uranium minerals may also be present. Thus, with many specimens, the label is probably not complete, even if it what is written is accurate. Kasolite is widely distributed. We saw yellow Kasolite from Musonoi, Katanga in the June *Mineral Mite* Photo of the Month, and another Musonoi specimen is pictured here.

Becquerelite and Kasolite

When I look at the pictures of Becquerelite on Mindat (www.mindat.org), some of the specimens look like Kasolite to me. There might be good data to support the identifications given, but I would have been fooled visually. In my specimens from Shinkolobwe, Becquerelite prisms have a flat termination or "roof", maybe sometimes with bevels, whereas Kasolite prisms always have a peaked "roof". That doesn't sound very scientific, but perhaps the pictures will help.

Kasolite, Shinkolobwe



Becquerelite, Shinkolobwe
Photomicrographer - Michael Pabst

Kasolite on Torbernite, Musonoi, Katanga, D R Congo

Kasolite and Torbernite, Shinkolobwe

I hope everyone enjoys seeing these secondary uranium minerals, because there are still more to come. The uranium minerals are beautiful specimens that I find hard to put away. There is always something more to be seen, and to guess whether a certain crystal is just another Kasolite, or perhaps something more exotic. All these crystals are no more than one mm long, so they are difficult to photograph as sharp images, even with stacking software. But after a long session photographing these crystals, I feel strangely ***Energized***!

Editor's Note:

I believe Michael Pabst has made an historical contribution for our club, while earning both the AFMS and the EFMLS trophies for his original micromineral articles in the BEAC 2013. Not only are his articles incredibly informative, he manages to master his own photomicrography.

I am grateful to Michael for contributing articles, and to our mineral club federations for providing a means for awarding club members who write articles for our newsletters.

Congratulations Michael!
Sincerely, Kathy Hrechka

Michael is shown here holding his EFMLS Trophy along with his article on Becquerelite & Kasolite