CHEMISTRY SEMINAR

Investigation of a novel pulse sequence for signal enhancement of 15N NMR

by Ofek Eisenbach ‘25 Chemistry

11:30 a.m. **April 24, 2025** **Darrah Auditorium**
McCreary Room 101

Abstract:
Solid State Nuclear Magnetic Resonance (ssNMR) is an incredibly valuable technique for investigating structure and dynamics. Low sensitivity is an inherent and enduring problem within the field, with much research going into finding methods to enhance the signal. One of the most common methods for signal enhancement is by changing the NMR’s pulse sequence to transfer magnetization from higher signal nuclei to lower signal nuclei. We investigate a novel pulse sequence for signal enhancement of 15N NMR.

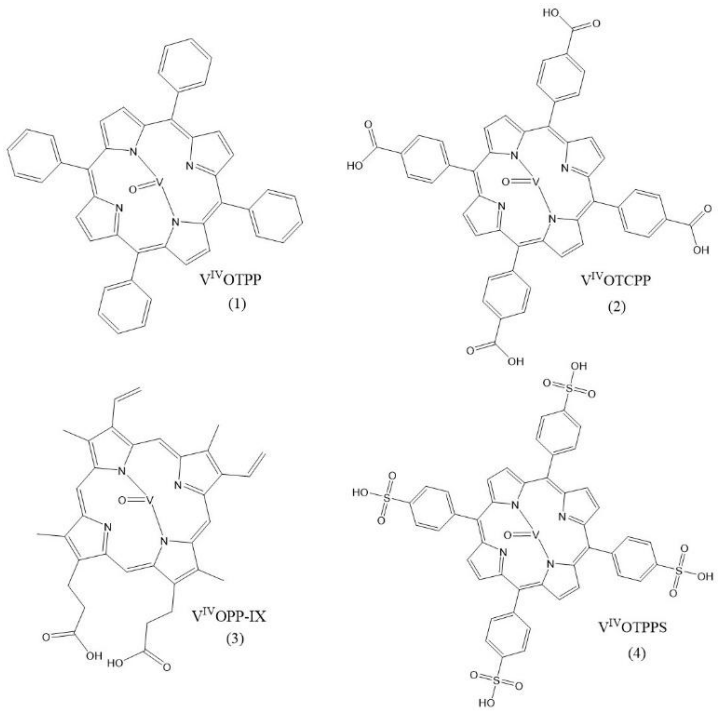
CHEMISTRY SEMINAR

Vanadium Porphyrins: Synthesis, Characterization and Applications in Catalysis

by Israel Fuentes Juarez ’25 BMB

11:30 a.m. **April 24, 2025** **Darrah Auditorium**
McCreary Room 101

Abstract:
Metalloporphyrins are essential molecules that play key parts in biological and nonbiological systems due to their exceptional physical and chemical properties. Porphyrins are commonly found in nature, such as hemes (iron bound porphyrin structures), and this association plays a critical role in structure and function of associated proteins. Vanadium has known association with porphyrins, especially in oil extracts, and could potentially be used as an alternative catalyst to Fe porphyrins, given the similar properties that they share. The synthesis and characterization of vanadium porphyrins is an important research area, as it provides information as to how nature selected metals for their incorporation into biological systems as insight into the optimization of metalloporphyrins for enantioselective reactions, by observing the electronic and structural effects of these complexes. The synthesis and characterization of vanadium porphyrins was carried out through NMR spectroscopy (1H, 13C, 51V), to understand how local environments affect vanadium characteristics. Four vanadium porphyrins,5,10,15,20-Tetraphenyl vanadium (IV) porphyrin (VIVOTPP), 5,10,15,20-tetraphenyl vanadium (IV) tetrakis (benzenesulfonic acid (VIVOTPPS), 5,10,15,20-tetraphenyl vanadium (IV) carboxyphenyl (VIVOTCPP), and vanadium (IV) protoporphyrin-IX (VIVOPP-IX) were synthesized and characterized with limited success. The compounds were oxidized to a V+5 oxidation state to characterize them through NMR.



CHEMISTRY SEMINAR

Understanding Small Molecule Chiral Pharmaceuticals

by Thalia Hubbard ‘25 Chemistry/Public Policy

11:30 a.m. **April 24, 2025** **Darrah Auditorium**
McCreary Room 101

Abstract:
In the 1960s, the world watched in fear as babies died of birth defects attributed to thalidomide. Thalidomide is a chiral compound with a single stereocenter, meaning two non-superimposable mirror image structures exist for this compound. Following the thalidomide disaster, it was discovered that one of these structures, or enantiomers, of thalidomide was teratogenic, and caused birth defects, while the other caused sedative effects as marketed. Chiral medications are a recent research focus in the biopharmaceutical industry, as chiral medications tend to have fewer side effects, less drug-drug interactions, and increased selectivity compared to achiral compounds. Additionally, the two enantiomers of a compound are able to participate in different mechanisms and as such, may have widely different effects on the human body, as evidenced by the thalidomide crisis. Chiral pharmaceuticals are sold either as the enantiopure compound or as a mix of enantiomers. Mixtures of enantiomers can further be classified by the bioactivity of the enantiomers and their ability to undergo chiral inversion. The selectivity of chiral pharmaceuticals allows these compounds to find use battling antibiotic-resistant bacteria or platinum-resistant cancers.