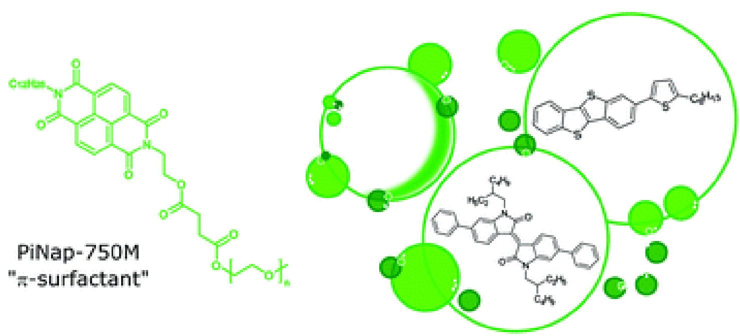
INV8

Conjugated materials from and into interface rich, water based microheterogeneous environments

Luca Beverina, Mauro Sassi, Sara Mattiello
Department of Materials Science, University of Milano-Bicocca, Via R. Cozzi 55 Milano
luca.beverina@unimib.it

Conjugated materials are key components for organic devices. Established materials were originally designed and developed with performances in mind and with rigorous exclusion of water from the environment they were supposed to work in. This scenario is rapidly changing according to both the drive for the substitution of organic solvents with water in synthesis and processing and with the ever-increasing number of applications requiring a water/organics interface. The general rule for organic conjugated compounds is that solubility in water is very poor, unless complex and invasive functionalization is performed.
Formulation chemists developed efficient strategies to homogeneously disperse and stabilize hydrophobic derivatives in water by means of suitable amphiphilic molecules possessing a hydrophilic and a hydrophobic domain, called surfactants. They are capable of sizably reducing the interfacial energy associated with the presence of hydrophobic derivatives in an aqueous environment. Above a certain concentration, most surfactants self-assemble in a variety of association colloids the most common of whom is the spherical micelle. At higher concentration, depending on the temperature and/or the ionic strength of the water solutions, more complex structures the like of microemulsions, lamellae, vesicles and tubules can also be observed.[1] The common characteristic of all such micro heterogeneous environments is the formation of lipophilic pockets within a polar environment where either additional surfactant or other lipophiles can be accommodated. In the early '80s synthetic chemists started realizing that association colloids are a simplified analogous of enzymes: reagents can be hosted and selectively localized in an environment with specific polarity, possibly leading to improved yield and selectivity.[2,3] The talk will focus on the opportunities that the formulation chemistry toolbox offers for the green synthesis and processing of established and new materials that could not be made otherwise.[4] Association colloids also offers the possibility to colocalize in a confined environment of controlled polarity, mixtures of different compounds that can be engaged in complex photophysical processes of interests for biological imaging and more.[5]



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