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Surface Science goes 3D: Clays as templates for the synthesis of highly ordered organic-inorganic hybrids using Langmuir Blodgett approach.

Much of the research effort concerning the nanoscopic properties of clays focuses on mechanical applications such as nano-fillers for polymer reinforcement. To broaden the horizon of what is possible exploiting the richness of clays in nanoscience, we developed a new bottom-up approach for the production of hybrid materials based on single and/or multi-layers of clay nanosheets as building blocks. Our method, based on combining self-assembly processes with the Langmuir Blodgett technique, uses the clay nanosheets as 2D template for reaction or grafting of a variety of guest species (in our case: C₆₀, Ni₈ molecular magnets, Prussian blue analogues) and allows for perfect layer-by-layer growth and control at the molecular level. We present a detailed study of this new approach with an emphasis on the crucial role of clays and illustrate the flexibility of our approach with T-dependant X-ray diffraction data, spectroscopic measurements, microscopy (AFM, STM), magnetic measurements of different new hybrid materials where clays act as structure directing interface and reaction media.

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Polarization contrast mechanism in near-field optical microscopy

The scanning near-field optical microscope (SNOM or NSOM) provides images with an optical resolution beyond the $\approx\lambda/2$ diffraction limit, λ being the wavelength of the illumination light. The local topography of the sample surface is simultaneously recorded with a few nanometers spatial resolution. In addition to the usual light scattering related to the local refraction index, SNOM can work with various contrast mechanisms. In this talk, the polarization modulation contrast mechanism is presented in different working SNOM modes for the investigation of optical anisotropy properties at the nanometer scale. Photoluminescence maps of InGaN/GaN single quantum wells, linear dichroism in self-organized gold nanostructures composed of a quasi-regular array of nanowires and nanowriting on thin films of azobenzene side-chain polymethacrylates are discussed.

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Women in Science, why so few?

Do women do research differently from men? Is the productivity of female researchers judged differently from that of their male colleagues? Do women judge success differently? I shall discuss these three questions based on comparative studies carried out in Europe, U.S.A. and Japan concerning the peer-review system, the number of papers published by male and female researchers and the behaviour during job interviews. I shall comment on how female scientists view themselves and how others view them, as well as on how family and work influence each other for scientists of both sexes. Based on the trends which emerge from these studies, I shall also suggest some measures to be taken to ensure that women stay in science.