The Waterloo Institute for Nanotechnology and the Department of Chemical Engineering, University of Waterloo

Seminar Series

Dr. Edward Roberts

Professor and Associate Head Research, Department of Chemical and Petroleum Engineering, University of Calgary

Doped Carbon and Graphene Materials for Electrochemical Applications

Electrochemical technologies for energy storage and water treatment (as well as other applications) require electrode materials that are low cost but offer good performance and lifetime. Carbon materials are widely used, as they are relatively cheap and very versatile. The seminar will discuss the development of electrochemical exfoliated graphene materials and heteroatom doped carbons, considering two electrochemical applications: vanadium redox flow batteries, and adsorption combined with electrochemical regeneration for treatment of organic contaminants. Doping of carbon can be achieved by thermo-chemical treatments, and has a significant impact on the electrochemical characteristics. Exfoliated graphenes such as reduced graphene oxide are an attractive carbon material for electrochemical applications, since they offer high specific surface area, conductivity, and electrochemical activity. However, exfoliation methods are relatively complex, energy intensive and consume expensive and/or toxic chemicals. Electrochemical exfoliation offers low cost, simple process and by tuning the operating conditions the characteristics of the graphene (including heteroatom doping) so that they can be tailored for different applications.

Dr. Edward P. I. Roberts is a Professor in the Department of Chemical and Petroleum Engineering at the University of Calgary. He graduated with BA, MEng and PhD in Chemical Engineering from the University of Cambridge, UK. Dr. Roberts was a Lecturer and Reader at the University of Manchester, UK for 16 years before moving to the University of Calgary in 2012. He has studied a wide range of electrochemical technologies for energy and environmental applications, and has a 30 year track record in research and innovation. He has received several awards for innovation including the IChemE Water Innovation Award and the European Academic Enterprise Award. He is a Fellow of the Institution of Chemical Engineers, and leads the NSERC CREATE program in Materials for Electrochemical Energy Solutions.

Tuesday, June 25, 2019
11 a.m. - 12 p.m.
QNC 1501

UNIVERSITY OF WATERLOO

WATERLOO INSTITUTE FOR nanotechnology

@uwnano @WINano nano.uwaterloo.ca