

Departmental Seminar Announcement

Electrochemical Interfaces: From Fuel Cells to DNA Biosensors

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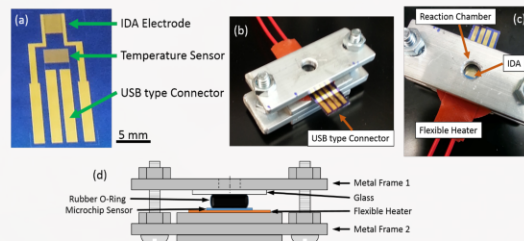
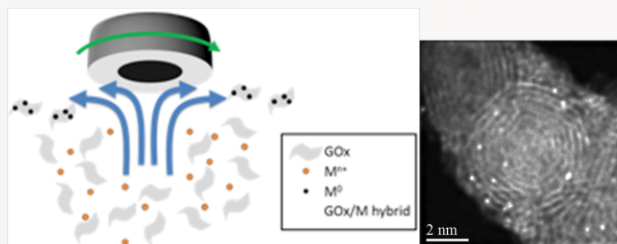
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Nanostructured catalyst/support materials are important for the development of the next generation of energy sources such as Fuel Cells. Electrochemical techniques and catalyst/support synthetic methods have been developed in our laboratory for several years. Recently, our group has been involved on an electrochemical synthesis based on a rotating disk slurry electrodeposition (RoDSE) technique for bulk preparation of catalysts/support materials. Our interest has been placed on carbon catalysts supports such as Vulcan XC-72, carbon nano-onions, and reduced graphene oxide. On the other hand, in the area of environmental chemistry, our group has worked on toxic metal remediation and wastewater purification. With the use of nano zero valent iron (NZVI), Cd^{2+} remediation has been achieved in aqueous systems. This project has led to a possible application of the CdNZVI remediation product for photoelectrochemical applications. In wastewater remediation, our group has used nanotechnology to develop a bioreactor-electrochemical system for the conversion of urea to ammonia to nitrogen in collaboration with NASA Ames Research Center. This has resulted on a possible bioelectrochemical reactor system for NASA's Life Support Systems. Another area of current interest has been DNA electrochemical biosensing. By using Au interdigital array electrodes and electrochemical impedance spectroscopy, label free DNA sensing has been possible. This includes surface PCR and telomerase activity for a possible point-of-care Cancer detection microchip.



Selected References

1. Keyla Soto et al., "From Cadmium Water Remediation to Photoelectrochemical Solar Cells using Nanoscale Zerovalent Iron", *ACS Sustainable Chem. Eng.* **2016**, 4 (3), 738–745.
2. Eduardo Nicolau et al., "Evaluation of an externally interfaced forward osmosis and bio-electrochemical system for energy recovery and wastewater reclamation", *ACS Sustainable Chemistry & Engineering* **2014**, 2, 749–754.
3. Roberto Martínez-Rodríguez et al., "Synthesis of Pt nanoparticles in water-in-oil microemulsion: on the effect of HCl on their surface structure", *J. Am. Chem. Soc.* **2014**, 136 (4), 1280–1283.
4. Lisandro Cunci et al., "Real-Time Detection of Telomerase Activity in Cancer Cells using Label-Free Electrochemical Impedimetric Biosensing Microchip", *RSC Advances* **2014**, 4, 52357–52365.
5. Diana Santiago et al., "Platinum Electrodeposition on Unsupported Carbon Nano-Onions", *Langmuir*, **2012**, 28, 17202–17210.

Location MMC: PG5 – 153 (Live)

BBC: MSB-105

January 20, 2017

Time: 11:00am to 12:00pm