



CHEMISTRY DEPARTMENT SEMINAR



Plutonium Chemistry and the Battlefields of the Cold War

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The Cold War rivalry between the United States and the Soviet Union lasted for much of the second half of the 20th Century. While the superpowers never engaged directly in full-scale armed combat, a nuclear arms race became the centerpiece of a doctrine of mutually assured destruction, and prompted a mass production of plutonium, and the designing, building, and testing of large numbers of nuclear weapons. In more than 50 years of operation, the Cold War battlefields created over 100 metric tons of plutonium, produced tens of thousands of nuclear warheads, oversaw more than 1000 detonations, and left behind a legacy of contaminated facilities, soils, and ground water. The extent of long-term adverse health effects will depend on the mobility of plutonium and other actinides in the environment and on our ability to develop cost-effective scientific methods of removing or isolating actinides from the environment.

I will summarize our current understanding of plutonium chemistry in the environment, and how that understanding was used in the decontamination and decommissioning of the Rocky Flats Site, where plutonium triggers for U.S. nuclear weapons were manufactured. At Rocky Flats, synchrotron radiation measurements made at the Stanford Synchrotron Radiation Laboratory were developed into a science-based decision-making tool that saved billions of dollars by focusing Site-directed efforts in the correct areas, and aided the most extensive cleanup in the history of Superfund legislation to finish one year ahead of schedule, ultimately resulting in billions of dollars in taxpayer savings.



January 31st Friday @ 2.00 p.m. – Lopez 106