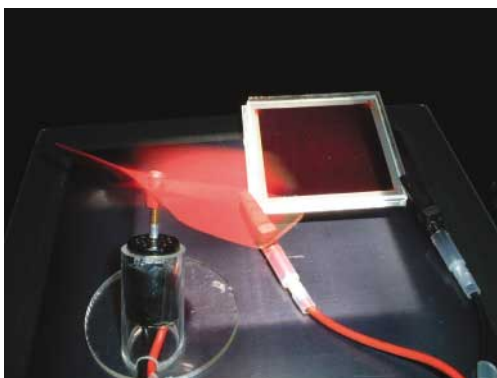


Efficient Dye-Sensitized Solar Cell based on Novel Coumarin-Dyes

We have developed efficient coumarin-dye-sensitized nanocrystalline TiO₂ solar cells (DSSCs). We have attained a 7.5% solar energy-to-electricity conversion efficiency, the highest performance among DSSCs based on organic-dye photosensitizers, under AM 1.5 irradiation (100 mW cm⁻²) with a DSSC based on a novel coumarin-dye photosensitizer and nanocrystalline TiO₂ photoelectrode. Our result strongly indicates that the molecular design of organic-dye photosensitizers for DSSCs can be successful and that the prospects for application of these photosensitizers in DSSCs are promising.



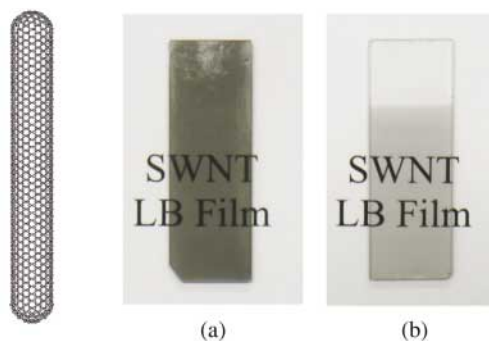
A dye-sensitized solar cell based on novel coumarin dye

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Thin Films of Highly Oriented Single-Wall Carbon Nanotubes

Optically homogeneous thin films of chemically solubilized single-wall carbon nanotubes (SWNTs) have been realized by the Langmuir-Blodgett technique. Deposition can be performed in a layer-by-layer fashion either by horizontal or vertical deposition, allowing to precisely control the film thickness. Absorption spectra of these LB films preserving the spectral features characteristic of semiconducting and metallic SWNTs prove that no serious alteration of their electronic structures occurred throughout the solubilization and film deposition. Polarized absorption spectroscopy and AFM observation demonstrate that the tubes are highly oriented in the vertical dipping direction. These results provide important basis for the future development of the scientific understanding and technological applications of this new and exciting form of carbon.



Langmuir-Blodgett films of single-wall carbon nanotubes by (a) horizontal lifting (140 layers) and (b) vertical dipping (58 layers).

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