



7 de JUNIO de 2023

12.00 h

Sala de Grados, Ed. A Facultad de
Ciencias, Campus San Francisco

• INMA

Junior

PHOTOACTIVE π -FUNCTIONAL ORGANIC MOLECULES IN PHOTOVOLTAIC APPLICATIONS

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n -conjugated systems attract great interest due to the large scope of their properties, useful for a wide range of applications. In particular, the optical and electronic properties of n -bridged compounds have fostered their study and integration into optoelectronic and electronic devices. Third-generation photovoltaics are able to produce high efficiency photon to electricity conversion devices at a cheaper and more suitable way in comparison with silicon devices. In this seminar, I will focus on the design and synthesis of D- π -A (donor- π -acceptor) organic dyes as photoactive component in dye-sensitized solar cells (DSSCs). The photovoltaic behavior of three series of dyes based on a 4*H*-piranilidene donor have been studied, paying attention to the influence of the chemical structure on the efficiency.

Moreover, I will present a novel spiro-type molecule as a hole transport material (HTM). We investigated the Spiro-HTM effects on the performance of inverted PSCs (iPSCs) based on triple cation CsFAMA perovskite. This HTM compound allows the formation of very thin layers (<15 nm) which promotes hole mobility without the need for doping. In comparison with the PEDOT:PSS reference devices, the iPSC based on Spiro-HTM exhibit a higher V_{OC} leading to a higher PCE.

AQUEOUS SEEDED RAFT POLYMERIZATION FOR THE PREPARATION OF SELF-ASSEMBLIES CONTAINING NUCLEOBASE ANALOGUES

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Amphiphilic block copolymers can self-assemble in water leading to different structures with sizes at the nanoscale and potential uses in different fields, including the biomedical one. The majority of self-assembly methodologies are post-polymerization processes which consist of time-consuming multiple steps and provide highly diluted block copolymer dispersions. Over the past years, polymerization-induced self-assembly (PISA) has emerged as an attractive one-step alternative where self-assembly occurs during the polymerization, thus avoiding multiple processing or purification steps and also providing highly concentrated self-assembly dispersions with good colloidal stability. In this work, self-assemblies containing the nucleobase analogue 2,6-diacylaminopyridine (DAP) have been successfully prepared for the first time by aqueous seeded RAFT polymerization in high concentrations. For this purpose, a diblock copolymer containing poly(ethylene glycol) (PEG) and DAP polymethacrylate blocks was used as a macro-chain-transfer agent (PEG₁₂₄-*b*-PDAP₉-CTA) for the polymerization of 2-hydroxypropyl methacrylate (HPMA) in water. From the systematic variation of the degree of polymerization and solid concentration, a phase diagram has been generated that correlates both variables with the morphologies of this new system. Self-assemblies have been characterized by TEM and DLS, observing morphologies from low to high order (from spherical micelles to worms and to vesicles). In addition, H-bonding supramolecular functionalization of the DAP repeating units during aqueous seeded RAFT polymerization has been examined by functionalization with a cross-linker with four thymine groups. Finally, the loading and the subsequent release of Nile Red have been proven in both supramolecular cross-linked and non-cross-linked self-assemblies.