Nanotech solar breakthrough will help spur viability of alternative energy

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Researchers from New Mexico State University and Wake Forest University achieve 5.2 percent energy conversion with organic solar development. This means less expensive more durable solar panels available in four to five years.

Imagine being able to paint your roof with enough alternative energy to heat and cool your home. What if soldiers in the field could carry an energy source in a roll of plastic wrap in their backpacks?

Those ideas sound like science fiction þu particularly in the wake of the rising costs of fossil fuel.

But both are on the way to becoming reality because of a breakthrough in solar research by a team of scientists from New Mexico State University and Wake Forest University.

While traditional solar panels are made of silicon, which is expensive, brittle and shatters like glass, organic solar cells being developed by this team are made of plastic that is relatively inexpensive, flexible, can be wrapped around structures or even applied like paint, said physicist Seamus Curran, head of the nanotechnology laboratory at NMSU. Nanotechnology, or molecular manufacturing, refers to the ability to build things one atom at a time.

The relatively low energy efficiency levels produced by organic solar cells have been a drawback. To be effective producers of energy, they

must be able to convert 10 percent of the energy in sunlight to electricity. Typical silicon panels are about 12 percent energy conversion efficient.

That level of energy conversion has been a difficult reach for researchers on organic solar technology, with many of them hitting about 3 to 4 percent. But the NMSU/Wake Forest team has achieved a solar energy efficiency level of 5.2 percent. The announcement was made at the Santa Fe Workshop on Nanoengineered Materials and Macro-Molecular Technologies.

"This means we are closer to making organic solar cells that are available on the market," Curran said.

Conventional thinking has been that that landmark was at least a decade away. With this group's research, it may be only four or five years before plastic solar cells are a reality for consumers, Curran added.

The importance of the breakthrough cannot be underestimated, Curran said.

"We need to look into alternative energy sources if the United States is to reduce its dependence on foreign sources," the NMSU physics professor said.

New Mexico Economic Development Department Secretary Rick Homans added, "This breakthrough pushes the state of New Mexico further ahead in the development of usable solar energy, a vital national resource. It combines two of the important clusters on which the state is focused: renewable energy and micro nano systems, and underlines the strong research base of our state universities."

A cheap, flexible plastic made of a polymer blend would revolutionize

the solar market, Curran said.

"Our expectation is to get beyond 10 percent in the next five years," Curran said. "Our current mix is using polymer and carbon buckyballs (fullerenes) and good engineering from Wake Forest and unique NSOM imaging from NMSU to get to that point."

NSOM or near-field scanning optical microscopy allows them to scan objects too small for regular microscopes.

The development is an outgrowth of the collaborative's work developing high-tech coatings for military aircraft, a program supported by Sens. Pete Domenici, R-N.M., and Jeff Bingaman, D-N.M., Curran said.

Source: New Mexico State University