Quantum Dot Thin Films With Goal to Increase Thermoelectric Efficiencies

March 7 2005

Evident Technologies announced it has received an SBIR (Small Business Innovation Research) grant from the Office of Strategic Defense for a project to develop a high performance thermoelectric material using Evident's proprietary quantum dot technology. The quantum dot thermoelectric project is scheduled to be completed in June of 2005. Dr. Gregory Scholes of the University of Toronto will be collaborating with Evident Technologies to measure and characterize these materials.

The award is under the United States Department of Defense's Office of Strategic Defense SBIR Phase 1 proposal OSD04- EP3 "Nanostructure-Enhanced Bulk Thermoelectric Materials", and the program is managed by the Navy's Office of Naval Research.

The objective of the project is to demonstrate that quantum dots can be used to produce an improved thermoelectric nanomaterial by engineering thermal and electronic properties to achieve increased fficiencies.
Thermoelectric materials can be fashioned into devices to create electricity from temperature differences or into solid-state cooling devices. However an inherent shortcoming of existing thermoelectric materials is that they make for inefficient devices, either for cooling or energy conversion. Evident will work to develop an advanced thermoelectric nanomaterial that, because of its improved efficiencies, could offer significant cost and performance benefits for both military and commercial applications.

“By using quantum dots in a thin film, our goal is to reinvigorate the development of thermoelectric technologies to obtain unprecedented device efficiencies. This should substantially help increase the performance and reduce the cost of a wide range of thermoelectric devices,” said Clint Ballinger, Chief Executive Officer of Evident.

“Thermoelectric devices have the potential for a wide range of applications,” said Dr. Gregory Scholes of the University of Toronto. “Thermoelectric devices can be used as a solidstate cooler to remove heat from solid-state electronics or used for generating electricity in wide variety of critical systems ranging from submarines or aircraft to space systems. By using an innovative quantum dot based material, we hope to see greater device efficiencies.”

Dr. Scholes is Assistant Professor in the Department of Chemistry, University of Toronto. He received his Ph.D. from the University of Melbourne in 1994 and has postdoctoral experience at Imperial College, London and the University of California, Berkeley. His research program includes developing new methods for the synthesis of semiconductor quantum dots, the application of ultrafast laser experiments and theory to elucidate the electronic properties of quantum dots and organic polymers, and the study of light-induced magnetism.