DEPARTMENT OF CHEMISTRY

Designing Nanomaterials for Biomedical *Theranostic* Application

Research Topics:

Magnetic Nanomaterials for *Theranostic* Applications

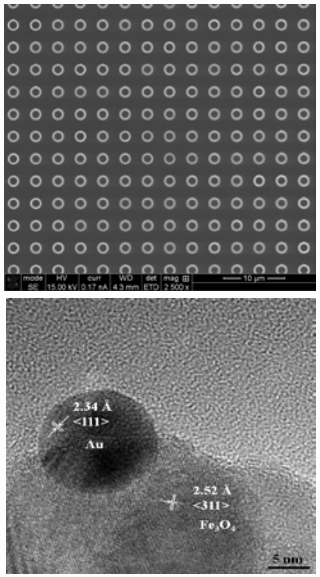
- Multifunctional magnetic nanostructures for hyperthermia treatment of cancer and applications.
- Growth of multifunctional magnetic nanobarcodes for use in MRI imaging

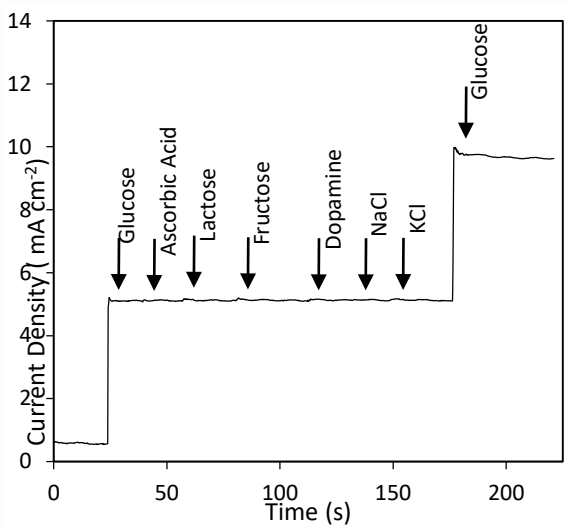
Nanorod and Nanotube Arrays for Biosensors

- Growing nanotube and nanorod arrays for through confined electrodeposition on lithographically patterned nanoelectrodes.
- Optimizing growth dimensions and geometry for specific biosensing application such as detection of certain pathogens in blood with low detection limit as well as non-enzymatic glucose biosensing.

Designed Synthesis of Non-enzymatic Glucose Biosensors

- Investigating transition metal selenides and tellurides for catalytic glucose electrooxidation.
- Understanding mechanistic details through exploration of molecular coordination complexes.
- Optimizing catalytic efficiency through controlli[illegible] the catalytic sites.





Nanostructures, Arrays and Non-enzymatic Glucose Biosensors Synthesized and Studied in the Nath Laboratory.

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Keywords

- Magnetic nanomaterials; magnetic fluid hyperthermia; catalytic glucose elctro-oxidation; solar-to-fuel energy conversion; water electrolysis oxygen evolution reaction.

Significant Achievements

- Liyanage, W. P. R.; **Nath, M**. "CdS-CdTe Heterojunction Nanotube Arrays for Efficient Solar Energy Conversion" *J. Mater. Chem. A*, **2016**, *4*, 14637-14648.
- Swesi, A.; Masud, J.; **Nath, M**. "High-Efficiency NiSe Based OER Catalysts for Water Electrolysis" *Energy and Environ. Sci.* **2016**, *9*, 1771.
- Masud, J.; Ioannou, P. C.; Levesanos, N.; Kyritsis, P.; **Nath, M.** "A Molecular Ni Complex Containing Tetrahedral Nickel Selenide Core as Highly Efficient Electrocatalyst for Water Oxidation" *ACS Catal. Sci. Chem.* **2016**, *9*, 3128-3132.

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