My research has been centered around the goal to find a generalized attachment strategy for the adherence of electroactive molecules to electrode surfaces. These molecules can then be characterized through cyclic voltammetry in various conditions and pH’s with the ultimate goal of attaching active catalysts for fuel forming reactions. Several methods for the synthesis of hollow silica nanospheres have been attempted with limited success. However, I have demonstrated the uptake of \([\text{Ru(bpy)}_3]^{2+}\) into the amorphous silica material that has been synthesized. These particles can be attached to glassy carbon electrode surfaces via polyurethane film formation (Thermoplastic vs Highly Resistant Thermoplastic Urethanes) and remain electrochemically active. We have also experimented with amine and octyl silane films for attachment of molecules to GC electrodes, but these remain far less stable than the HPU/TPU films. I found an ideal HPU/TPU ratio through different experiments and have been using 50:50 HPU/TPU films to attach the silica gel particles onto the electrode surface.