J Material Sci Eng 2013, 2:4
http://dx.doi.org/10.4172/2169-0022.S1.012

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference and Exhibition on
Materials Science & Engineering

October 07-09, 2013 Hampton Inn Tropicana, Las Vegas, NV, USA

Provitamin D photochemistry in liquid crystal and soft matter physics: Fundamental and applied aspects

Irina Terenetskaka
Institute of Physics, NAS Ukraine, Ukraine

Provitamin D photoisomerization is the first step of biologically important process of vitamin D synthesis under solar UV irradiation. Our first study of the photoreaction in a nematic LC matrix was inspired by the idea of vizual following the photoreaction course in real time, i.e. developing personal UV biodosimeter for estimation of the vitamin-D-synthetic capacity of sunlight *in situ*.

This goal was accomplished by observing the changing number of Cano-Grandjean stripes in the wedge-shaped cell under UV irradiation. Later on, the easiest detection of previtamin D synthesis *in situ* was carried out by following the LC cell color change as a result of accumulated UV dose. Recently a new method for visual detection of provitamin D photoconversions has been proposed that is based on the determination of an azimuth of a disclination line in the so-called θ-cell. Besides, two methods of spectral monitoring of the vitamin-D-synthetic capacity of sunlight *in situ* have been developed and patented using soft media (polymer and hydrogel) as matrix material.

Unique effect of rotation of provitamin D rod-like microcrystal during its dissolution at the top of nematic droplet was observed, and the dynamics of cholesteric helix induction was interpreted. To the best of our knowledge, this was the first observation of a monodirectional rotation driven by direct transformation of chemical dissolution energy into mechanical rotation energy.

Using provitamin D as a photosensitive chiral dopant, the polarization properties and structure changes of plane-oriented nematic LCs were studied, and the chirality transfer effects under UV irradiation were investigated in detail using multi-domain LC cells.

Besides, specific features of provitamin D photoisomerization in nematic and cholesteric liquid crystals were revealed, and the increase in the efficiency of *cis-trans* isomerization as compared to ethanol solution was studied in dependence on the temperature and provitamin D concentration. Altogether, the results obtained indicate the collective character of *cis-trans* isomerization in ordered liquid crystalline matrices.

Biography

Irina Terenetskaya has completed her Ph.D. at the age of 29 years from the Institute of Physics, NAS Ukraine and postdoctoral studies on Solid State Physics from Kiev State University. She is Professor in Optics & Laser Physics and works as leading scientist at the Institute of Physics, NAS Ukraine. She has published more than 100 papers in reputed journals and is serving as a reviewer. At Biomedical Optics'94, her outstanding paper was rewarded by Theodore H. Maiman Award from the Laser Centers of America. She has got several international fellowships, was invited in European Universities, participated in several international projects collaborating with DLR, LLNL and NOAA/ARL, and presented her work at several EC and NATO workshops.

teren@iop.kiev.ua

Green synthesis of macroporous monoliths of silver using pluronic P-123 and pluronic F-127 as sacrificial templates

Gowhar Ahmad Naikoo and Farid Khan
Dr. HariSingh Gour Central University, India

An elegant method is presented to prepare the silver monoliths using pluronic P-123 and pluronic F-127 as sacrificial templates. Some additives like dextran, silica nanoparticles and swelling agent 1, 3, 5 trimethylbenzene (TMB) to the Ag/pluronic matrix, significantly affects the architecture of the sponges. Scanning electron microscopy (SEM), powder X-ray diffraction (PXRD), thermagravimetric analysis (TGA) and Brunauer-Emmet-Teller (BET) adsorption isotherm techniques were applied to characterize the sponges. Imprinting of pores on the monoliths surfaces were dependent on the bubble-burst processes generated due to the release of gases like CO_2, NO_2, O_2 and steam during annealing. Our results provide a facile approach to the fine structural control of porous materials of metals self-organized in the composite gels.

naikgowhar@gmail.com