AN AZOMETHINE-H-BASED FLUOROGENIC SENSOR FOR FORMIC ACID. Mark Potter, Suman Debnath, Marcus W. Drover, Simon Rondeau-Gagné, & Bulent Mutus. University of Windsor, Department of Chemistry and Biochemistry, 401 Sunset Ave, Winsor, ON N9B 3P4, Canada. (potterm@uwindsor.ca)

Formic acid (FA) sensing has received increasing attention in recent years due to its ability to act as a liquid-organic hydrogen carrier and as a fuel source in formate fuel cells. As the use of FA increases, the development of sensitive FA sensors is of considerable interest. For this, the commercially available fluorescent dye azomethine-H (Az-H) was investigated. Solution-based studies showed that FA quenches both the absorbance and fluorescent properties of Az-H. Additionally, FA was found to diminish the (E)-to-(Z) photoisomerization rate of Az-H, suggesting an Az-H/FA interaction which is likely a result of hydrogen-bonding. To sense FA vapours, an Az-H solid state sensor was fabricated by incorporating this dye into a gelatin matrix to produce Az-H/Gelatin thin films. Upon exposing these thin films to FA vapor, a FA-dependant fluorogenic response was observed. The response was attributed to the formation of a stable hydrogen-bonded Az-H/FA complex that facilitates the (Z)-to-(E) isomerization, producing the more fluorescent E-isomer. Thus, Az-H/Gelatin thin films can be used as a fluorogenic sensor for FA vapor with a detection limit of ~0.4 ppb. This work describes a sensitive solid-state and solution-based sensor for FA, encouraging cleaner energy source adoption, and broadening organic acid detection capabilities.