

Mineral Locality Symposium Abstracts

October 25, 2008

Megan Shadrick, California State University, San Bernardino, Presentation: **Lasers in Geology: A Two Part Analysis in Destructive and Non Destructive Testing of Rocks and Minerals.** 25 October 2008, SCFM meeting, Barstow CA.

LASER technology (Light Amplification by Stimulated Emission of Radiation) has captured the imagination of our modern society. Lasers are found everywhere from grocery stores and night clubs to advanced medical and scientific research centers. In the geological sciences, lasers are utilized for both destructive and non destructive uses such as well bore drilling and spectroscopy. Non destructive scientific lasers utilize the optical properties of coherent, monochromatic light to measure various properties of a rock or mineral, such as the composition or temperature. Destructive applications of lasers require a high power laser to remove portions of rock without damage to the surrounding rock body. This technology is being used to repair or create art sculptures and complete drilling operations for the oil and gas industry. High power fiber laser research was conducted at Gas Technology Institute of Des Plaines, Illinois to show proof of concept for drilling and other operations. This research also included work on methane hydrates, acoustic tomography and concrete cutting applications. This research was conducted under the supervision of Dr. Samih Betarseh and Mr. Brian Gahan during two summer internships in 2004 and 2005.

Daniel Heaton: **An Overview of the Method and Applications of Whole Rock Analysis of San Antonio Canyon's Igneous Rock Assemblage through X-Ray Fluorescence.** 25 October 2008, SCFM meeting, Barstow CA.

By X-ray fluorescence (XRF) has been utilized as a geological tool since the 1980's. Despite new expensive technologies and analytical techniques, the XRF is still widely used for geochemical analysis. It is non-destructive, has a relatively low cost to run and operate and efficiently runs samples. Researches utilize the XRF to analyze and compare geochemical properties of rocks and minerals to aide them in their investigations. Such applications include the calculation of element partition coefficients of elements in rocks and minerals and determining the genesis of minerals in melts. XRF analysis was used to help investigate two similar plutonic rock assemblages near Sugarloaf Peak and west of Shinn road at a marble quarry of San Antonio Canyon, in the San Gabriel Mountain Range in Southern California, which would indicate 10 km of left-slip offset. The investigation was completed as part of a senior thesis requirement for Cal Poly Pomona. 32 samples were collected, described and analyzed using the XRF. The samples from both study areas were found to be geochemically similar but not enough to conclude that they were from the same source or event.

Stephanie Danielle Montgomery, California State University San Bernardino: **An Introduction to Mineral Identification Via X-Ray Diffractometer (XRD): The Powder Diffraction Method and Common Applications.** 25 October 2008, SCFM meeting, Barstow CA.

The x-ray diffractometer (XRD) is a non destructive tool used for determining the chemical composition of rock samples and other materials by using x-rays to measure the d-spacing within the material's crystal lattice. Doing so reveals the minerals present in a sample, as well as the respective amounts. The powder diffraction method is one methods used for XRD analysis. The powder method requires that the samples analyzed be powdered in order to produce an accurate reading of the sample's composition. This technique was used to determine the composition of evaporate crusts from Mahoney Lake in British Columbia, Canada. Secondly, it was used to find the amount of scheelite in rock samples collected from various locations, to be used in a comprehensive project focused on quantifying the reaction products, solubility, and dissolution rates of tungstate minerals in natural waters, which in turn will allow for refined computer modeling and an improved understanding of the origins and fate of W in natural waters. Interpreted XRD patterns revealed that the Mahoney Lake crust samples contained mostly the minerals bloedite and thenardite. Samples x-rayed to determine their scheelite percentages revealed that none of the collected samples had above 53% scheelite, which was not enough for use in future research.