

Thermoelectric Composites for Hydrogen Fuel Cell Applications

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Research Area: Clean Energy, Fuel Cells, Thermoelectric Materials, Polymer Composites

Project Description:

Polymer electrolyte membrane fuel cells (PEMFCs) are gaining traction in transportation and automotive applications as a clean source of electricity and subsequently an alternative to conventional combustion engine vehicles. PEMFCs undergo a redox reaction, where hydrogen protons and oxygen combine to produce electricity, heat, and water, as the only by-product. Our research focuses on incorporating smart materials, namely thermoelectric composites in PEM fuel cells for vehicles. Thermoelectric materials allow for excess heat to be successfully converted into electricity. Thus the goal of this project is to improve efficiency and performance, assess the recyclability of components and reduce cost and density of the overall cell. In the past decade, our research center, Toronto Smart Materials & Structures (TSMART) lab at University of Toronto in collaboration with industrial partners has developed advanced nanostructured materials for numerous cutting-edge applications namely microelectronics, energy storage devices, biomedical fields, healthcare monitoring and aerospace. We are looking for candidates with a passion and motive to find tangible solutions to Climate Change through research in clean energy applications. The research is performed in TSMART lab in collaboration with outstanding researchers in MIE, MSE and BME departments. By joining our team, you will have the opportunity to perform research in our state-of-the-art research labs in Canada, expand your lab skills, and fortify your academic resume by having contribution in academic publications.

Interested candidates should contact Prof. Hani E. Naguib (naguib@mie.utoronto.ca) for more information.