

## **Internal Seminar**

### **Development of Noble Metal-free Electrocatalysts for Fuel Cells and Water Electrolysers**

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The supply of sufficient energy without additional CO<sub>2</sub> exhaust to the atmosphere is one of the most challenging issues at this point of time. Power generation based on renewable energy has been considered as an alternate to minimize reliance on fossil fuels that release excess amounts of carbon dioxide, a major source for global warming. Hydrogen production by water electrolysis in water electrolysers (WEs) or fuel cells (FCs) that have no constraints on energy storage capacity by electrode materials has been studied as an alternative technology for energy conversion and storage. The epicentre of these energy conversion technologies is a series of electrochemical processes, which include electrocatalytic oxygen reduction reaction (ORR) and hydrogen oxidation reaction (HOR) that occur on the cathode and anode of a hydrogen–oxygen fuel cell, respectively; and hydrogen evolution reaction (HER) and oxygen evolution reaction (OER) at the cathode and the anode of an water electrolytic cell producing gaseous molecular hydrogen and oxygen, respectively.

Recently we have explored the nanomaterials such as transition metals (oxides) and graphene hybrids, and non-metal doped graphene-based materials as alternatives of precious metal catalysts for water electrolysers and fuel cells. A broad spectrum of the available advanced characterization techniques in this area, allowing us to gain new insights into the nature of the electrocatalytic activity of these new catalysts toward specific reactions.

***Wednesday, May 24<sup>th</sup> 2017***

***2:00 PM (Tea/Coffee at 1:45 PM)***

***Seminar Hall, TCIS***