UC San Diego
JACOBS SCHOOL OF ENGINEERING
NanoEngineering

UCSD NanoEngineering/Chemical Engineering
SEMINAR SERIES
Wednesday, February 19, 2020
Seminar Presentation: 11:00am – 12:00pm
SME room 248

"Conjugated Polyelectrolytes in Biosensing and Disinfection"

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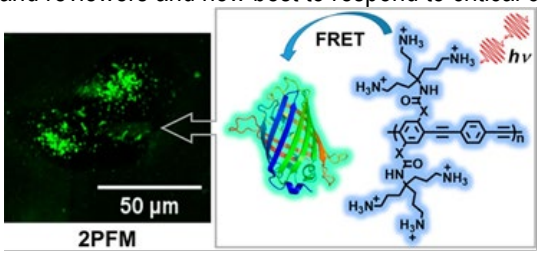
Abstract: Conjugated polyelectrolytes (CPEs) featuring poly(phenylene ethynylene) and poly(thiophene) backbones substituted with ionic solubilizing groups are water soluble. These materials display a variety of interesting properties, including self-assembly into nanoscale aggregates, ability to process into nanostructured layer-by-layer films and optical/stimuli responsive behaviour in the presence of ions, surfactants and biomacromolecules. We have explored the use of cationic CPEs as fluorescent sensors for polyphosphates (pyrophosphate, ATP and ADP). In addition, cationic CPEs exhibit profound light-activated biocidal activity vs. a broad spectrum of bioagents, including bacteria, virus particles and spores. The talk will give a high-level overview work in this area, including recent work concerning the interactions between cationic CPEs and mammalian cells.

I will also speak briefly about scientific publishing, from the viewpoint of the editor of a large materials science journal. What makes a good paper, how is it assessed by editors and reviewers and how best to respond to critical comments after peer review.



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[2] Parthasarathy, A.; Pappas, E. H.; Hill, E. H.; Huang, Y.; Whitten, D. G.; Schanze, K. S. "Conjugated Polyelectrolytes with Imidazolium Solubilizing Groups. Properties and Application to Photodynamic Inactivation of Bacteria", ACS Appl. Mater. Interfaces 2015, 7, 28027-28034, DOI: 10.1021/acsami.5b02771.

[3] Wang, S.; Li, Z.; Liu, X.; Phan, S.; Lv, F.; Belfield, K. D.; Wang, S.; Schanze, K. S. "Two-Photon Absorption of Cationic Conjugated Polyelectrolytes: Effects of Aggregation and Application to 2-Photon-Sensitized Fluorescence from Green Fluorescent Protein", Chem. Mater. 2017, 29, 3295–3303, DOI: 10.1021/acs.chemmater.7b00676.

[4] Li, Z.; Acharya, R.; Wang, S. S.; Schanze, K. S., "Photophysics and Phosphate Fluorescence Sensing by poly(Phenylene Ethynylene) Conjugated Polyelectrolytes with Branched Ammonium Side Groups", J. Mat. Chem. C 2018, 6, 3722-3730, DOI: 10.1039/c7tc05081j.

[5] Huang, Y.; Li, Z.; Risinger, A. L.; Enslow, B. T.; Zeman, C. J., IV; Jiang, G.; Yang, Y.; Schanze, K. S. "Fluorescence Spectral Shape Analysis for Nucleotide Identification" Proc. Nat. Acad. Sci. USA 2019, 116, 15386-15391, DOI: 10.1073/pnas.1820713116.

Biosketch: Kirk Schanze earned his B.S. in Chemistry from Florida State University in 1979 and his Ph.D. in Chemistry from the University of North Carolina at Chapel Hill in 1983. He was appointed a Miller Postdoctoral Fellow at the University of California, Berkeley, from 1984-1986 and began his independent faculty career at the University of Florida in 1986. Schanze was University Distinguished Professor and Prominski Professor of Chemistry at the University of Florida until 2016. He is currently the Robert A Welch Distinguished University Professor at the University of Texas at San Antonio. He was a Senior Editor of the ACS journal Langmuir from 2000 - 2008. Since 2008, Schanze is Editor-in-Chief of ACS Applied Materials & Interfaces, the ACS journal focused on chemistry and engineering of applications-focused research in materials and interfaces.

He has authored or co-authored more than 300 peer-reviewed articles on basic and applied research topics, with a primary focus on organic and organometallic materials chemistry, and is named in 20 patents or disclosures.