

UNIVERSITY OF RHODE ISLAND
Department of Chemistry Ph.D. Seminar

Room 105 Beaupre
3:00 P.M., Monday, April 25, 2022

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***“Exploring metal
phthalocyanines as sensors
for small oxygen-containing
molecules”***

HOST

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Exploring metal phthalocyanines as sensors for small oxygen-containing molecules

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Small oxygen containing molecules such as acetone, hydrogen peroxide, formaldehyde and formic acid present a difficult challenge in detection via visible and fluorescence spectroscopy as by themselves they produce little to no signal. These are also important molecules to our everyday life. Hydrogen peroxide has often been used as an adjacent to the explosives of TATP and HMTD. Formic acid and formaldehyde present danger in textile production and the foam industry resulting in cancer, especially in children. Acetone has also become a known biomarker for diabetes, resulting in a focused effort in creating detection methods for it. Metal phthalocyanines present a potential in detecting these molecules and possibly distinguishing between them as well. Previously used often in electrochemical sensors and solar cell research, as well as commercial dyes, these compounds will be used in a novel way. By utilizing a variety of metal centers and two augmented ring phthalocyanines we will show changes across the UV-visible and fluorescence responses depending on the analyte. From this data we are able to compare the changes in the spectroscopic properties for each analyte/dye pair and create spectroscopic fingerprints as well as explore a reaction between a modified phthalocyanine ring and formic acid resulting in its own separate sensor. While this work is done in the solution phase it lays out a potential path forward towards the development of thin film sensors.