Livermorium and Flerovium join the periodic table of elements

May 31 2012, by Anne M Stark

(Phys.org) -- The International Union of Pure and Applied Chemistry (IUPAC) today officially approved new names for elements 114 and 116, the latest heavy elements to be added to the periodic table.

Scientists of the Lawrence Livermore National Laboratory (LLNL)-Dubna collaboration proposed the names as Flerovium for element 114, with the symbol Fl, and Livermorium for element 116, with the symbol Lv, late last year.

Flerovium (atomic symbol Fl) was chosen to honor Flerov Laboratory of Nuclear Reactions, where superheavy elements, including element 114, were synthesized. Georgiy N. Flerov (1913-1990) was a renowned physicist who discovered the spontaneous fission of uranium and was a pioneer in heavy-ion physics. He is the founder of the Joint Institute for Nuclear Research. In 1991, the laboratory was named after Flerov --

Flerov Laboratory of Nuclear Reactions (FLNR).

Livermorium (atomic symbol Lv) was chosen to honor Lawrence Livermore National Laboratory (LLNL) and the city of Livermore, Calif. A group of researchers from the Laboratory, along with scientists at the Flerov Laboratory of Nuclear Reactions, participated in the work carried out in Dubna on the synthesis of superheavy elements, including element 116. (Lawrencium -- Element 103 -- was already named for LLNL's founder E.O. Lawrence.)

The IUPAC states Livermorium was chosen because over the years scientists at Livermore have been involved in many areas of nuclear science: the investigation of fission properties of the heaviest elements, including the discovery of bimodal fission, and the study of prompt gamma-rays emitted from fission fragments following fission; the investigation of isomers and isomeric levels in many nuclei; and the investigation of the chemical properties of the heaviest elements.

"These names honor not only the individual contributions of scientists from these laboratories to the fields of nuclear science, heavy element research, and superheavy element research, but also the phenomenal cooperation and collaboration that has occurred between scientists in these two countries," said Bill Goldstein, associate director of LLNL's Physical and Life Sciences Directorate.

Scientists at LLNL have been involved in heavy element research since the Laboratory's inception in 1952 and have been collaborators in the discovery of six elements -- 113,114,115,116,117 and 118.

Livermore also has been at the forefront of investigations into other areas related to nuclear science such as cross-section measurements, nuclear theory, radiochemical diagnostics, separations chemistry including rapid automated aqueous separations, actinide chemistry,

heavy-element target fabrication and nuclear forensics.

The creation of elements 116 and 114 involved smashing calcium ions (with 20 protons each) into a curium target (96 protons) to create element 116. Element 116 decayed almost immediately into element 114. The scientists also created element 114 separately by replacing curium with a plutonium target (94 protons).

The creation of elements 114 and 116 generate hope that the team is on its way to the "island of stability," an area of the periodic table in which new heavy elements would be stable or last long enough for applications to be found.

The official names will be published in the July issue of the IUPAC journal, *Pure and Applied Chemistry*.

Provided by Lawrence Livermore National Laboratory

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