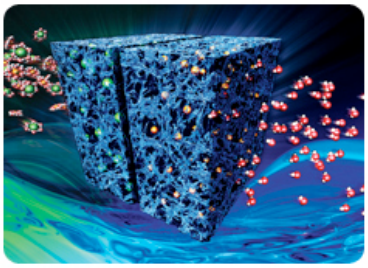
LIVERMORE LAB
# REPORT

**A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Aug. 6-10, 2012**

## R&D TECHNOLOGY WORTH ITS SALT



**The new desalination technique uses porous carbon material so the feed stream passes directly through the electrodes.**

Laboratory researchers have developed a new capacitive desalination technique that could ultimately lower the cost and time of desalinating seawater.

The new technique uses new porous carbon materials, which allows the saltwater to easily flow through a set of electrodes.

Flowing through the electrode allows for several significant advantages relative to traditional flow between systems, including faster desalination, more salt removed for each charge of the capacitor, and more energy efficient desalination.

The desalination process now takes as long as it takes to charge the electrodes, on the order of minutes or less. And it removes the salt five to 10 times faster than previous systems.

To read more, go to *R&D Magazine*.

## TheGuardian NIGERIA LIVERMORE FINDS ITS PLACE


The Laboratory and the city of Livermore have found their place on the Periodic Table of Elements.

The International Union of Pure and Applied Chemistry (IUPAC) earlier this year 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-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.

Livermorium (atomic symbol Lv) was chosen to honor Lawrence Livermore and the city of Livermore, Calif. A group of researchers from the Laboratory, along with scientists at the Flerov Laboratory of Nuclear Reactions in Russia, 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.)

To read more, go to *The Guardian*.

HPC wire GOING TO EXTREMES

**The Laboratory is home to Sequoia, the world's fastest supercomputer.**

You could say that supercomputing at the Laboratory is an extreme sport. And the Department of Energy (DOE) is putting its name behind it.

Under an initiative called FastForward, the DOE, Office of Science and the National Nuclear Security Administration (NNSA) have awarded $62 million in research and development (R&D) contracts to five leading companies in high performance computing to accelerate the development of next-generation supercomputers vital to national defense, scientific research,

energy security and the nation's economic competitiveness. The program is managed by Lawrence Livermore.

AMD, IBM, Intel, Nvidia and Whamcloud received awards to advance "extreme scale" computing technology with the goal of funding innovative R&D of critical technologies needed to deliver next generation capabilities within a reasonable energy footprint.

DOE missions require exascale systems that operate at quintillions of floating point operations per second. Such systems would be 1,000 times faster than a 1-petaflop (quadrillion floating point operations per second) supercomputer. Currently, the world's fastest supercomputer -- the IBM BlueGene/Q Sequoia system at Lawrence Livermore -- clocks in at 16.3 petaflops.

To read more, go to *HPC Wire*.

C&EN PERSONALIZED MEDICINE

**The Laboratory's National Resource for Biomedical Accelerator Mass Spectrometry.**
Former Lawrence Livermore staff scientist Paul Henderson is using accelerator mass spectrometry (AMS) to test for resistance to chemotherapeutic drugs based on measurement of a drug bound to DNA in patient samples.

The Laboratory is a pioneer in AMS, which is a highly sensitive technique that can separate rare isotopes even at extremely low concentrations. In the case of medication, AMS could allow doctors to personalize the doses depending on the patient.

LLNL researchers had been using the technique for toxicology studies of radiolabeled drugs when it occurred to them that it could be used in diagnostic applications. Henderson took it one step further and wondered if you administered a microdose of chemotherapy, and then take a sample from the tumor, does the level of DNA damage in that tumor sample then correlate to how that tumor would respond to the full-dose therapy?

Turns out Henderson's assessment was right and he launched Accelerated Medical Diagnostics, which is conducting clinical trials with lung and bladder cancer patients.

To read more, go to *Chemical & Engineering News*.

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LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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