Theoretical and Physical Chemistry Institute

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LECTURE

"Nitrogen bridged 1D, 2D, 3D polymeric materials: electronic transport, redox activity, electrochromism and fluorescence"

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Seminar room, ground floor, NHRF

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Conductive polymers hold great promise as electromagnetic shielding materials and sensors. For certain applications, water repelling properties are desirable and the two monomers of perfluorinated polyaniline, 3- and 4-perfluoroctyl aniline can provide uniform, large scale, low cost oligomers and thin films with a contact angle against water up to 140°. When the monomers are polymerized through a liquid-liquid interfacial polymerization [1] by utilizing different water-organic solvent two different products are distinguished. Firstly, a series of oligomers [2] that exhibit distinctive light emitting properties and remained soluble in the organic phase, and secondly, thin films suspended at the interface with a hydrophobic, water repelling character. Light emitting oligomers with Stokes shifts up to 205 nm [3] were isolated through column chromatography and the electrochemical and capacitive [4] behavior of the thin films was studied by means of galvanostatic charge-discharge and impedance spectroscopy. The oligomeric fractions were investigated as sensors towards the detection of small organic acids or bases. While these are materials with either a linear or branched backbone, by utilizing triazine central cores a new class of covalent organic frameworks emerges. In this presentation, the perspectives on the 2D layered and 3D polymers that were synthesized based on C_3N_3 or P_3N_3 central cores and can readily form noble metal nanocomposites will also be explored. [5]

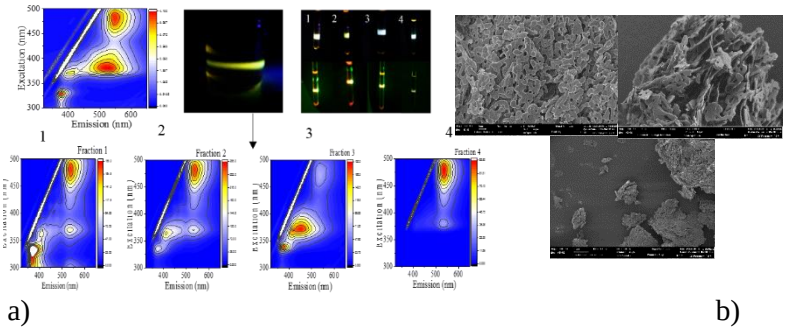

Fig. 1: *a) Excitation dependent fluorescent maps for the different oligomeric fraction of the 3-perfluoroctyl aniline synthesized through a chloroform-water interface. The mixture is separated through column chromatography to the different fractions that demonstrate distinctive fluorescence patterns. b) SEM images of the thin films that are isolated from the interface grown in flake-like morphologies.*

References:

1. P.Dallas, V.Georgakilas, *Adv.Coll.Int.Sci.* **224**, 46 (2015)
2. P Dallas, I Rašović, K Porfyrakis, *J.Phys.Chem.B.* **120**, 3441 (2016)
3. P Dallas, I Rasovic, T Puchtler, RA Taylor, K Porfyrakis, *Chem.Comm.* **53**, 2602 (2017)
4. E.N. Tomšík, O. Kohut, I. Ivanko, M. Pekárek, I. Bieloshapka, P. Dallas, *J.Phys.Chem.C.* **122**, 8022 (2018)
5. **P**. Dallas, J. Tucek, D. Jancik, M. Kolar, A. Panacek, R. Zboril. *Adv.Funct.Mater*. **20**, 2346 (2010)