MO 26: Poster: Biomolecules

Zeit: Dienstag 16:30–18:30 Raum: Poster A

MO 26.1 Di 16:30 Poster A

Saturation Threshold of Adsorption Reaction of Lysozyme on Surfaces of Nanodiamond/Nanosilica — •Victor Wei-Keh Wu — Department of Chemical and Material Engineering, National Kaohsiung University of Applied Sciences, 80782 Kaohsiung, Taiwan — Group 510, Institute of Atomic and Molecular Sciences, Academia Sinica, P.O.Box 23-166, 10617 Taipei, Taiwan — Victor Basic Research Laboratory e. V. Gadderbaumer-Str. 22, 33602 Bielefeld, Germany, Email:victorbres3tw@yahoo.com.tw, http://www.che.kuas.edu.tw

Fluorescences from free lysozyme of 0-1000 nM in 7 mM PPBS at pH = 11.0 after adsorption reactions on the surfaces of nanodiamond (100 nm, No.I-21, carboxylated; KDM, Kay Diamond) and nanosilica (100 nm, VP OX 10, degussa) with Xe lamp as light source monochromated (Tandem GM252, ABI Analytical) at 285 nm of ca. 0.6 mW and PMA-11 of Hamamatsu as fluorescence spectrometer have been measured. Each of 2 mL lysozyme solutions was treated with 50 μg suspension of nanodiamond/-silica in 20 μL PPBS. BET and Langmuir surface areas, 55 and 80 m^2/g for nanodiamond, 15 and 20 m^2/g for nanosilica, respectively, have been obtained by use of adsorptive dose rate, and static volumetric measurement technique, where BET surfaces are applicable. Saturation thresholds of adsorption of lysozyme have been measured at 190 and 175 nM; 110 and 101 mg lysozyme adsorbed for 1 g nanodiamond/-silica can be estimated, respectively. The adsorbed lysozyme on an unit surface of nanoparticle can finally be obtained as 2.0 and 1.8 [mg-lysozyme/m^2-nanoparticle] for nanodiamond/-silica, respectively. **Ref.** V. W.-K. Wu, Chem. Lett. 35, 1380 (2006).

MO 26.2 Di 16:30 Poster A

Screening Biological Systems by Raman Scattering Techniques — Towards Specific Characterization of Tumors on a Molecular Level — •Patrice Donfack, Malte Sackmann, and Arnulf Materny — International University Bremen IUB (Jacobs University Bremen as of Spring 2007), Germany

Cancer is a severe disease connected with progressive radical molecular distortions in the host cells. Since many years vibrational Raman spectroscopy (RS) and related techniques have been recognized as powerful tools for probing molecular vibrations giving rise to molecular fingerprints. In a non-destructive and non-invasive way even relatively small molecular distortions can be detected. An early detection of the onset of biological deterioration is possible only if specific molecular information can be obtained that becomes distinguishable as soon as changes occur. Understanding molecular events in biological systems at molecular level appears would be an outstanding attainment allowing for a monitoring of the behavior of biological systems and the discrimination between healthy and cancerous states. Obviously, a potential approach would consist of a combination of many methods. We are applying spontaneous RS, surface enhanced Raman scattering (SERS) as well as biochemical molecular recognition techniques. Our goal is to differentiate and histopathologically assign spectroscopic changes that occur between healthy cells or tissue and to identify tumors in different stages of their development. Results obtained from RS and SERS applied to tissue sections and cells for different experimental environments and conditions are discussed.

MO 26.3 Di 16:30 Poster A

Revealing Food Quality by Raman Spectroscopy — •Rasha Hassanein, Patrice Donfack, Malte Sackmann, and Arnulf Materny — International University Bremen (Jacobs University Bremen as of Spring 2007), Germany

In the food industry, various ingredients and biopolymers are commonly used in order to optimize the texture or the flavor of food. The distribution and the microstructure of the ingredients strongly determine the properties of the final product. Therefore, research and development as well as quality control require powerful analytical tools for studying the distribution of the various compounds.

Raman spectroscopy provides a nondestructive method to determine the chemical composition of a sample and requires only a minimum of sample preparation. Raman spectroscopy has therefore become a widely used technique for analytical purposes both in industry and scientific research. However, up to now only little work was invested in an application of this spectroscopical method in food chemistry. In our recent work, we have started to investigate food quality applying various Raman techniques. Because food quality is very often mainly determined by ingredients, which may be present at low concentrations or which are trapped in a complex matrix, separation methods have to be improved and an enhancement of the Raman signal is required. For the latter, surface enhanced Raman scattering is used, which also helps to suppress the fluorescence background. In our contribution, we discuss our first experiments, which *e.g.* aimed at the characterization of different types of whisky.

MO 26.4 Di 16:30 Poster A

Femtosecond transient absorption studies on the photolyase of Thermus thermophilus and their chromophores FMN and FAD — Annette Brunsen, •Tiago Buckup, Tobias Klar, Lars-Oliver Essen, and Marcus Motzkus — Physikalische Chemie, Philipps Universität Marburg, D-35032 Marburg, Germany

CPD-photolyases are enzymes which use blue light to repair UV-induced DNA damage. Flavins, like FAD and FMN, are the corresponding enzyme cofactors responsible for light absorption and the first step in the DNA repair reaction. In spite of the importance of photolyase in nature, very little is known about the ultrafast dynamics after the initial light absorption. In this work we investigate the mutant CPD-photolyase of Thermus thermophilus, which contains FAD only, with femtosecond transient absorption. The dynamics of the mutant photolyase is compared to the transient absorption signal of isolated FAD and FMN in different solvents. After excitation at 450 nm, ground-state bleach, excited-state absorption and stimulated emission could be measured between 450-900 nm. A fast solvent dependent time constant (2-10 ps) was observed and related to the closed form of FAD and dimerisation of FMN. Another long time constant is associated with the open and non-dimerised form. The transients of a mutated photolyase can be compared to those of FAD in water.