Title: Investigation of crosslinked UiO-66-NH_2 and MiL-125-NH_2 PANI-Graphite electrodes as supercapacitors

The fabrication of composite electrodes for supercapacitors utilizing Metal Organic Frameworks (MOFs) and conducting polymers has become a popular area of research. MOFs have garnered attention specifically because of their high tunability and high porosity, which makes them great options when considering electrode production. However, MOFs are intrinsically insulating, which means they require modifications to improve charge transfer. Conductive organic polymers, such as polyaniline, are often introduced to MOFs to improve conductivity. In the case of amine-functionalized MOFs, polyaniline can also serve as an anchor that binds the MOF to a substrate through the NH_2 group of the organic linker. UiO-66-NH_2 and Mil-125-NH_2 were deposited onto electrochemically synthesized PANI-Graphite electrodes using electrophoretic deposition and then crosslinked under relatively mild conditions. Graphite was chosen because it is an inexpensive conductor that serves as a substrate for the PANI-MOF electrodes. The crosslinked PANI-MOF composite was characterized using FTIR-Infrared spectroscopy, UV-Vis Integrated Sphere, and XRD analysis. Each electrode was characterized using FTIR-Infrared spectroscopy, white light interferometry, SEM imaging, and EDS analysis. The electrochemical properties of each electrode were characterized by utilizing Cyclic Voltammetry and Galvanostatic Charge Discharge techniques.