

Rensselaer researchers test polymer membrane for fuel cell and hydrogen applications

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Rensselaer Polytechnic Institute researchers have started a new fundamental research project on the component that is often referred to as the heart of a fuel cell – the polymer membrane. Researchers are testing a new type of polymer membrane, created at Rensselaer, for potential use in proton exchange membrane (PEM) fuel cell and hydrogen applications.

"Fuel cells have great potential to contribute to energy solutions, but basic research is needed to better understand how parts of the system can be optimized so that fuel cells can be further developed into applied technologies," says Brian Benicewicz, professor of chemistry and chemical biology at Rensselaer, director of the New York State Center for Polymer Synthesis at Rensselaer, and principal investigator for the project.

The grant is part of the federal Hydrogen Fuel Initiative, a commitment of more than \$64 million in research and development projects aimed at making hydrogen fuel cell vehicle and refueling stations available, practical, and affordable for American consumers by 2020, according to the U.S. Department of Energy.

"Our research team has developed a new polymer membrane that may facilitate hydrogen separation, purification, and transport at high temperatures," says Benicewicz. "Optimizing conditions for the

purification and separation of hydrogen is an essential component to the fuel cell system that requires fundamental research for development. As part of this project, these membranes will be tested for use in applications that support this goal."

Benicewicz is collaborating on the project with Glenn Eisman, research professor and director of the Center for Fuel Cell and Hydrogen Research at Rensselaer; Sanat Kumar, professor of chemical and biological engineering at Rensselaer; and Steven Greenbaum, professor of physics at Hunter College of the City University of New York. The researchers will study membrane transport as it relates to conductivity mechanisms, electrode interaction, and system modeling.

"The availability of reliable, sustainable, and secure energy sources is paramount to solving the global energy security problems facing humanity today," said Omkaram "Om" Nalamasu, vice president for research. "Rensselaer's historical strengths in materials, devices, and systems, combined with rapidly growing research efforts in energy conservation and renewable energy systems, will help to address the world's demand for affordable and environmentally benign energy."

Source: Rensselaer Polytechnic Institute

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