Multimodal fluorescence imaging for nanomaterial characterization

Vinod Subramaniam, Nanobiophysics, MIRA Institute for Biomedical Technology and Technical Medicine, University of Twente, Enschede, The Netherlands v.subramaniam@utwente.nl

Multimodal fluorescence imaging is a versatile method with applications ranging from biological studies to materials science. Typical observables in multi-modal fluorescence imaging are intensity, lifetime, polarization, and excitation and emission spectra which are recorded at chosen locations at the sample. This talk will focus on our use of multimodal fluorescence imaging for nanomaterials characterization. I will present our work on supramolecularly organized host-guest systems that were prepared by inserting perylene dyes with differing end substituents into the nano-sized channels of zeolite L (ZL)[1]. I will also address applications of spectral emission imaging microscopy to quantitatively map photonic properties from below the surface of strongly photonic 3D crystals[2], by analysing the emission from the fluorescent protein DsRed2 infiltrated into self-organized 3D titanium dioxide inverse opals.

[1] Busby, M., C. Blum, M. Tibben, S. Fibikar, G. Calzaferri, V. Subramaniam, and L. De Cola. 2008. Time, space, and spectrally resolved studies on J-aggregate interactions in zeolite L nanochannels. J Am Chem Soc 130:10970-10976; Busby, M., A. Devaux, C. Blum, V. Subramaniam, G. Calzaferri, and L. De Cola. 2011. Interactions of Perylene Bisimide in the One-Dimensional Channels of Zeolite L. J Phys Chem C 115:5974-5988.

[2] Blum, C., A. P. Mosk, C. Otto, W. L. Vos, and V. Subramaniam. 2009. Spectral emission imaging to map photonic properties below the crystal surface of 3D photonic crystals. JOSA B 26: 2101-2108.