

MO 30: Poster: Photochemistry

Time: Thursday 16:00–18:00

Location: P1

MO 30.1 Thu 16:00 P1

In situ X-ray scattering and differential reflectance spectroscopy (DRS) of molecular switches — •SEBASTIAN BOMMEL, CHRISTOPHER WEBER, and STEFAN KOWARIK — Institut für Physik der Humboldt-Universität, 12489 Berlin, Deutschland

Molecular switches are a promising class of functional molecules on surfaces. Controlling the functional properties at an atomic scale opens a wide range of applications for molecular electronics, molecular sensing, smart surfaces and nanomachinery. We study the optically induced geometrical and spectral changes of molecular switches using *in situ* real-time x-ray scattering and Differential Reflectance Spectroscopy (DRS). We use a portable UHV organic molecular beam deposition (OMBD) system that has been optimized for small size, optical spectroscopy and *in situ* x-ray scattering in order to measure the Gracing Incidence X-ray Diffraction (GIXD) pattern before and after switching the molecules. This allows us to compare the switching behavior of the molecular classes of azobenzenes, cyclopentene and maleimide.

MO 30.2 Thu 16:00 P1

Metallic Nanoparticles as Non-linear Optical Antennae in Photoactive Polymer Matrices — •PHILIPP REICHENBACH¹, ULRIKE GEORG², THOMAS KÄMPFE¹, STEFAN GRAFSTRÖM¹, BRIGITTE VÖLT², and LUKAS M. ENG¹ — ¹Technische Universität Dresden, Institut für Angewandte Photophysik - IAPP, George-Bähr-Straße 1, 01069 Dresden, Germany — ²Leibniz-Institut für Polymerforschung - IPF, Hohe-Straße 6, 01069 Dresden, Germany

Our work deals with triggering photochemical reactions on the nanometer length scale by using strongly localized optical fields. In previous investigations, UV-based photochemical reaction were induced through fiber-based linear optical near-fields with an optical resolution on the 1 μm length scale. The goal here is to use second-

harmonic radiation (SHG) generated at a metallic nanoantenna structure in order to locally induce such photochemical reactions. We use metallic nanoantennae with sharp edges and tips, serving two purposes: firstly to confine the optical field to a nanoscale area, and secondly to enhance the local SHG field considerably. Both effects are needed in order to achieve an optical resolution < 100 nm.

We embed such SHG sources into a photoreactive polymer matrix, which is photosensitive to SHG wavelength at 400 nm, but transparent at the exciting wavelength of 800 nm. Upon irradiation with 800 nm femtosecond pulses, photochemical reactions are induced in the immediate surroundings of the nanoparticle antennae via SHG. This will be proven by both direct optical means as well as topographic inspection.

MO 30.3 Thu 16:00 P1

Time resolved studies of spiropyrans in water — •JÖRG KOHL-LANDGRAF, JOSEF WACHTVEITL, DIANA GONÇALVES, and ALEXANDER HECKEL — Goethe-Universität Frankfurt a.M.

Spiropyrans, which consist of two orthogonal ring systems, are photochromic molecules that can be optically switched between two conformational states.

We focus on spiropyran derivatives with improved water solubility and the capability of binding to RNA fragments. This enables triggering RNA activity by simply inducing structural changes upon irradiating the photoswitch with a proper wavelength. Subsequently interaction with the photoswitch as well as its RNA dynamics taking place after excitation of the photoswitch will be studied by means of time resolved IR spectroscopy.

We present steady state observations and recent results maintained by femtosecond pump/probe spectroscopy in the visible and infrared spectral region. We show that the ring opening as well as the closing process is obtained in the low picosecond range. Furthermore we partially reveal the reaction pathway for the isomerization processes.