Martedì **11 ottobre 2022**
alle ore **12** presso l'aula H

Francesca Arcudi

Dipartimento di Scienze Chimiche
Università di Padova

terrà il seminario dal titolo:

Widespread opportunities for (photo)catalytic (nano)materials engineering

The engineering of (nano)materials' properties is an essential tool *en route* to a variety of applications, including catalysis. (Nano)materials are in many ways ideal systems for many reactions that produce fuels and commodity chemicals. This talk will describe some of what we know we can do and what we can potentially do in light of the larger scope of reactions now being attempted, and to conduct these reactions more sustainably by powering them with sunlight. In photoredox-based catalysis, colloidal quantum dots (QDs) have been shown to act as photosensitizers but also as solo photocatalysts for reactions relevant to energy conversion and organic synthesis. A desirable property of colloidal QDs as photosensitizers or direct catalysts for these reactions that is less-discussed, perhaps because it is still in development, is their tunable surface chemistry. In one example, the power of tuning the chemistry at the organic-inorganic interface within QDs sensitizer provides a strategy to enhance the photocatalytic activity for the reduction of CO_2 to CO in water, and show that we can control this activity by exploiting the nanoconfined environment at the QD surface. Other applications of the photoredox phenomenon are cobalt/photoredox cooperative systems. In one example, the photochemical reduction of cobalt compounds yields a Co(I) active species for the photocatalytic reduction of acetylene to ethylene. The real payoff will come when we can efficiently and selectively turn waste emission, e.g. CO_2, into value-added chemicals and fuels using sunlight. Strategies to accomplish this ambitious goal will be discussed.

Il Direttore del Dipartimento
Michele Maggini