Venerdì **23 maggio 2025** alle ore **15:00** presso l'aula A
la **Dr.ssa Elisabetta Benazzi**

Dipartimento di Scienze Chimiche, Università di Padova
email: elisabetta.benazzi@unipd.it

terrà il seminario dal titolo:

Tuning Electron Transfer at Organic–Inorganic Hybrid Junctions for Small Molecule Activation

Hybrid organic–inorganic junctions offer a versatile and tunable platform to mediate light-driven electron transfer processes essential for the activation of small molecules. This seminar will delve into the mechanistic underpinnings of charge transfer at these interfaces, with a particular focus on photo-induced processes that enable selective reductions/ oxidations. Central to this work is the generation and strategic use of hydride species—potent reductants that play a key role in facilitating small molecule transformations such as N_2 and organic substrate reduction[1].

Beyond mechanistic insight, the research emphasizes the rational design of hybrid heterojunctions in which each component—organic molecular systems, inorganic semiconductors, and interfacial interactions—cooperatively contributes to efficient charge separation and collection[2-4]. These synergies are critical for enhancing overall energy conversion efficiency and enabling the production of solar fuels. Through spectroscopic and electrochemical investigations, the aim is to uncover the structure–function relationships that govern performance at these complex interfaces, ultimately guiding the development of next-generation light-driven catalytic systems.

The project is part of a Marie Skłodowska-Curie Global Fellowship involving three institutions: the University of Padova, Caltech, and the J. Heyrovský Institute of Physical Chemistry. This international collaboration reflects the interdisciplinary and cross-institutional nature of the research, integrating expertise from diverse fields to address fundamental challenges in solar energy conversion and small molecule activation.

References

1. Benazzi E. et al. "*On the Mechanism of Photodriven Hydrogenations of N_2 and other substrates by Hantzsch Ester: Photoinduced generation of weak N−H pyridinyl bonds in the presence of a suitable buffer*" PNAS, accepted.
2. Benazzi E. et al. "*Organic-Inorganic Photosynthetic Interfaces built on Intertwined WO_3 Nanosheets for Enhanced HBr/H_2O Photoanodic oxidations*" Advanced Energy and Sustainability Research, Under revision.
3. Benazzi E. et al. "*Role of Intragap States in Sensitized Sb-Doped Tin Oxide Photoanodes for Solar Fuels Production*." ACS Applied Materials & Interfaces 16.21 (2024): 27209-27223.
4. Benazzi E. et al. "*Enhancing oxygenic photosynthesis by cross-linked Perylenebisimide "Quantasomes"*." Journal of the American Chemical Society 144.31 (2022): 14021-14025.

La presenza della S. V. sarà molto gradita

Il Direttore del Dipartimento
Prof. Stefano Mammi

Prof.ssa Marcella Bonchio