

Electron paramagnetic resonance (EPR) spectroscopy was used to examine the photoexcited nanostructures. Photoexcitation of structures with single-stranded DNA attached to the TiO₂/DA nanostructure showed the same EPR signature as for photoexcitation of the TiO₂/DA nanostructure alone. According to the researchers, this indicates that the charge separation in the single-stranded DNA/DA/TiO₂ nanostructure is terminated at the dopamine and never reaches the DNA. Double-stranded DNA/DA/TiO₂ nanostructures were obtained by hybridizing the attached oligonucleotides with their complementary strands. EPR studies of the double-stranded DNA/DA/TiO₂ nanostructures showed that charge separation into the DNA occurs.

The researchers also used silver reduction studies to confirm these results. Silver ions act as receptors for photogenerated electrons, and silver metal precipitates preferentially on the TiO₂ if excess electrons are available. Deposition of silver onto the TiO₂ was monitored for double-stranded DNA/DA/TiO₂, single-stranded DNA/TiO₂, and DA/TiO₂ nanostructures. More silver was found to deposit on the double-stranded structures than the other two structures, consistent with the interpretation of the EPR studies.

The researchers said that by using the interface of a nanocrystalline metal oxide semiconductor linked to a DNA molecule to probe DNA recognition, they have shown that the binding of DNA molecules to nanocrystalline metal oxide parti-

cles yields a photoelectrochemical system that can be used to perform extended pair-charge separation, a technique that finds application in constructing sensors for DNA hybridization. An important aspect of the work is that, since the nanoparticles are photoresponsive and therefore serve as a source of photogenerated charges, they can act as reporters of the electronic properties of the biomolecules. The researchers conclude that similar approaches may be used to detect DNA binding due to the change of redox properties of DNA molecules, and that the method opens doors to a new class of site-specific biomolecule electronic sensors and electronically tunable site-specific metal oxide catalysts.

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News of MRS Members/Materials Researchers

Ronald W. Armstrong, a senior scientist in the Munitions Directorate of the Air Force Research Laboratory at Wright-Patterson Air Force Base in Ohio and professor emeritus at the University of Maryland College Park, has been honored by the Minerals, Metals, and Materials Society and the American Institute of Mining and Metallurgical Engineers for his lifetime achievement by sponsoring a symposium in his honor at the TMS 132nd annual meeting and exhibition held in San Diego, Calif. Armstrong's main efforts involved energetic material technologies and promoting collaboration with non-U.S. governments and organizations, other services and agencies, universities,

and industry, as relevant to the directorate thrusts and long-range goals of involving energetic materials and their uses.

Steven Chu, professor in the Physics and Applied Physics Departments at Stanford University, has been named director of Lawrence Berkeley National Laboratory.

Gustavo A. Cragolino has been promoted to Institute Scientist in the Center for Nuclear Waste Regulatory Analyses at Southwest Research Institute (SwRI) by the U.S. Nuclear Regulatory Commission. The position is among the highest technical positions an SwRI staff member can attain.

Mary L. Good, dean of the Donaghey

College of Information Science and Systems Engineering at the University of Arkansas, Little Rock, received the 2004 Vannevar Bush Award from the National Science Board of the National Science Foundation for her lifelong contributions to science, engineering, and technology, and for leadership throughout her multifaceted career.

Donald Paul of the University of Texas at Austin has been named a fellow of the Society of Plastics Engineers.

Xie Sishen has been appointed principal investigator of China's National Center for Nanoscience and Nanotechnology.

The American Academy of Arts and Sciences has announced the election of 2004 fellows and foreign honorary members, including:

A. Paul Alivisatos, professor of chemistry at the University of California, Berkeley;

Moungi Gabriel Bawendi, professor of chemistry at the Massachusetts Institute of Technology;

Arden L. Bement Jr., director of the National Institute of Standards and Technology;

Murray S. Daw, R.A. Bowen Pro-

fessor of Physics at Clemson University;

Subra Suresh, Ford Professor of Engineering and department head, Massachusetts Institute of Technology; and

Herbert Gleiter, director of the Institute of Nanotechnology, Germany. □

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