

## XVI International Materials Research Congress Held in Mexico

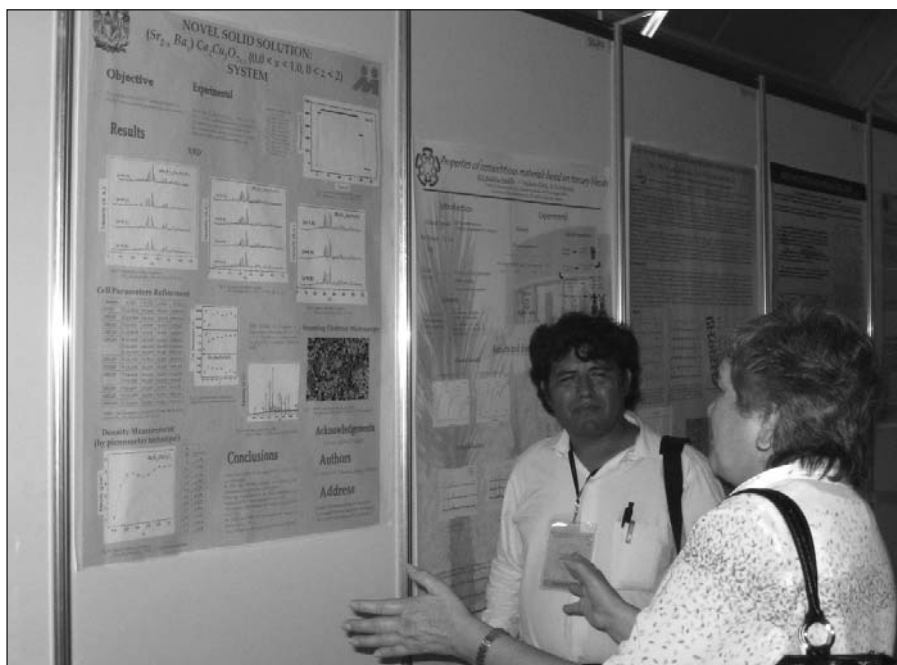
The XVI International Materials Research Congress (IMRC-2007) was held in Cancún, México, on October 29–November 1, 2007. The conference was rescheduled from August due to the threat from Hurricane Dean. The Congress was conducted by the Mexican Academy of Materials Research Science (MRS-Mexico) in conjunction with the VI Congress of the National Association of Corrosion Engineers (NACE)-International-Mexico section. With the participation of materials researchers from various countries in the Americas, Europe, and Asia, including four plenary speakers and over 100 invited speakers in addition to contributed talks and poster presentations, attendees were able to discuss new directions being developed in materials science and technology. Also, participants discussed a number of advances being made in corrosion, synthesis, characterization, properties, processes, applications, and trends in basic research and education in materials research. The Congress also included an equipment exhibit and tutorials.

In the opening presentation of the Congress, Juan Méndez Nonell, director of CIQA and president of the Materials Science Mexican Academy, emphasized the relevance of the conference to stimulate the development and pursuit of new knowledge connected to Mexico's technological future.

Among the Mexican-based highlights were presentations in the symposium on Archaeological and Arts Issues in Materials Science and on Ecomaterials and Global Warming. Accurate assays of the amount of gold or other precious metals in a sample have always been important in determining its value, which presented a driving force to improve methods for such analysis. The profession of "ensayador," or "assayist" was a respected one. In the symposium on Archaeological and Arts Issues, Francisca Franco Velasquez of the Universidad Autonoma Metropolitana-Azcapotzalco described a "fire assay" method developed in the 17th century and adopted as a standard in 1723. The method was basically an "assay of gold by fire based on experimental oxidation of a metallic oxide." Heating impure metal samples to 750–850°C with appropriate melting reagents results in two liquid phases: a silica-based slag and a metallic phase containing lead oxide and the gold and silver it "collects." A series of chemical reactions involving acidic  $\text{HNO}_3$  and basic  $\text{NH}_4\text{OH}$  separates the lead, silver, and gold so that the precious metals can



Meeting Organizers (left to right): Romeo de Coss, Jose Luis Mora, Juan Mendez Nonell, Pedro Hugo Hernandez Tejada, and Jorge Lopes Cuevas.



Poster session discussions.

be assayed. Velasquez performed this fire assay on artifacts from the Fisherman's Treasure, a collection of gold objects found in the Gulf of Mexico. A comparison of the fire assays with modern energy dispersive spectroscopy assays on these samples confirms that the ancient technique accurately determined the gold quantities in samples.

In the latter symposium, E. Custodio-Garcia of Universidad Juarez Autonoma

de Tabasco described how Tabasco, Mexico is dominated by a PEMEX oil refinery, which provides jobs for almost all of the surrounding population. However, the area also has a lot of fertile land to grow plants capable of being converted into biodiesel fuel products. Custodio-Garcia estimates that there are 2,000 hectares of land available for production of palm oil and castor oil. While the federal government is discussing a law



Attendees with balloons dance late into the night at the conference banquet.

governing bioenergy and subsidizing the price of gasoline and diesel fuel, Custodio-Garcia and his co-workers are building a pilot plant to produce 20,000 liters of biodiesel fuel from locally grown vegetable oils, with the full cooperation of PEMEX and the government, and with university and private funding support. They have established the Center for Investigation of Alternative Energy in Tabasco, and the pilot plant is almost completed. Their business plan shows that they can eventually produce large volumes of biodiesel at prices lower than con-

ventional, petroleum-based diesel fuels.

Plenary speaker Jurrian Schmitz of the University of Twente, the Netherlands, gave a unique perspective on Moore's law. Schmitz said that the doubling of the number of transistors on an integrated circuit every two years is beneficial for industrial companies and that these companies have perfected their technology. "The technological challenge is how to combine electronics with sensors, actuators, and optical components," Schmitz said. His research group at the University of Twente is concentrating on a technolo-

gy called "wafer post-processing." This involves purchasing complementary metal oxide semiconductor (CMOS) wafers right from the fabrication laboratory, adding functionality through a post-processing step, dicing the wafer into separate functional components, and then packaging the products. A key consideration in this process is to leave the CMOS intact while adding the functional units. This requires careful treatment involving temperatures less than 400°C, mild (or no) plasmas, maintenance of the hydrogen balance to avoid hydrogen outgassing, and placing little mechanical stress on the wafer. To accomplish this, Schmitz and co-workers have developed a process by which they cool the CMOS substrate while heating the surface using laser annealing. This enables them to build second layers of CMOS devices on top of a first layer. Possible applications involve adding light projectors, CMOS imagers, or radiation imaging detectors on top of CMOS substrates. The research group has already built a detector that they believe images cosmic radiation better than any device currently available. To paraphrase Richard Feynman, "There's plenty of room at the top (of the microchip)," Schmitz said.

The organizers of IMRC-2007 established important communication channels with other Materials Research Societies around the world. For the first time, the Congress's three recipients of the Best Poster Award also displayed their posters at the 2008 MRS Spring Meeting.

More research highlights and coverage of the plenary lectures can be accessed at [www.mrs.org/meetings](http://www.mrs.org/meetings). IMRC-2008 will be held in Cancún on August 17–21, 2008. More information can be obtained from the Congress Web site at <http://imrc2008.com>.

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