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Oil make you pay

Can we afford the real price of liquid gold

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Cover Image

Biomimetic engineered structures with nanometer-scale hydrophobic bands act like native membrane proteins, tightly integrating into lipid bilayers. This design provides an intimate interface between inorganic materials and biological cells that could be used to access the cell's interior with little damage.

Courtesy of Professor Nicholas A. Melosh
Department of Materials Science and Engineering,
Stanford University, 476 Lomita Mall, Stanford CA 94305

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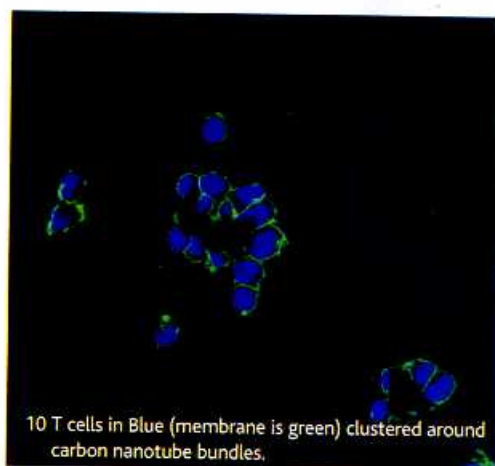
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9 Nonlinear acoustic lens in the biomedical field.



10 T cells in Blue (membrane is green) clustered around carbon nanotube bundles.



13 Development of a new breed of micro-supercapacitor



Lead story 14

Dynamic actuation using nano-bio interfaces
The nanoscale dimensions, sensitive electronic control, and flexible architecture of new generations of nanomaterials and nanofabrication techniques hold immense promise not only for electronic devices, but also biological interfaces. While stellar examples have been demonstrated for biomolecular detection and imaging, exciting new possibilities for long-term integration and dynamic stimulation are now emerging.
Ian Y. Wong, Benjamin D. Almquist, and Nicholas A. Melosh

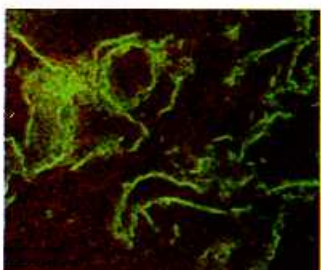
Surface science: What lies beneath?



■ Review 24

Self-assembly of block copolymer thin films
In this review, we discuss the roles of surface and interfacial effects on self-assembly, with a specific focus on confinement, substrate surface modification, and thermal and solvent annealing conditions. Finally, we comment on novel techniques for manipulating and characterizing thin films, motivating the use of gradient and high-throughput methods for gaining a comprehensive picture of self-assembly to enable advanced nanotechnologies.

Julie N. L. Albert and Thomas H. Epps, III



■ Review 34

Colloidal self-assembly at an interface
Mix a drop of water into a vial of oil. With some surfactant and a vigorous shake, that one droplet has become thousands, and the total interfacial area has increased by an order of magnitude or more. Like the folded membranes in our mitochondria, the alveoli in our lungs, and the catalytic converters in our cars, oil-water emulsions contain a vast reservoir of interfacial area that can be used to control and transform the things that encounter it.

Ryan McGorty, Jerome Fung, David Kaz, Vinodhan N. Manoharan

Next issue

Materials Today takes a look at nanotechnology and sensors

Materials science breakthroughs in chemical sensors

For the past decade, Byrne et al. have been investigating strategies to develop ways to provide chemical sensing platforms capable of long-term deployment in remote locations.

Metal oxide nanowires as chemical sensors

It is almost a decade from the first presentation of metal oxide nanowires as chemical sensors. Significant advances have been made both in terms of preparation procedures and their integration into functional sensing devices.

Immunosensing using nanoparticles

Immunosensing technology is taking special advantages from the latest developments in material science in general and particularly from the nanomaterials field.

Supramolecular porphyrin assemblies

Porphyrins show unique binding properties that are widely exploited in Nature to accomplish essential functions for life; the potential mimic of these functions with synthetic counterparts has provided the basis of many kind of chemical sensors.

