

The 270th MANA Special Seminar



Nano-Carbon Materials in Batteries and Solar Cells

Chair: Dr. Jonathan Hill (MANA Scientist)

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There is now a rising demand for efficient and clean energy storage devices as a result of increasing concerns about limited world energy supply as well as environmental considerations. Lithium batteries have become the main power source for portable electronic devices such as laptops and mobile 'phones. However, in order to power electric vehicles and so reduce fossil fuel consumption and CO₂ emissions, there has to be significant improvements to the energy and power densities. Nano-carbon based materials are showing great promise for use in lithium batteries especially usage in cathode materials. Dye-sensitized solar cells (DSC) are another important field where nano-carbon materials have achieved good results. DSCs provide a technically and economically credible alternative to present day p-n junction photovoltaic devices. In contrast to conventional systems, where the semiconductor assumes both the task of light absorption and charge carrier transport, the two functions are separated here. Light is absorbed by a sensitizer, which is anchored to the surface of a wide band semiconductor. Charge separation takes place at the interface via photo-induced electron injection from the dye into the conduction band of the solid. The use of sensitizers having a broad absorption spectrum in conjunction with oxide films of nanocrystalline morphology means that a large fraction of sunlight can be harvested. Near quantitative conversion of incident photons into electric current is achieved over a large spectral range extending from the UV to the near IR regions.

Venue: Auditorium, 1F, WPI - MANA Bldg.

Date: June 13th, Wednesday Time: 15:30-16:15

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