Hierarchical Naphthalene Diimide based Surface Anchored Metal Organic-Framewoks (SURMOFs) with panchromatic light absorption.

Antoine MAZEL[1], Ritesh HALDAR[2], Reetu JOSEPH[3], Michael ADAMS[3], Ian HOWARD[3], Bryce RICHARD[3], Manuel TSOTSALAS[2], Engelbert REDEL[2], Stéphane DIRING[1], Christof WÖLL[2], Fabrice ODOBEL[1].

[1] Chimie et Interdisciplinarité: Synthèse, Analyse, Modélisation (CEISAM), UMR 6230, Université LUNAM, Université de Nantes, CNRS, 2 rue de la Houssinière, 44322 Nantes cedex 3, France

[2] Karlsruhe Institute of Technology, Institute of Functionnal Interfaces (IFG), Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen, Germany

[3] Karlsruhe Institute of Technology, Institute of Microstructure Technology, Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen, Germany

E-mail: antoine.mazel@univ-nantes.fr

Over the past two decades, porous coordination polymers and Metal-Organic Frameworks (MOFs) have emerged as an important family of crystalline materials with a broad range of applications.[1] These unique class of hybrid materials assembled from metal ions or clusters and organic ligands as building units allow the combination of functional ligands in a highly ordered three-dimensional fashion.[2] More recently, the possibilty to grow MOFs on a surface has been developped, these Surface Anchored Metal-Organic Frameworks (SURMOFs) extend even more the range of application for these materials.[3]

Their versatility and synthetic tunability aswell as the possibility to deposit these material on a surface already made MOFs and SURMOFs appealing platforms to design artificial photosynthetic systems.[4]

Optimizing the light collection efficiency is one of the key feature to achieve solar energy conversion. Indeed, sunlight covers a wide range of wavelength in the visible spectra (from 380 nm to 780 nm) and having a unit, composed of several dyes, capable of absorbing light in this whole range would certainly improve the performances of such systems. Furthermore, there is a considerable potential in hieriarchically organizing theses components to favor an energy cascade and thus energy concentration.

In this presentation, we are reporting the synthesis of three new energetically complementary core-substituted Naphthalene Diimide (cNDI) dyes, which are used as building units for the controlled construction of a hierarchical SURMOF with panchromatic light absorption. (Fig. 1)

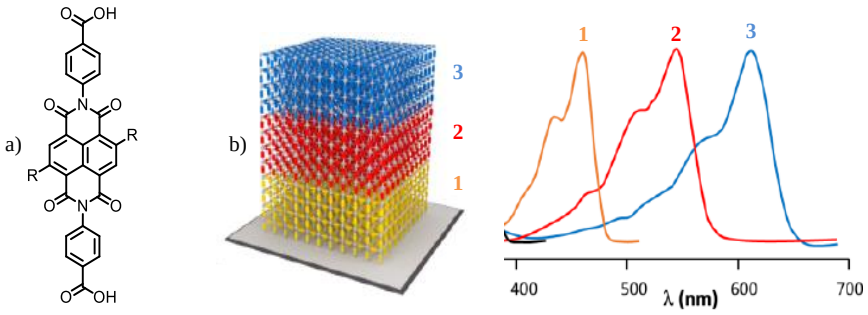

Figure 1. a) Representation of the building unit used in this work, b) Schematic representation of the hierarchical SURMOF with panchromatic light absorption made out of three energetically complementary dyes.

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