

Designing Nanomaterials for Energy Conversion and Biomedical Application

Research Topics

Designing High efficiency Water Splitting Catalysts

- Investigating transition metal chalcogenides for electrocatalytic water splitting.
- Understanding mechanistic details through exploration of molecular coordination complexes.
- Optimizing catalytic efficiency through controlling the chemical potential around the catalytic sites.

Nanostructure Arrays for Energy Conversion

- Growing nanotube and nanorod arrays for solar photoabsorbers through confined electrodeposition on lithographically patterned nanoelectrodes.
- Optimizing solar cell efficiency by tuning the growth dimensions and geometry.

Designed Synthesis of Non-enzymatic Glucose Biosensors

- Investigating transition metal selenides and tellurides for catalytic glucose electro-oxidation.
- Understanding mechanistic details through exploration of molecular coordination complexes.

PoC

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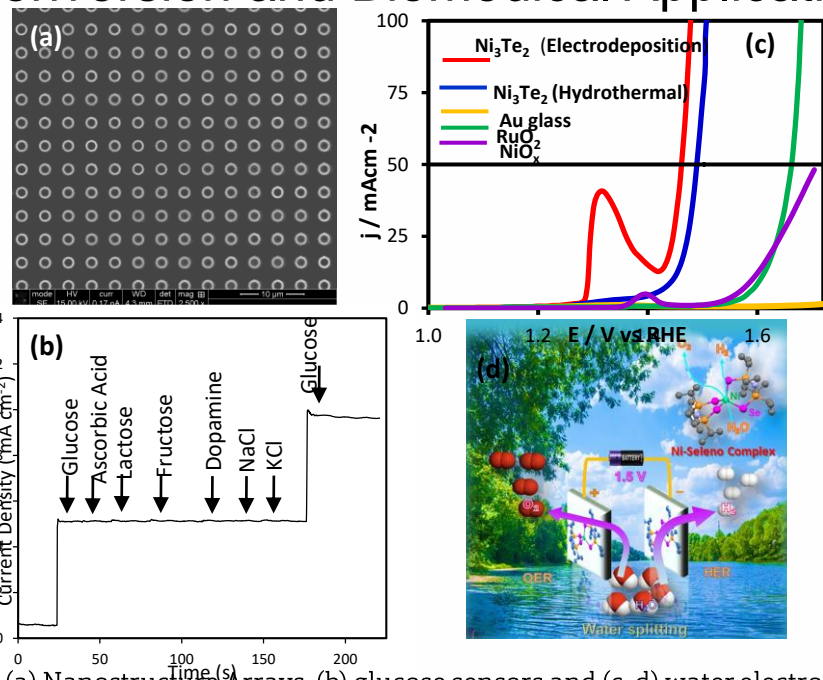
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- UM Research Board



(a) Nanostructure Arrays, (b) glucose sensors and (c, d) water electrolyzers

Keywords

- Solar energy conversion; water electrolysis, nanomaterials; solar-to-fuel energy conversion; nanobiosensors; non-enzymatic glucose sensors; magnetic fluid hyperthermia; oxygen evolution reaction.

Recognitions/Significant achievements

- <https://phys.org/news/2016-12-approach-hydrogen-production.html>
- 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.