

The Pennsylvania NanoMaterials Commercialization Center Helps Strategic Polymer Sciences to Hit the Ground Running With a Polymer That Can Multi-task

By: Kevin Lane

An early-stage startup company that is commercializing a novel electroactive polymer developed at The Pennsylvania State University is attracting the attention of the cardiac medicine and high-tech electronics industries, the U.S. Navy and no less than two major aerospace and defense contractors.

The flagship technology of Strategic Polymer Sciences (SPS) was invented by Dr. Qiming Zhang, Distinguished Professor of Electrical engineering and Material science at Penn State, is considered among the top 10 electroactive polymer scientists in the world and currently serves as Chief Technology Officer at SPS.

The SPS proprietary electropolymers will increase the energy density of conventional capacitors by at least five times and they will enable significant miniaturization of many electrical devices with enhanced reliability and in many cases at a reduced cost. They can be used in a variety of applications such as capacitors for medical devices, microelectronics, power electronics, energy harvesting, hybrid electrical vehicles and military weapon systems.

Since SPS has successfully demonstrated the feasibility of producing this new high quality capacitor film with thicknesses below three micrometers, it is partnering with a global medical device company to develop nanostructured polymer hybrid film and prototype capacitors for implantable heart defibrillators, also known as ICDs.

This unique capacitor will considerably reduce the size and cost, while increasing performance as compared to standard ICDs, enabling wider access of this life-saving device to millions of Americans threatened by sudden cardiac arrest disease.

In a similar application, the SPS polymer film also may be used in cardiac catheters that can be programmed with coordinates, thereby enabling the device essentially to steer itself to a desired specific location within the inner chambers of the heart, rather than having to be manipulated externally with a joystick. At the same time, the catheter tip will have a greater degree of flexibility that can add insurance against punctures in hearts and arteries during cardiac procedures.

This same flexibility attribute of the polymer film also could enable higher resolution images from space by using actuators to bend mirror surfaces to achieve clearer focus on targeted objects.

The SPS polymer film also may prove the ability to capture the energy of ocean waves more effectively than current pulse power and energy harvesting technologies.

CEO Ralph Russo, a private venture investor, entrepreneur and veteran executive of Apple Computer since the Macintosh start-up, is bullish on the potential of SPS polymers and the assistance and funding provided by the Pennsylvania NanoMaterials Commercialization Center.

“Several new business opportunities have developed as a result of our affiliation with the Center,” said Russo. “Certainly the \$200,000 grant we received through the Center from the Air Force Research Laboratory helped us develop and scale up our ICD prototype for a major national medical device manufacturer, thereby cutting our time to market by two years. But the Center’s technical expertise and the doors they opened for us, such as at the Office of Naval Research, also will pay dividends in the near future.”

The company currently has five principal employees including Russo and Dr. Qiming Zhang. Dr. Shihai Zhang is the Director of Engineering, Dr. Dean Anderson serves as the Director of Operations, and Dr. Paul Rehrig is the company’s Director of Program management.

In anticipation of the company’s growth, SPS is currently searching to hire a lab engineer and a senior actuator engineer.

From the inner reaches of the human heart, to the world’s ocean waves, to space based exploration and monitoring, look for SPS polymers to be doing their fair share of multi-tasking.

For additional information visit the SPS website at www.strategicpolymers.com

