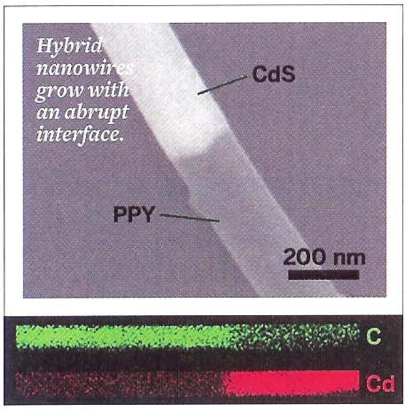
## LIGHT-CONTROLLED NANOWIRES

Researchers in China have prepared hybrid organic-inorganic semiconducting nanowires where electrical conductivity can be switched on and off with light (*J. Am. Chem. Soc.* **2008**, *130*, 9198). The study broadens understanding of photoelectrical phenomena on the nanometer scale and may lead to new types of miniature circuits. Yanbing Guo, Yuliang Li, and coworkers at the Chinese Academy of Sciences' Institute of Chemistry, in Beijing, used porous templates to grow nanowires composed of polypyrrole (PPY) and cadmium sulfide. On the basis of single-nanowire microscopy images (top) and elemental maps (bottom), the team reports that the nanowires, which measure 200–400 nm in diameter, grow with an abrupt interface between the CdS and PPY segments. Furthermore, they find that unlike pure CdS or pure PPY nanowires, the hybrid structures' electrical conductivity can be controlled with light. In the dark, the hybrid nanowires are insulators. Under illumination, however, their capacity for carrying electrical current varies strongly with the intensity of the radiation.

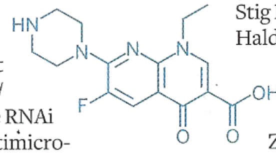



*Hybrid nanowires grow with an abrupt interface.*

YULIANG LI/CHINESE ACADEMY OF SCIENCES

## ANTIBIOTIC BOOSTS RNA INTERFERENCE

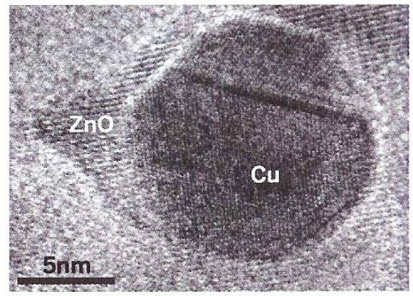
An FDA-approved antibiotic makes the gene-silencing technique known as RNA interference (RNAi) more effective in the laboratory, according to a new report (*Nat. Biotechnol.*, DOI: 10.1038/nbt.1481). The small-molecule RNAi booster, a fluoroquinolone antimicrobial called enoxacin, may help scientists learn more about how RNAi machinery works. A multi-institution team led by Peng Jin of Emory University discovered this trait of enoxacin by using a cell-based assay that can detect enhancers and inhibitors of gene silencing. RNAi enhancement is not a general property of fluoroquinolones, the authors write, since most other variants had little to no effect on gene silencing. They propose that enoxacin works by facilitating the interaction between specialized RNAs and a part of the protein complex involved in silencing. Outside experts say that enoxacin could theoretically lower the needed doses of therapeutic RNAs, thereby reducing the chance of side effects, but they emphasize that more work is needed to verify that possibility. Emory has licensed the technology to Effigene Pharmaceuticals, an Atlanta-based company cofounded by Jin that focuses on RNAi technology for studying and treating diseases.



**Enoxacin**

## CATALYSTS UNDER PRESSURE

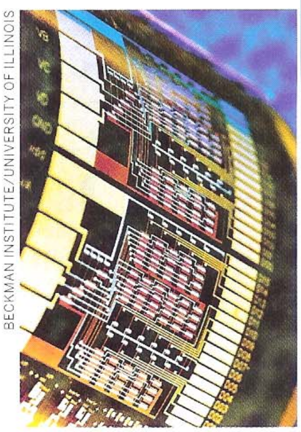
A team of researchers has recorded atomic-resolution transmission electron microscopy (TEM) images of catalyst particles (shown) while the solids were exposed to relatively high pressures of reactive gas (1 atm $H_2$) and heated to 500 °C (*Ultramicroscopy*, DOI: 10.1016/j.ultramic.2008.04.014). The imaging experiment, which was conducted at 100 times greater pressure than in previous TEM studies, may lead to new ways of probing materials that undergo subtle but important structural changes as chemical reactions proceed on their surfaces. Generally, researchers aiming to record atomic-resolution TEM images conduct their experiments under high vacuum and at moderate temperatures because higher pressures and temperatures limit resolution and image quality. The usual imaging conditions, however, differ greatly from typical industrial catalytic reaction conditions, which may alter a catalyst's structure from an inactive to a catalytically active form. To get an up-close view of catalysts under demanding conditions, J. Fredrik Creemer of Delft University of Technology, in the Netherlands; Stig Helveg of catalyst manufacturer Haldor Topsøe, in Denmark; and coworkers designed a TEM-compatible microreactor and used it to probe a Cu/ZnO methanol-synthesis catalyst. While activating the catalyst at high temperature in hydrogen, the team directly observed the growth, structure, and evolution of copper nanocrystals with angstrom resolution on a subsecond timescale.




DELFT U. TECHNOLOGY & HALDOR TOPSØE

## FLEXIBLE CIRCUITS FROM CARBON NANOTUBES

Random networks of single-walled carbon nanotubes can be used to construct high-performance integrated digital circuits on flexible plastic substrates, according to a new study (*Nature* **2008**, *454*, 495). The work advances the possibility of developing low-cost electronic displays and other devices that are more flexible, lightweight, and shock resistant than similar devices based on traditional silicon wafers or other rigid substrates. Earlier work in several labs has focused on developing flexible circuitry by using semiconducting small organic molecules and various types of polymers. Compared with electronics based on those materials, the carbon-nanotube circuits—designed and fabricated by John A. Rogers of the University of Illinois, Urbana-Champaign, and coworkers—show superior charge-carrier mobilities, operating voltages, switching speeds, and other electronic properties. George Grüner, a professor of physics and astronomy at UCLA, calls Rogers' work a proof-of-concept experiment. These flexible circuits could become "a paradigm-changing technology," Grüner says.



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***Networks of carbon nanotube transistors result in high-powered, lightweight, flexible integrated circuits.***