

The Waterloo Institute for Nanotechnology

Presents

Current Research on Next Generation Fuel Cells and Catalyst Development

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Fuel cell systems offer the promise of economically delivering power with environmental and other benefits. There have been huge advances in technology from all areas of contribution: industry, research institutions and academia, over the last 20 years. However, further cost reduction and durability improvement are still required for the commercialization of fuel cells in wide spread applications. For polymer electrolyte membrane (PEM) fuel cells, electrocatalysts are a major cost factor, due to their precious metal content, and a major contributor to the durability of PEM fuel cells. The significant challenge on the electrocatalysts for PEM fuel cell is not only the need to achieve excellent electrochemical activity, but also the necessity to maintain high stability for these catalysts. In order to maximize the utilization of the precious metal content, Pt particles are typically supported on a high surface area carbon support to provide high electrocatalyst surface area. The catalyst supports in electrocatalysts thus play an important role to improve performance and durability.

This talk will present recent progress on the research and development of next generation fuel cells, particularly on electrocatalysts. Electrocatalysts supported on different carbon supports, including carbon blacks, carbon nanotubes and graphene, as well as, nitrogen-doped carbon nanotubes and graphene will be presented. Our results indicate proper choice of carbon supports can achieve simultaneous improvements for both performance and durability.

Many of the major challenges in electrocatalysts for PEMFC's are considered to be significant and offer great opportunities for scientists and engineers working on nanotechnology. At the end of this presentation, potential future directions for the electrocatalysts for PEMFCs for further performance and durability improvements will be discussed.



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3:30 pm - 4:30 pm
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