

# Invited Lecture

## Ionic Liquids and Global Sustainability



**Speaker:** Prof. Doug MacFarlane

**Date & Time:** Sep 20, 2012 (Thursday)

**16:30-17:30**

**Venue:** Multifunctional Hall, IPE Mansion

### **Introduction:**

Professor Doug MacFarlane is an ARC Federation Fellow at Monash University. He is also the program leader of the Energy Program in the ARC funded Australian Centre for Electromaterials Science. He also holds Adjunct Appointments at the University of Alabama and Queen's University Belfast. He was a PhD graduate from Professor Austen Angell's group at Purdue in 1982 and after postdoctoral fellowships in France and New Zealand took up an academic position at Monash in 1983. He was appointed Professor of Chemistry in 1995 and served terms as Deputy Dean of Science 2000-2001 and as Head of School 2003-2006. Then, he was elected to the Australian Academy of Sciences in 2007 and to the Australian Academy of Technological Sciences and Engineering in 2009. He has published more than 400 papers and 20 patents, with a citation more than 8500 times.

### **Abstract:**

Ionic liquids are simply organic salts that have melting point below 100° C. As liquid salts they offer a range of solvency properties distinctly different from normal molecular solvents. In addition to this, they are often very stable-thermally, chemically and electrochemically. They have thus found application in a wide variety of contexts where chemical and energy sustainability is a key issue, from green chemistry to electrochemistry and more recently in the biochemical and biosciences. By way of example, they have been shown to be very useful in low energy electrowinning and electro-refining of metals and semiconductors and as electrolyte solvents for advanced batteries and solar cells. Their electrochemical and thermal properties have led to the development of applications in corrosion protection of light metal alloys and in lubrication. Certain selected examples are excellent solvents for processing renewable biopolymers such as cellulose and lignin. They can also be used as novel stabilising solvents for proteins, the stability of the protein being much enhanced both with respect to thermal denaturation and also chemical degradation, hence supporting the use of enzymes in chemical processes. This talk will survey these fields and discuss future directions in applications related to sustainability.