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REQUEST FOR PROPOSALS

The Center opened its 10th RFP on June 13, 2011 and is making available \$700,000 in early stage commercialization of nanomaterial research funding.

There are two types of funding opportunities: Pre-Commercialization for \$30,000 and Commercialization for \$185,000.

The proposal round closes by EOB August 17, 2011 and winners will be announced February 2012.

For more information, visit the [Center's website](#).

WEB PORTAL

In the Fall of 2011, the Center is introducing a new service for members - a "virtual incubator" where researchers, small and large companies, and investors can share innovative technologies and ideas, form partnerships and develop new product ideas using nanotechnology. See the [Center's website](#) for more details.

NEED HELP FINDING A RESEARCH OR INDUSTRY PARTNER?

The Center has established partnerships with a wide range of university researchers, small and established companies, and entrepreneurs. Our goal is to create, support, and accelerate the commercialization of innovative technologies and new product concepts using nanotechnology.

To achieve our goal, the Center invites researchers and business individuals to submit ideas to the Center of the purposes of finding a partner.

For more information, visit the [Center's website](#).

ARKEMA BUILDING STRONGER, TOUGHER WIND TURBINE BLADES

By Tim Hayes

It happens in nearly every super hero movie. A typical Joe somehow gets blasted with gamma rays, or is bitten by radioactive spider, or travels through a wave of cosmic mush, and comes out the other side of the experience better, tougher, and stronger.

Chris Roger at Arkema knows all about that sort of thing. Not about super heroes necessarily, but about transforming an existing material into something better, tougher, and stronger. Specifically, Roger and his fellow researchers at King of Prussia-based Arkema have developed and are in the process of commercializing a new polymer for use in wind turbine blades.

"The polymer we've created improves the impact properties of these 180-foot blades," he explained. "Birds and bats can collide with these blades, so they need to be as strong as possible to last longer, while still protecting their structural integrity."

The Pennsylvania NanoMaterials Commercialization Center is supporting Arkema Inc., with Dr. Robert Barsotti as principle investigator, as it works to bring this Nanostrength® block copolymer technology to the market. The Nanostrength product toughens the epoxies in wind energy and electronic materials applications. Specially designed block copolymers self-assemble into nanometer-sized rubbery domains in epoxy matrices. The nano-scale morphology of these modifiers allows for extremely efficient toughening of highly brittle thermosets, such as epoxies, without sacrificing key thermal and mechanical properties.

"This technology will be extremely valuable in wind energy applications where there is a demand for increased reliability of the wind blades without sacrificing strength," noted Dr. Alan Brown, Executive Director of the PA Nano Center.

Likewise, in electronic materials, according to Roger, higher operating and processing temperatures have necessitated increased resistance to cracking. Arkema's Nanostrength® block copolymer and BlocBuilder® controlled radical polymerization technology are also valuable in a wide variety of adhesive, coating and composite applications, he said.

"Block polymers can incorporate two or more connected polymer chains," Roger said. "This allow for the presence of soft rubbery block and a block compatible with the thermoset resin, enabling the nano-scale rubber phase morphology."

The company finds itself within the enviable spot of presenting a new product in a growth market, but the industry doesn't necessarily change rapidly, Roger said.

"There's still a little apprehension out there about new technologies," he said. "Manufacturers have millions invested in these wind turbines, and they are being careful about changing materials."

While Arkema does not make the wind turbine blades, it does perform all of the mechanical testing in conjunction with the PA Nano Center and Lehigh University, and other industrial. Arkema has continued to optimize the technology, introducing block copolymers that can toughen thermoset resins with minimal effect on viscosity of the resin, allowing for improvements in blade manufacturing.

"Research into this block polymer has been going on for some years, with a focus on wind turbines being done for the past two years or so," said Roger. "The PA Nano Center has helped us to leverage research to get this work off the ground, as well as helping with research into the wind turbine market."

"Today most blades are made of epoxy resins, and manufacturers are looking for something less expensive," he said. "Our new polymer allows for the use of resins that are made tougher and less expensive. We believe it's a real success story with the potential to change the wind turbine industry."

www.arkema-inc.com

DIRECTOR'S COMMENTS:

Welcome to our Summer 2011 edition of the NanoMaterials Quarterly. I hope that you are all surviving the current heat wave and supporting our winning Pirates baseball team.

Recently, we announced the winners of our Round 9 RFP. The Center, along with its Board and Technical Advisory Committee were pleased with the quality of the proposals. In addition, we were struck by the diversity of ideas, technologies, and new product concepts. These ideas used novel nanotechnology research for a wide range of applications in many market sectors; energy, consumer, equipment, and biomedical.

In addition, I am gratified by the growing number of partnerships exhibited in the proposals. Many proposals demonstrated partnerships between universities, small companies and large companies. The Center strongly believes that partnering is critical to reducing the risk of transitioning these new technologies to market.

To provide a more efficient way for researchers, companies and investors to review and comment on these technologies, discuss new product concepts and create partnerships, the Center is developing a unique new web portal. This web site and supporting database will showcase hundreds of technologies from leading nanomaterials researchers at universities, federal laboratories and emerging startups. Stay tuned for more information as we unveil the portal later this year.

Finally, you will see elsewhere in this newsletter and on our web site information on our latest RFP round. I encourage you to apply or submit an idea paper. If you are unsure whether your idea is viable or feel you need a partner, don't hesitate to contact us.

Have a safe and pleasant summer.

Alan G. Brown, Ph.D.
Executive Director



NANO CENTER NEWS

PA MANUFACTURERS' ENERGY & INNOVATION FORUM

The Regional Innovation Cluster Consortium for Technology Acceleration (T-RIC) and Catalyst Connection are hosting the first annual PA Manufacturers' Energy and Innovation Forum. In this Forum you will hear from regional companies and how they successfully transformed their organization by commercializing new technology and products in the energy sector. [\(+\)](#)

2011 AFRL SHOWCASE

Every year the Center hosts a Technology Showcase Day at the Air Force Research Laboratory in Dayton, OH. On August 4, 2011 the Center will hosts its fifth consecutive Showcase at AFRL. It's a successful event that highlights the Center's Portfolio Companies to AFRL program managers and provides a forum for networking.

PORTFOLIO COMPANY BRINGS REVOLUTIONARY APPROACH TO CONDUCTIVE INKS

Metalonix a spin-out from Carnegie Mellon University has come up with a revolutionary approach to achieve dramatic changes in conductive inks by developing a form of liquid metal. [\(+\)](#)