UNIVERSITY OF TWENTE.

MESA+ INSTITUTE FOR NANOTECHNOLOGY

Molecular Movies of Ultrafast Processes in Artificial Photosynthesis

October 27, 2016, 10:15-12:00, CR 1333

10:15-10:45 **Viewing electrons at work in solar energy conversion**

Prof. dr. V. Sundström, Chemical Physics Department, Lund University, Sweden

Solar energy is the most abundant renewable energy source available. Conversion of light into electricity and chemical energy are the two major paths for solar energy conversion. Nanostructured organic materials are being explored for applications in photovoltaic solar energy conversion, as well as photocatalysis for solar fuel generation. Light harvesting, energy transport, charge photogeneration and recombination, charge transport are the elementary processes accounting for the conversion of light energy into useful charge carriers. We show how a combination of time resolved spectroscopy covering the time scales from femtoseconds to milliseconds and spectral range from x-rays to the far infrared (THz frequencies) is a powerful tool to study the light-induced processes and provide mechanistic information valuable for the design of novel materials.

10:50-11:20 **Recent progress in the development of supramolecular photocatalysts for the light-driven generation of hydrogen from water**

Prof. dr. J.G. Vos, School of Chemical Sciences, Dublin City University, Ireland

In this presentation the design and application of bimetallic photocatalysts of the type Ru/M where M =Pd or Pt for the generation of hydrogen via intramolecular light driven processes are assessed. The basic ideas behind the development of these supramolecular assemblies and the evaluation of these ideas over the last number of years are discussed. Particular attention is paid to the contributions of the catalytic centre and the bridging and peripheral ligands.

11:25-11:55 **Probing (not so) ultrafast spin cross over in solution with Raman spectroscopy**

Prof. dr. W.R. Browne, Stratingh Institute for Chemistry, University of Groningen

Spin crossover, the switching of a molecule from one microstate to another, is an increasingly important phenomenon especially in solid-state devices where cooperativity is a key factor in delivering abrupt changes. In solution the changes in molecular spin state are governed solely by thermodynamic considerations and primarily the difference in enthalpy between the states. In this presentation the use of Raman and resonance Raman spectroscopy will be discussed with a focus on the non-innocence of the technique and the use of this non-innocence to observe relatively slow switching between low and high spin states of an iron(II) complex.

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