



## South Carolina Researchers Making the Fuel Cell Industry More Sustainable

*The development of Carbon Composite Catalyst for PEM Fuel Cells is critical to mass deployment of fuel cells*

Dr. Branko Popov, Director for the Center of Electrochemical Engineering at the University of South Carolina is making the fuel cell industry more sustainable by developing materials and methods that reduce the need for platinum and other precious metals in fuel cells while maintaining high levels of efficiency and durability. Regarded as one of the best materials for highly efficient fuel cells, platinum is very expensive and is mined from specific areas around the world contributing to its limited availability, high expense and carbon footprint.

Dr. Popov and his team of researchers recently developed a highly active and stable Carbon Composite Catalyst (CCC) process for oxygen reduction in PEM fuel cells. Using low-cost cobalt, nitrogen, and carbon, the Carbon Composite Catalyst showed a potential for oxygen reduction of approximately 90% of that of the best platinum/carbon catalysts. The CCC PEM fuel cell is capable of producing the same amount of energy that a typical platinum fuel cell would normally produce, but at a lower cost to the end user. Additionally, the CCC PEM fuel cell is as durable as platinum fuel cells. "After 480 hours of continuous fuel cell use, no significant performance degradation was observed" said Dr. Popov.

As the worldwide transportation industry expands, Dr. Branko Popov and his team are continuing their work on making the hydrogen and fuel cell industry much more sustainable and cost effective. Dr. Shannon Baxter-Clemmons, Executive Director of the South Carolina Hydrogen and Fuel Cell Alliance, and University of South Carolina graduate said, "Dr. Popov's work, as well as the many other fuel cell researchers at the University of South Carolina, is solving the challenges of hydrogen production, storage and cost. These breakthroughs have the potential to make the hydrogen and fuel cell industry more affordable sooner."

### **About Dr. Branko Popov**

Currently, Dr. Popov is professor at USC and Director of the Center for Electrochemical Engineering at USC. His research interest in the area of power sources focuses on new materials for cathodes and anodes for primary and secondary batteries capacitors and fuel

cells and development of performance models for capacitors, fuel cells and to predict capacity fade for lithium ion batteries. Office of Naval Research and American Electroplaters and Surface Finishers Society have funded his research group in last ten years to develop alternative coatings to protect hard alloys from hydrogen embrittlement and to substitute cadmium plating.

**About the South Carolina Hydrogen and Fuel Cell Alliance**

The Alliance is a non-profit partnership of government, business, academia and citizens working together to grow economies of local communities, the state and the nation, to enable energy security and to limit our environmental footprint with the use of hydrogen fuel cells

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