



Behold Livermorium: A Quest for New Elements

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Thursday, March 7, 2019
6:00-7:15 pm
Building 2400, Room 2420
Free and open to the public

Abstract: The heavy element group at Lawrence Livermore National Laboratory has had a long tradition of nuclear and radiochemistry dating back to the 1950's. Some of the most exciting work has taken place in the last decade (in collaboration with the Flerov Laboratory of Nuclear Reactions in Dubna, Russia) with the discovery of six new elements - 113, 114, 115, 116, 117, and 118. By pushing the boundaries of the periodic table, we can start to answer some of the most fundamental questions of nuclear science, such as the locations of the next "magic numbers" of protons and neutrons, and the possibility of an "Island of Stability" where nuclides would have lifetimes much longer than those currently observed in the heaviest elements. We have seen evidence of extra-stability in the heaviest nuclides leading to half-lives that are long enough for us to perform chemistry on these isotopes one atom at a time. Work is underway on developing an automated chemical system that will be used for studying chemical properties of the heaviest elements including element 114 where the chemical properties are completely unknown. In this overview the discovery of these new elements and the chemical experiments in progress will be discussed.



Dawn Shaughnessy received a B.S. in Chemistry from the University of California at Berkeley in May of 1993. After graduating, she remained at Berkeley to pursue a Ph.D. with a focus on nuclear chemistry. She joined the research group of Professor Darleane Hoffman and received a Ph.D. in 2000. Her research focused on the delayed fission properties of isotopes of einsteinium, which were produced at the 88-Inch Cyclotron at Lawrence Berkeley National Laboratory. After finishing graduate school, Dawn began a postdoctoral appointment at Lawrence Berkeley National Laboratory studying the interaction of plutonium with naturally occurring manganese-bearing minerals for clean-up of nuclear materials in the environment. After completing her postdoc in 2002, she accepted a position at Lawrence Livermore National Laboratory in the Stockpile Radiochemistry Group. In 2010 she was appointed group leader for the newly created Nuclear and Radiochemistry Group, which is currently part of the Nuclear and Chemical Sciences Division at LLNL, and is also the lead for Nuclear Science and Radiochemistry in the Joint High Energy Density Sciences organization. In addition, she is the project leader of the LLNL heavy element program, which announced discovery of element 117 in April of 2010. In May of 2012, it was also announced by the International Union of Pure and Applied Chemistry that element 116 would be officially known as "livermorium", an honor granted to the LLNL heavy element program in recognition of their years of research. Dawn's general research interests include actinide and heavy element chemistry, chemical automation, nuclear forensic methods and the study of nuclear reactions and fission. She has been a staff chemist at LLNL for 16 years. Most recently she was awarded the DOE Office of Science Outstanding Mentor Award (2010), the Gordon Battelle Prize for Scientific Discovery for the discovery of element 117 (2010), was inducted into the Alameda County Women's Hall of Fame for Scientific Discovery (2012) and was named number 9 of the 100 most creative people in business by *Fast Company* (2016).