

Organometallic Chemistry for Catalysis, Medical Imaging, and Drug Design Dr. Pienkos URP 2024

Organometallic chemistry is an emerging field finding application in catalysis, medical imaging, and drug design. Dr. Pienkos will briefly highlight three research projects that cover the aforementioned topics. The projects are as follows:

1) Ligand design and characterization.

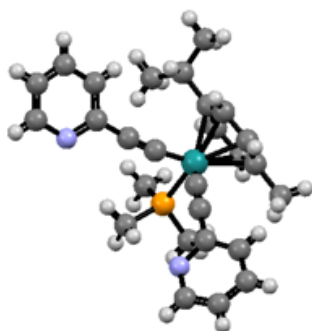
Trans-bidentate ligands, which force metals to adapt to a constrained geometry, are useful in the field of catalysis. Herein, we propose a means to easily access *trans*-bidentate ligands using octahedral and square planar metal complexes.

2) Iridium based imaging agents.

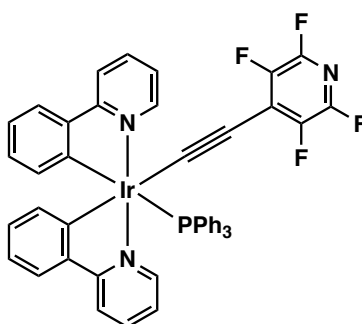
Tuning how compounds interact with light is of great interest to chemists because changing a material's absorption and emissive properties (a way in which a compound releases light as energy) allows it to be used in a variety of different applications. For instance, iridium based compounds are being investigated as medical imaging agents because of their emissive properties. Herein, we propose a method to synthesize such emitters.

3) Carbon Monoxide Releasing Molecules

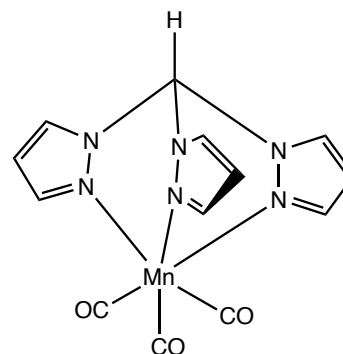
Carbon monoxide (CO) when ingested in large quantities is fatal, however, controlled absorption has shown medicinal benefits. For instance, administration of CO (200 ppm) through the lungs as a mixture with air can decrease inflammation. The drawback of this treatment is that CO is administered globally, and can affect areas other than those intended for treatment. A strategy to precisely control the delivery of CO involves binding CO to a carrier molecule, which, when delivered to targeted cells, can be triggered to release CO. Transition metals, because of their affinity for CO, are good candidates for these delivery systems and have been used as CO releasing molecules (CORMs). This project aims to synthesize and study new classes of CORMs.



Ligand Design



Imaging Agents



CORMs