Chemistry Research Capability at TSU

Brief introduction and Contact information

3/17/2018

Department of Chemistry, Tennessee State University

RESEARCH CAPABILITY

Department of Chemistry

College of Life and Physical Sciences

**Specific Research Areas**

***Cancer Research (Drs. Beni, Boadi, Vercruysse and Whalen)***

* Studies on the effect of heavy metals and how they modify DNA.
* The use of Natural and Synthetic Compounds in the Prevention of Oxidation of DNA, Proteins and Lipids
* Studies to assess the capacity of a variety of compounds, known to contaminate the environment, which interfere with this crucial immune function.
* **Anticancer drug discovery and development by chemical modification**
* Compounds found to interfere with the immune function of the NK cell are further examined for their capacity to alter the biochemical pathways needed by the NK cell to carry out its functions.
* The potential use of the flavonoids (i.e., kaempferol, quercitin, luteonin, genistein and eridictyol) as antioxidants against prooxidants
* Polysaccharide-stabilized nanoparticles: synthesis, characterization, applications
	+ - Polysaccharide/cation interactions
	+ - Enzymatic degradation of polysaccharides

***Nano materials Science (Dr. Moore)***

* + Synthetic inorganic and materials chemistry, and nanoscience.
	+ Synthesis of novel inorganic materials at both the macro- and nano-scales.
	+ Preparation of *c*eramic nanocomposite materials using sol-gel chemistry.
	+ Preparation of luminescent materials based on the MoO42− and WO42− complex ions.
	+ Syntheses of nanopowders of *r*are-earth molybdates and various metal tungstates
	+ Seperation Via Nano-Material Formation

***Nano-Materials with Biomedical Applications (Dr. Vercruysse)***

* Gold nanoparticles are developed for potential applications in the area of drug delivery.
* Rhodium and other nanoparticles are developed for potential applications in the area of chemical catalysis.
* Uranyl-based nanoparticles are developed for potential applications in the area of nuclear energy and safety issues.
* Other nanoparticles are developed for imaging purposes or for their magnetic properties.

***Biological and Bio-physical Chemistry (Dr. Phambu)***

* Dr. Phambu’s team investigates the interactions between antimicrobial peptides and membrane constituents, with special emphasis on the role of endogenous/ exogenous metal ions.
* Spectroscopic techniques are used to discern structural changes in both antimicrobial peptides and phospholipid membranes.

***Synthetic Organic Chemistry (Drs. Al-Masum, Beni, Karim, Okoro and Beni)***

* Synthesis of medicinally important compounds and study their medicinal values
* **Synthesis and application of phosphorylated nucleotides as anti-HIV agents:**
* **Synthesis and evaluation of modified oligodeoxynucleotides**
* Development of new synthetic methods
* Synthesis and chemistry of fluorinated cyclic β-diketones as building block for heterocyclic synthesis, topoisomerase II poisons/catalytic inhibitors, anticonvulsant drug synthesis, and enzyme inhibitors for CDK5, Hsp90, Akt, and 4-HPPD.

***Environmental Chemistry (Dr. Siddiquee)***

* Study of Environmental Contaminants
* To Understand Micro Environmental Chemistry
* Use of EPA Methods
* Study of Supramolecular host-guest complexation: structure-function relationship
Separation via nano material formation
Main stream waste separation: metals

***Atmospheric Chemistry (Dr. Guha)***

* Dr. Guha’s primary focus is the use of theoretical methods to investigate the structures, spectroscopy, energies, and kinetics of complexes and transition states involved in novel catalytic reactions between free radicals and molecules in the Earth's atmosphere as well as interstellar space.
* Dr. Guha is interested in analyzing the photochemistry of small molecules in order to understand the reaction mechanisms of upper atmospheric species that have not yet been addressed.

***Polymer Chemistry (Dr. Zheng)***

* Analyzing Polymer Additives by GC-MS and LC-MS
* In mass spectrometry area, Dr. Zheng’s interests are (A) development and application of GCMS and LCMS methods to measure stable isotopic tracer enrichments in biological samples, and (B) identification of additives in synthetic polymer.