

## **Artificial Leaves**

By Colleen J. Mcguire

Title: North Carolina research workers indicate how water based 'artificial leaf' generates electricity

Were you aware that a North Carolina State University team has shown that water gel-based solar devices (known as: "artificial leaves") can work like solar cells to generate electricity?

The analysis has been posted on-line within the Journal of Materials Chemistry by Dr. Orlin Velev, an Invista Professor of Chemical and Biomolecular Engineering.

The studies prove the concept for making solar cells that more closely imitate nature. They also have the potential to be cheaper and more beneficial to our environment than the recent standard silicon based solar cells.

The bendable devices are composed of water-based gel infused together with light-sensitive molecules (like plant chlorophyll) coupled with electrodes coated by carbon elements, such as carbon nanotubes or graphite.

Graphene is the standard structural element of a few carbon allotropes such as graphite, carbon nanotubes and fullerenes. Graphene is a one-atom thick planar sheet of carbon atoms that are densely packed in a honeycomb crystal lattice. The title comes from graphite ene; graphite itself consists of many graphene sheets piled together.

The light-sensitive molecules get "excited" by the sun's rays to generate electricity, similar to plant molecules that get excited to synthesize all kinds of sugar in order to grow.

Dr. Velev affirms that the study team hopes to be able to "learn how to imitate the materials through which nature harnesses solar energy." Although man made light-sensitive molecules can be used, Velev says naturally extracted products, like chlorophyll, are also very easily integrated in these devices because of their own water-gel matrix.

Velev even imagines a future in which roofs could be covered with soft sheets of similar electrical power-generating synthetic-leaf solar cells. The concept of biochemically inspired 'soft' products for generating electricity may well in the future provide an alternative for the present-day solid-state technologies.

About the Author: Colleen J. Mcguire creates for the <a href="http://www.solarwaterfountains.org/">solar fountains</a> blog, her personal hobby blog site focused on guidelines to help house owners to spend less energy with solar power.

Reference: Aqueous soft matter based solar devices. Journal of Materials Chemistry, 2011; DOI: <http://pubs.rsc.org/en/Content/ArticleLanding/2011/JM/c0jm01820a>