UNIVERSITY OF HOUSTON
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SPEAKER SERIES

PRESENTS

Molecular and Nanostructure Engineering of Semiconducting Polymers for Information, Energy and Health Technologies

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Friday, September 21, 11:15 am
Melcher Hall - Room 180 (Business School)

LECTURE ABSTRACT

The design of functional polymers with well-defined structure and architecture and with the ability to precisely control sequence has been of significant technological and fundamental interest. The ability to engineer the electronic, photonic and magnetic properties and elucidate structure–property relationships is essential for developing novel materials, functions and device applications. Also of significant interest is the synthesis of zero–dimensional (0–D) and one–dimensional (1–D) nanostructures of organic semiconductors for exploration of the effects of carrier and exciton confinements as well as applications in electronic devices. In this seminar, I will present recent progress in materials design and synthesis of polymers, factors that determine their self-assembly, elucidation of structure–property relationships that govern their electronic and optoelectronic properties. First, an extremely simple and an effective strategy to generate well-aligned arrays of 1-D polymer semiconductor nanowires that exhibit remarkable enhancement in charge transport and would enable high-performance, large-area, flexible electronic devices for a wide range of applications will be presented. Second, I will discuss our recent efforts in developing multicomponent photonic polymer nanoparticles (0D) for targeting tumor cells as well as targeted molecular imaging agents in carotid artery atherosclerosis and to elucidate key biological processes for early diagnosis. Finally, I will highlight new strategies in engineering of excited states and spin-polarization of soft materials to understand and control the role of electron spin dynamics for potential application in magneto-optic and optoelectronic devices.

SPEAKER BIOSKETCH

Eilaf Egap joined the Departments of Materials Science and NanoEngineering and the Chemical and Biomolecular Engineering at Rice University in August 2017. She received her PhD degree from the University of Washington in 2011, where her work focused on polymeric materials for electronics and optoelectronics. She then moved to MIT as a postdoctoral fellow where she developed a new platform of multicomponent nanomaterials for diagnostics and imaging. Prior to moving to Rice, Eilaf started her independent career as an Assistant Professor in the Department of Chemistry at Emory University and the Wallace H. Coulter Department of Biomedical Engineering at Georgia Institute of Technology and Emory University. Eilaf is the recipient of 2015 Thieme Chemistry Award, 2017 Emerging Investigators in the Journal of Materials Chemistry C and the 2018 ACS PMSE Young Investigator. Broadly, her group is interested in the molecular-engineering and self-assembly of functional soft materials with the goal of controlling and creating novel photonic, electronic, and magnetic properties to enable new forms of technologies.

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