Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Dynamics of Swollen Gel Layers Anchored to Solid Surfaces GEORGE FYTAS, FORTH, University of Crete, Greece, MARIA GIANNELI, University of Crete, Greece, ROBERT ROSKAMP, ULRICH JONAS, KALOIAN KOYNOV, WOLFGANG KNOLL, MPIP Mainz, Germany, BENOIT LOPPINET, FORTH, Greece — Thin responsive hydrogel films are currently under development for biosensor applications. Photocrosslinkable poly(N-isopropylacrylamide) (PNIPAAm) based chains are spin coated as thin films (about 1 micron) and UV irradiated with variable doses to control the crosslink density. The obtained anchored gel layers can swell in ethanol or water up to about 10 microns for low crosslinking densities. Dynamics of the swollen layers and diffusion of different tracers (as analyte mimicks) are studied by dynamic light scattering (PCS) and fluorescence correlation spectroscopy (FCS). PCS resolved fast and slow diffusions, attributed to cooperative diffusion and long range concentration heterogeneities. Higher crosslink densities give rise to faster cooperative diffusion, i.e. short dynamic mesh sizes. FCS revealed the importance of electrostatic interactions between probe and negatively charged network. While a negatively charged dye senses local dynamics with a moderate slow down, a positively charged dye exhibited substantially retarded diffusion. Larger tracers are used to assess the size dependent gel penetrability, whereas large particles, trapped into the network, expectedly follow the network dynamics.

George Fytas
FORTH, University of Crete, Greece

Date submitted: 26 Nov 2007 Electronic form version 1.4