

Colloquium

Light-responsive organic molecular switches for energy storage and nano-gap modulation

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Abstract

Dynamic molecular switches, which change their conformation upon exposure to external stimuli, have been of interest to diverse fields of study and applications such as sensing, drug delivery, and memory due to the rapid and significant changes of their physical properties. Particularly, photo-switches that exhibit reversible response to light by isomerization are of interest since they enable rapid and repeated switching by remote irradiation. This seminar will illustrate diverse strategies for utilizing molecular photo-switches for energy and nano-device applications. Due to the intrinsic energy gap between isomeric states, solar energy can be absorbed and stored in a metastable state of photo-switches until being trigger-released. The nanoscale structural change of molecule is employed to fine-tune small gaps of nano-devices. A new method developed to directly image the nanoscale structural change of photo-switches using annular dark-field scanning transmission electron microscopy (ADF-STEM) will be also presented.

Bio

Grace was born and raised in South Korea where she attended POSTECH and received BS in Chemistry. She spent a year in UC Berkeley and worked in the laboratory of Prof. Jeffrey Long to perform research in metal-organic frameworks. Then she pursued PhD in Chemistry at MIT with Prof. Timothy Swager, and her thesis mainly focused on the covalent functionalization of nanocarbon materials and on developing organic semiconductors for photovoltaics. Grace joined the Department of Materials Science and Engineering at MIT as a postdoctoral associate with Prof. Jeffrey Grossman in 2015, where she explored various research areas including solar thermal fuels, 2D materials, and thermal storage. Grace joined the Department of Chemistry at Brandeis in July 2018, and her team's effort in thermal energy control and storage applications has been recently recognized by Provost Research Award and Entrepreneurship Awards at Brandeis University.

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