応化分子教室セミナー

Center for Molecular Systems (CMS), The 59th CMS International Seminar

Photoswitchable Molecules to Remote-Control Materials and Devices

Prof. Dr. Stefan Hecht

Humboldt-Universität zu Berlin

平成30年3月7日(水)　13:00—14:30

伊都キャンパス ウエスト3号館 2階会議室 (209)

この度、Prof. Dr. Stefan Hechtのご来学に際し、セミナーを開催させていただく運びとなりました。
光機能化学分野に関する学術研究の最先端動向に関しても情報を得る機会にもなります。詳しくは別紙の予稿をご覧ください。
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連絡先 君塚 信夫　e-mail: n-kimi@mail.cstm.kyushu-u.ac.jp　内線(2832)
九州大学大学院工学研究院 応用化学部門 分子システム科学センター(CMS)

Free Admission

Photoswitchable Molecules to Remote-Control Materials and Devices

Stefan Hecht

Department of Chemistry & IRIS Adlershof, Humboldt-Universität zu Berlin, Germany

Email: sh@chemie.hu-berlin.de; URL: www.hechtlab.de

Controlling molecular building blocks and their organization into nanostructured materials with specific functions constitutes the basis of modern bottom-up materials science. Using an external light stimulus to control such advanced materials in a dynamic fashion with superior spatial and temporal resolution offer tremendous opportunities and is at the heart of our group's research program. This presentation will highlight some recent examples from our laboratory in which carefully designed photoswitches with improved performance have been exploited to remote-control materials. To develop photoswitchable systems into high-performing materials and practical applications the switching processes have to be highly efficient and reliable. Both criteria are stringent and necessitate continuing optimization of key parameters, involving spectral separation and selective addressability in attractive wavelength regions using one or two photons, high quantum yields for switching in both directions, enhanced (photo)chemical resistance enabling highly repetitive switching without fatigue, among others. Importantly, the photoswitchable systems of choice have to undergo a significant change of the physicochemical property of choice in order to maximize the overall achievable modulation. Specifically, this presentation will detail some of our recent efforts to optimize various photoswitches, such as azobenzenes,[1] diarylethenes,[2] acylhydrazones,[3] and indigos[4] with regard to their switching characteristics and furthermore illustrate the use of these optimized photochromic building blocks to control dynamic polymeric materials[5] as well as charge transport in optoelectronic devices[6] and to drive optomechanical transduction.[7]

References

[1] *J. Am. Chem. Soc.* **2012**, *134*, 20597; *Angew. Chem. Int. Ed.* **2016**, *55*, 1569.
[2] *Chem. Sci.* **2013**, *4*, 1028; *J. Am. Chem. Soc.* **2015**, *137*, 2738; *Angew. Chem. Int. Ed.* **2016**, *55*, 1208.
[3] *J. Am. Chem. Soc.* **2015**, *137*, 14982.
[4] *J. Am. Chem. Soc.* **2017**, *139*, 15205.
[5] *Angew. Chem. Int. Ed.* **2016**, *55*, 13882; *Nat. Commun.* **2016**, *7*, 13623.
[6] *Nat. Chem.* **2012**, *4*, 675; *Nat. Commun.* **2015**, *6*, 6330; *Nat. Nanotech.* **2016**, *11*, 769.
[7] *Nat. Commun.* **2016**, *7*, 11975.