Albany State University

Faculty Capabilities and Interests

Names: Richard James Mason, Jr.

Discipline: Chemistry

Subdiscipline(s): Synthetic Organic Chemistry

Areas of Research Interests: Organic semiconducting materials

Skills: Educational Software

Moodle (Modular Object-Oriented Dynamic Learning Environment), WebCT, Blackboard Vista, Degreeworks

Respondus, TurningPoint Audience Response System, Atomsmith (molecular modeling-MM2 level), ChemOffice

ACD/Chemsketch, ISIS, Microsoft Office, SciFinder Scholar, Origin, KaleidaGraph.

Instrumental Software

Varian NMR software, Bruker NMR software, Omnic FT-IR software, MestreNova.

Instrumental

^{1}H NMR, ^{13}C NMR, ^{19}F NMR, ^{29}Si NMR, 2D NMR, FT-IR, GPC, GC/MS, HPLC, UV-Vis spectroscopy,

Fluorescence spectroscopy, cyclic voltammetry, DSC, TGA Microwave (CEM Discover Labmate and Biotage Initiator), High Performance flash chromatography (Biotage Isolera).

Research Summary *(current, performed in the past 5 year; 300 words or less):*

1) Synthesis of Imidazo[1,5-a]pyridines: Imidazo[1,5-a]pyridines and their derivatives with a nodal nitrogen atom, are an important class of ring fused heterocyclic which compounds exhibit a wide spectrum of bio-logical activities. In addition, imidazo[1,5a]pyridines are both an important intriguing class of compounds due to their unique structural (π- conjugated system)and photophysical properties . Therefore development of new efficient synthetic method for the synthesis of these compounds is of paramount importance.

2) Structure/Property relationship of imidazopyridines: In order to realize the full potential of n-type semiconducting materials, it is imperative that these materials posses the ability to perform under ambient conditions. The structure-property relationship of imidazo[1,5-a]pyridine containing functionalized with electron withdrawing groups, a class of potential n-type semiconducting materials and has not been yet examined. The synthesis of a convenient library of small molecules, with diverse imidazo[1,5-a]pyridine appended with electron withdrawing groups will allow us to investigate the molecular structure-property relationships of this systems. The study should demonstrate that optical and electronic properties of a series of these new imidazo[1,5a]pyridines can be finely tuned through the different electron withdrawing groups interactions with imidazo[1,5-a]pyridine, resulting in a better understanding of their potential uses in various optoelectronic application, in particular organic field effect transistors under ambient conditions

3) The specific aim of this project is to develop sensitive saccharides sensors, using 1,3-diphenylimidazo[1,5-a]pyridine cores appended to a boronic acid receptor unit, that can successfully and selectively detect and quantify various saccharide concentrations. The initial phase of this project entails the design, synthesis and characterization of the prerequisite functionalized imidazo[1,5-a]pyridines. Implementing methodologies, adapted from the research literature, a rationally designed library of sensors based on photoinduced electron transfer (PET) and internal charge transfer (ICT) mechanisms are being prepared.

Keywords: Organic semiconductors, Organic field effect transistors, Diabetes sensors