Session VI: Functional Colorants - II

Emerging zwitterionic dyes in quinoid chemistry

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Prof. Olivier Siri obtained his PhD (1997) from the University of Burgundy in Dijon (France). Subsequently, he worked as post-doctoral fellow in Prof. Kevin M. Smith's group at the University of California in Davis (1997-1999); and then spent 6 months at the University of Neuchâtel (Neier group, Switzerland). He joined the CNRS in 1999 at the University of Strasbourg and moved in 2005 at Aix-Marseille University. He is currently Director of Research (CNRS) and group leader at CINaM laboratory. He is also deputy director of CINaM (160 people).

Prof. Siri's main research interests deal with the synthesis of molecular and supramolecular conjugated pi-systems with a particular emphasis on interpreting structure/property relationships in order to highlight their potential as dyes in photonic, as ligand in coordination chemistry, or as building block in nanoscience. He is an author and co-author of about 130 publications and patent applications, and has given 95 plenary, keynote, and invited talks.

Abstract

The rich chemistry of molecules exhibiting a quinoid structure has attracted the interest of a large scientific community for decades owing to their implications in a wide range of science including in color chemistry. A critical element in designing and fabricating new dyes is the control of the pi-distribution. 2,5-Diamino-1,4-benzoquinonedimine is a very long known molecule (1887) that has been poorly investigated owing to its low solubility and its instability in solution. We decided to revisit the chemistry of this molecule in order to elaborate new near infra-red (NIR) dyes that are of major interest in many technological sectors. Our strategy is based on the control of the N-substituents and the incorporation of the quinoidal unit in extended architectures for the construction of dyes with unusual electronic properties. The different approaches and the key role of the pi-distribution in 2,5-diamino-1,4-benzoquinonedimine will be described and discussed in the presentation. In addition, its analogue bearing two oxygen atoms will be also reported in order to highlight the crucial influence of the heteroatoms on the observed properties.