BROOKHAVEN NATIONAL LABORATORY

Laboratory Link

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Scientists Create New Material

- For the first time, scientists have created a material containing tiny particles in decreasing concentrations along its length. The material consists of a silica surface containing nanoparticles of gold in a layer that changes from very dense to very sparse. It was developed at North Carolina State University and tested at Brookhaven's National Synchrotron Light Source.

- The material provides the first evidence that nanoparticles — each about one thousand times smaller than the diameter of a human hair — can form a gradient of decreasing concentration along a surface.

- The ability to vary and control the concentration of captured particles allows chemists and other scientists to devise sensors, filters, DNA-screening processes and, potentially, single-electron capacitors and transistors, among other possibilities.

- Such filters could also be designed to detect or capture harmful viruses or toxins. The controlled distribution of particles also allows rapid testing of potential catalysts — always in demand by chemical, pharmaceutical and petroleum industries -— because numerous substances and variations in their amounts can be tested simultaneously.

Mount Sinai Student Studies Adult/Child Fingerprint Differences

- Children's fingerprints on objects can disappear faster than those of adults. This little-known fact can hamper investigations of kidnapping cases, which have been so prevalent in the news this summer. Lara Hershcovitch, who will be a senior at Mount Sinai High School this September, used an infrared microscope at the National Synchrotron Light Source (NSLS) in an experiment to determine why this effect occurs.

- In her experiment, Lara studied fingerprints from fathers and their young sons, ages 5-8, to determine the differences in chemical composition between the fathers' and sons' prints. Her data analysis may eventually be published in a scientific journal, and it could lead to more effective forensic investigations.

Working on the fingerprinting project are: (from right) Lara Hershcovitch, Lisa Miller, a Brookhaven scientist who volunteered to mentor Hershcovitch, and Jackie Tetenbaum, an NSLS guest technical collaborator.

- Lara is a participant in Brookhaven's Community Summer Science Program, managed by the Lab's Office of Educational Programs and funded by Brookhaven Science Associates. Through this program, 26 high school students spent six weeks at the Laboratory this summer participating in hands-on workshops or in research internships.

(over)

Scientists Determine Age of New World Map

- Scientists from the University of Arizona, Brookhaven Lab, and the Smithsonian Institution have used carbon-dating technology to determine the age of a controversial parchment that might be the first-ever map of North America.
- The scientists conclude that the so-called “Vinland Map” parchment dates to approximately 1434 A.D., or nearly 60 years before Christopher Columbus set foot in the West Indies.
- The map shows lands known by 15th-century travelers, including Europe, Asia, and the Far East, but also shows the “Island of Vinland,” which has been taken to represent an unknown part of present-day Labrador or Newfoundland.
- Text on the map reads, in part, “By God's will, after a long voyage from the island of Greenland to the south toward the most distant remaining parts of the western ocean sea, sailing southward amidst the ice, the companions Bjarni and Leif Eiriksson discovered a new land, extremely fertile and even having vines, ... which island they named Vinland.”
- Many scholars have agreed that if the Vinland Map is authentic, it is the first known cartographic representation of North America, and its date would be key in establishing the history of European knowledge of the lands bordering the western Atlantic Ocean. "If it is, in fact, a forgery, then the forger was surely one of the most skillful criminals ever to pursue that line of work," said chemist Garman Harbottle, the lead Brookhaven researcher on the project.

Vegetable Oil In Hydraulic Systems

- The Laboratory's garbage truck is soon to be retrofitted to use vegetable oil in its hydraulic system. Two Brookhaven employees — Peter Pohlot, an environmental professional, and Kenneth Mohring, a Staff Services Division environmental coordinator — thought of the idea for the Laboratory’s 2002 Pollution Prevention program.
- Every year since 1991, Brookhaven has asked its employees to submit proposals for reducing waste and emissions, thereby protecting the environment and cutting waste-management costs. This year, eight out of 21 proposals were selected. While they will cost $120,000 to implement, the expected return on investment is $268,000 per year.
- Vegetable oil is being used in a motor-pool hydraulic lift system at the Laboratory, and a proposal to use vegetable oil-based hydraulic fluid for the balance of the five motor-pool hydraulic lift systems will also be implemented. The Lab has a fleet of 335 vehicles.
- While petroleum-based fluids are dangerous for the environment and expensive to clean up, vegetable-oil hydraulic fluid is biodegradable. Once it is on the ground, it is consumed by naturally occurring microorganisms.

Events Open to the Public

- *Spanish Flamenco Music, Dance, September 21, 7 p.m., Berkner Hall.* The BERA Hispanic Heritage Club will present a Spanish Classical and Flamenco Concert featuring the Sol y Sombra Spanish Dance Company. Tickets are $10 for adults, $5 for children under 12, and are available at the BERA Sales Office in Berkner Hall from 9 a.m. to 3 p.m. Only cash or checks are accepted. At the door, adult tickets will be $12 each, children’s tickets will remain at $5.