

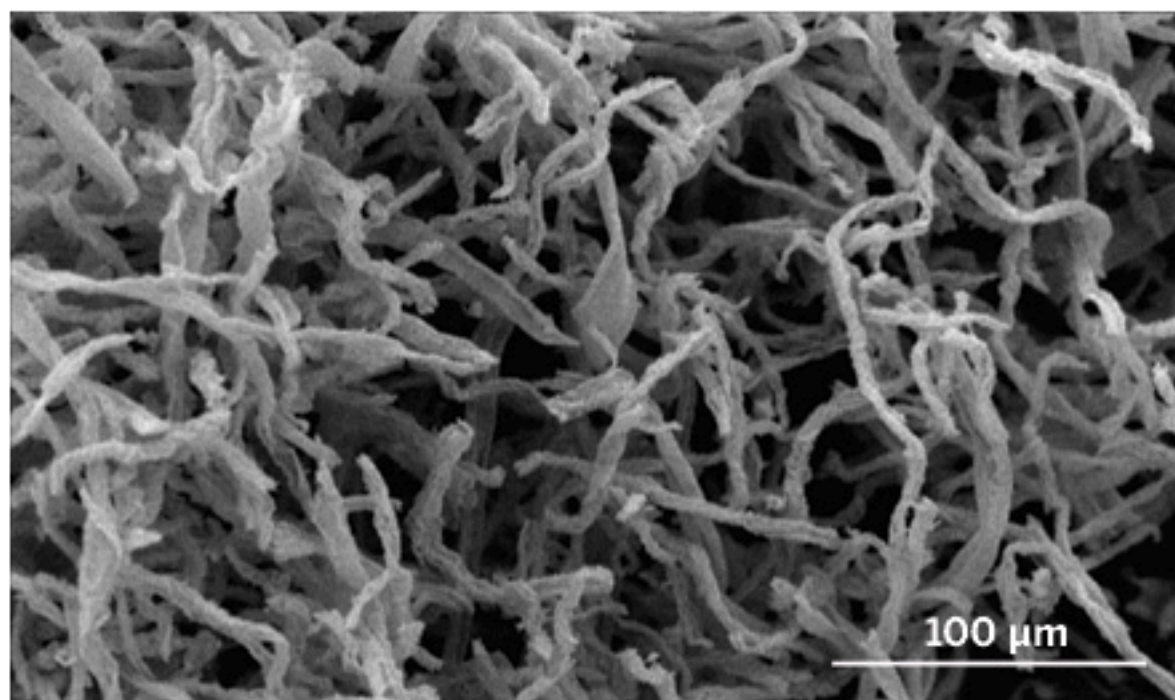


MAY 17, 2010 | VOLUME 88, NUMBER 20 | P. 29

Hollow Titania Fibers Improve Solar Cells

TiO₂ fibers made on a cotton template outperform TiO₂ particles in photovoltaic device tests

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Nano Lett.

An SEM image reveals TiO₂ nanofibers made from a cotton fiber template.

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Electrodes made from hollow titanium dioxide fibers outperform ones made from solid spherical TiO₂ particles in photovoltaic device tests, according to a study by researchers in Switzerland and Iran (*Nano Lett.* 2010, 10, 1632). Dye-sensitized solar cells (DSCs) typically incorporate a photoanode fabricated from a film of interconnected, porous, spherical TiO₂ nanoparticles that are coated with dye molecules. DSCs are widely studied as alternatives to costly but better performing silicon-based photovoltaics. To boost DSC performance while keeping costs low, **Nima Taghavinia** of Sharif University of Technology, in Tehran; **Jacques-E. Moser** of the Swiss Federal Institute of Technology, Lausanne; and coworkers developed a method for synthesizing TiO₂ as elongated hollow fibers by using inexpensive cotton fibers as a template. Compared with conventional spherical particles, the fiber morphology is expected to enhance the efficiency of charge transport and collection and improve light harvesting. These predictions are borne out by device tests, the team says. The researchers report that the electron transport rate doubled and the electron lifetime before charge-robbing neutralization occurs increased by a factor of up to four in the new DSCs relative to DSCs made with conventional TiO₂ films.

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