RYANNE BROWN#, and ROSALYNN QUINONES-FERNDANDEZ, Department of Chemistry, Huntington, WV, 25755. **Polymorphism screening of drugs.**

The presence of crystal polymorphisms within common pharmaceutical drugs can alter the drug's stability, rate of absorption into the body and bloodstream, as well as its effectiveness. Manipulations to the drug's disposition surface with organic acid self-assembled monolayers (SAMs) can introduce various functional groups to surface creating novel bonding structures with the drug and induce polymorphic orientations; organic acids used in this project include octadecylphosphonic acid (ODPA), 16-phosphonohexadecanoic acid (COOH-PA), and hexadecane sulfonic acid (HDSA). Several pharmaceutical drugs were examined due to their known existence of polymorphisms: flufenamic acid (FFA), a common nonsteroidal anti-inflammatory drug (NSAID) pain-reliever with 9 known forms; caffeine, a widely consumed stimulant with 2 forms; and carbamazepine, an anti-convulsant for epilepsy treatment with 4 known polymorphic forms. In addition, the federally scheduled drug cocaine, was selected because of no reported conclusions or investigations on its polymorphic tendencies. Screening of polymorphisms and their analysis was completed using Diffuse Reflectance Infrared Fourier Transform (DRIFT) spectroscopy, an IR Microscope, Raman spectroscopy, and Powder X-Ray Diffraction (PXRD), while analysis of absorption rates in the body conditions was estimated using UV-Visible Spectrophotometry. Thus far in the investigation, 5 polymorphic forms of FFA have been produced, the anhydrous caffeine crystal, and 3 forms of carbamazepine.