UNIVERSITY OF RHODE ISLAND
Department of Chemistry
SEMINAR

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Sauradip Chaudhuri

Graduate Student
Chemistry Department
URI

"Progress towards selective and sensitive detection systems employing synthetic cyclodextrin derivatives."

HOST

Jason Dwyer
Department of Chemistry
401-874-4648

CHM 644

Progress towards selective and sensitive detection systems employing synthetic cyclodextrin derivatives.

Sauradip Chaudhuri

Department of Chemistry, University of Rhode Island

Abstract: Development of supramolecular sensors involves the design and synthesis of supramolecular hosts for selective and sensitive detection systems for environmentally toxic compounds and anions. The ability of three architecturally distinct combinations of perbenzylated-β-cyclodextrin/fluorophore sensor molecules to distinguish three isomeric and two analogous classes of analytes with 100% accuracy using linear discriminant analysis (LDA) of the fluorescence response signals has been discussed. Each analyte-sensor binding event results in the modulation of the fluorescence signal of the associated fluorophore, generating a unique chemical signature for each isomer across all the three sensors in an array based sensing strategy. Additionally, the synthesis of a series of cyclodextrin-incorporated higher order architectures has also been actively pursued. These architectures have been designed to exhibit higher binding affinity and greater selectivity towards larger hydrophobic analytes like stilbene, tamoxifen and biphenyls based on hydrophobic binding of the guest from two or more distinct ends of the molecule. Two cyclodextrins were tethered by aromatic/alkyl amide linkages, and binding properties of these novel receptors were investigated for near infrared (NIR) squaraine dyes as transducers (Figure 1).

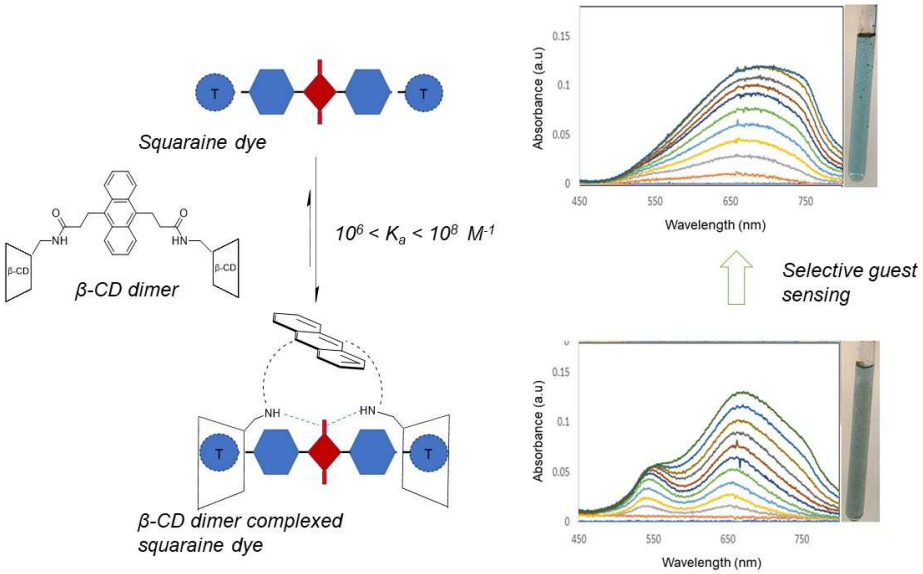

Figure 1. Schematic representation of β-cyclodextrin dimer complexed squaraine dyes employed for visual detection of selective guest analytes.