



Amazing Discoveries

Tom Campbell began collecting and studying fossils and minerals as a kid. Eventually his childhood hobby led to degrees in geology from the University of Akron and the South Dakota School of Mines & Technology, which turned into a career as a geologist.

While on that journey, Campbell, a Science Education Specialist at Sanford Lab, made some amazing discoveries. He was working on his master's degree helping his mentor Bill Roberts characterize some minerals when he heard the Tip Top mine was reopening near Custer, S.D.

"I got really excited because I'd never seen an operating pegmatite before," Campbell said. Pegmatite is a coarse-grained igneous rock similar in composition to granite in that it is an inverted-teardrop shaped or dike-like formations. You can see similar formations in the rhyolite dikes in the Open Cut.

On his first trip to Tip Top, Campbell discovered some tiny, very colorful minerals on beryl fractures. "We're talking millimeter sized minerals in red, white, pink and dark brown. That's really unusual."



Photo by Dan Behnke
Red montgomeryite crystal group. Largest crystal is 1.25 mm in length. T.J. Campbell specimen.

Campbell took his discoveries back to the School of Mines where he and Roberts began characterizing the minerals. "We looked at the most attractive one first—the red one—and it turned out to be montgomeryite, which wasn't a new mineral, but the color was a new occurrence."

They began working on Campbell's other samples using a scanning electron microscope. "As we looked at them, we thought, 'Yeah, these are bizarre.'" So they began doing additional tests to determine what elements they had. Eventually, they turned to Pete Dunn at the Smithsonian in Washington D.C. for help. To his delight, Campbell was invited to do an internship with Dunn.

"That was the ultimate internship for a grad student," Campbell said. "I was at the Hall of Gems and Minerals as a kid and loved it. As an intern, I got to go behind the scenes." He also was able to continue characterizing his minerals, working



Photo by Tom Campbell and the Smithsonian Institute

The tiptopite crystal was found in the Tip Top pegmatite. The image was taken using a scanning electron microscope.

alongside experts from the United States and Canada using specialized equipment.

Through the characterization process, he discovered the minerals were unlike any existing minerals. He named one fransoletite, which honors Dr. Andre-Mathieu Fansolet for his work with primary phosphate minerals; a second was named pahasapaite, from the Lakota word for the Black Hills; and a third was named tiptopite, for its first-noted appearance at the Tip Top mine. All were found at the Tip Top site and have not been found anywhere else.

"This was super exciting. One of those things you never expect to happen," Campbell said. "There about 5,000 known mineral species and only a dozen or so are found every year. It's kind of remarkable."

Learning Made Easy



Photo by Matt Kapust

For the past two months, Carissa Hauck was an intern with the Environmental, Health and Safety Department at Sanford Lab. A senior at Black Hills State University, Hauck transferred existing training components into modules she developed for online training.

"The modules have video, scenarios and embedded quizzes that allow people to do their training from anywhere," Hauck said. "The modules will be easy to use, like a PowerPoint presentation,

but more immersive and interactive."

Hauck works at BHSU doing much the same thing she did for EHS. "I help create programs that help students learn. It could be a quiz or a program that teaches students how to make a photo."

After graduation, Hauck, a business administration major, hopes to work in international relations, but believes it's good to have something to fall back on. "Tech-savvy people are highly marketable" she said.