

## **Internal Seminar**

### **Investigations on the interfacial architecture for the electrochemical CO<sub>2</sub> reduction reactions**

**Sreekanth Narayanaru**

**CSIR-Central Electrochemical Research Institute, Karaikudi**

The importance of electrocatalysis is growing due to its application to the field of renewable and sustainable energy generation. In the past few decades, extensive research has been focused on the production of next generation fuels: namely hydrogen and oxygen through water splitting; and reduction of CO<sub>2</sub> to methanol and formic acid, in the context of fuel cells. There is an increasing renewed world-wide interest in CO<sub>2</sub> sequestration in the context of global warming as evident in the resolutions announced in the recent Climate Change conference at Paris.

Design of electrocatalytic interfacial architecture is essential for the efficient reduction of CO<sub>2</sub> to a selective product. Selectivity depends on several factors like applied potential, surface structure of the electrocatalysts, ability to stabilize CO<sub>2</sub> and intermediates like the anion radical, CO<sub>2</sub><sup>•-</sup> and CO, electrolyte, electrolyte pH and local (interfacial) pH, and finally the impurity effects. The main objective of this work is to gain understanding of the behaviour of metal and non-metal electrocatalysts for the selective catalysis of CO<sub>2</sub>RR. In this effort, we used a local probe like Substrate Generation/Tip Collection (SG/TC) mode of the scanning electrochemical microscopy (SECM) to obtain the preliminary information on what the electroactive products are from CO<sub>2</sub>RR. We probed the products of CO<sub>2</sub>RR at different metal substrates (Au, Ag, Pd, Bi and Hg) and then on the modified gold surfaces. Non-metallic surfaces such as (a) heteroatom doped -graphene; and (b) conjugated polymers for the electro-reduction of CO<sub>2</sub> have been explored.

***Friday, Mar 10<sup>th</sup> 2017***

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

***Seminar Hall, TCIS***