Mogens Brøndsted Nielsen, J Material Sci Eng 2015, 4:3
http://dx.doi.org/10.4172/2169-0022.S1.002

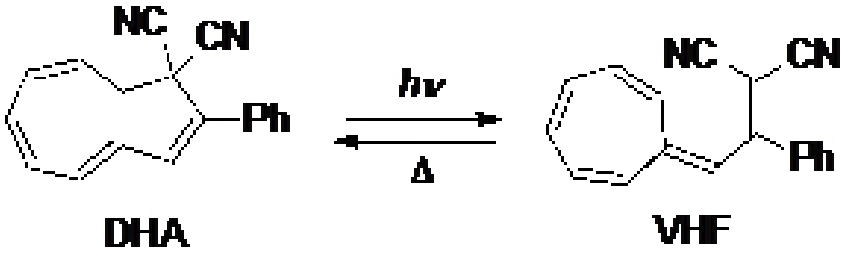
OMICS International
conferenceseries.com

International Conference on
Smart Materials & Structures
June 15 -17, 2015 Las Vegas, USA

From light-controlled molecular electronics devices to solar energy storage materials

Mogens Brøndsted Nielsen
University of Copenhagen, Denmark

Molecular switches that can be converted between high- and low-conducting states play a central role for information storage and logic operations at the molecular level and hence for the development of molecular electronics. The 1,8a-dihydroazulene-1,1-dicarbonitrile (DHA) molecule presents an example of such a light-sensitive molecule. Thus, by irradiation with light, DHA undergoes a ring-opening reaction to form a vinylheptafulvene (VHF) which in turn can return to DHA by a thermally induced ring-closure. By suitable functionalization in either the five- or seven-membered rings of DHA, the switching behavior can be finely tuned as well as the optical properties of both the DHA and VHF isomers. By incorporation of sulfur end-capping groups, DHA molecules can be anchored to silver or gold electrodes and hence be used as molecular wires/switches for molecular electronics. This talk will present how light-controlled conductance switching has been established in different junctions. In addition, the higher energy of the metastable VHF isomer renders the DHA-VHF pair interesting for solar thermal energy storage systems (solar-heat batteries). Such systems should harvest sunlight, store the energy, and ultimately release the energy when triggered. Challenges in regard to controlled release of the energy as well as energy storage capacities will be presented.



Biography

Mogens Brøndsted Nielsen is Professor of Organic Chemistry in Department of Chemistry at the University of Copenhagen, where he teaches courses in advanced organic chemistry, heterocyclic chemistry, and supramolecular chemistry. He has published more than 100 peer-reviewed papers, monographs, and book chapters.

mbn@kiku.dk

Notes: