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NSF Awards \$450,000 to UNH, Conductive Compounds Inc. for Solar Panel Innovation

DURHAM, N.H. – University of New Hampshire researchers and Conductive Compounds Inc. in Hudson recently received \$450,000 from the National Science Foundation to help produce more conductive and cost-effective solar panels. The three-year grant, under the GOALI (Grant Opportunities for Academic Liaison with Industry) program, will support the engineering of nanoparticles of silver suitable for screen-printing onto photovoltaic (PV) solar panels.

To generate electricity from the sun, solar panels must have metal on the top and bottom to create a positive and negative connection, like a battery. Coating the shaded bottom side is fairly easy, but on the top, panels are screen-printed with lines of silver fine enough that they maximize light exposure.

“But the ink that creates these lines is not nearly as conductive as pure silver,” says principal investigator Dale Barkey, professor of chemical engineering at UNH. “We’d like to produce inks that are much more conductive than the ones on the market.”

Nanoparticles of silver, measuring just 100 atoms in diameter, have some unusual properties that Barkey and his co-investigators – Conductive Compounds CEO Don Banfield and Xiaowei Teng, assistant professor of chemical engineering – seek to exploit. They melt at a lower temperature than the silver powder currently used (450 degrees Celsius versus 961 degrees Celsius), bringing a cost savings to the production of PV panels. Further, the highly active surfaces of the nanoparticles make the passage of current from one particle to the next much faster.

Nonetheless, Barkey says, the project is hardly simple. “Formulating nanoparticles into a good screen-printing ink is very complicated, and making it all economical is challenging,” he says.

The GOALI grant, which supports a Ph.D. student and six undergraduates working in Barkey’s and Teng’s labs, builds on a partnership established between UNH and Conductive Compounds by an earlier grant from the New Hampshire Innovation Research Center, a state-funded agency administered by UNH. It’s a partnership that made the team very competitive for this NSF funding and which could bring shared revenues to both the university and the company.

“This NSF grant represents the significant opportunities that are available to small New Hampshire technology based companies with limited resources when they are able to find good partnerships in academia like the chemical engineering department at UNH,” Banfield of Conductive Compounds says.

As solar power grabs an increasing share of the global energy market, Barkey says the potential of this collaboration is great.

"It would be very satisfying to have a New Hampshire company and university fill a key need in this huge market," he says.

Conductive Compounds Inc., founded in 1994 and based in Hudson, is a provider of materials for the electronics industry, developing and manufacturing products for customers worldwide. It specializes in electrically conductive and resistive inks and coatings, electrically conductive and thermally conductive adhesives, potting compounds, ultraviolet-cured dielectrics, encapsulants and conformal coatings, radio opaque inks, silver and silver chloride inks, PTC (Positive Temperature Coefficient) carbon heater inks, VRI (Variable Resistance Inks) mechanical abrasion resistant precision carbon inks and pressure sensitive variable resistance transducer inks. CCI's materials are used to manufacture membrane switches, EL (Electroluminescent) panels, touch screens, disposable medical sensors such as EEG, EKG, defibrillator pads and blood glucose sensors, cell phone and RFID (Radio Frequency Identification) antennas, rigid and flex circuits, printed heaters, solar panels, and for EMI/RFI (Electromagnetic Interference/Radio Frequency Interface) shielding and thermal management of electromechanical assemblies. For information on Conductive Compounds Inc.'s full line of inks and adhesives, visit <http://www.conductivecompounds.com>.

The University of New Hampshire, founded in 1866, is a world-class public research university with the feel of a New England liberal arts college. A land, sea, and space-grant university, UNH is the state's flagship public institution, enrolling 12,200 undergraduate and 2,300 graduate students.

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