

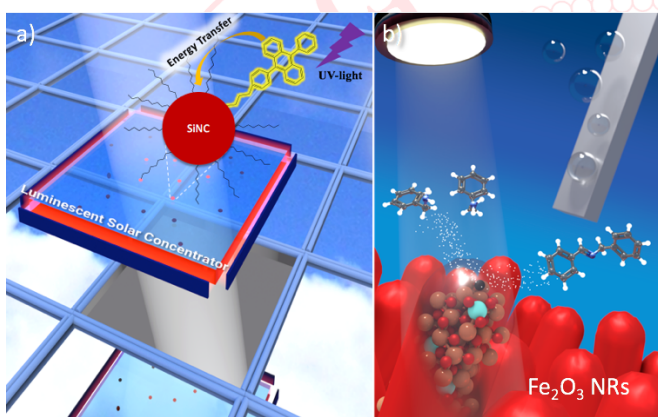
Martedì **18 giugno 2019** alle ore **11:00** presso l'aula **L1**

il **Dott. Raffaello Mazzaro**

Istituto di Microelettronica e Microsistemi del CNR, Bologna

terrà il seminario dal titolo:

**Earth-abundant nanostructured materials
for unconventional solar energy conversion devices**



Sunlight is considered as one of the most promising energy sources to meet the increasing energy demand, but its conversion to either electrical or chemical energy is still facing fundamental challenges. Current solar energy conversion systems are based on the robust and reliable silicon technology, whose reliability comes at the price of a limited application flexibility. Indeed, while bulk silicon-based photovoltaic cells are widespread and relatively cheap, these devices are i) not suitable to the increasing need for **building integrated photovoltaics**, where energy production and aesthetical properties must be joined, due to the dark

color and rigid structure¹; ii) intrinsically inefficient when the aim is to produce **chemical fuels**, due to the need of an external electrolysis cell and the resulting efficiency losses².

In this regard, the development of innovative **nanostructured materials** opens the path to a new generation of solar energy devices, where such specific properties are required. Indeed, the fine control of size, shape and surface chemistry is a powerful tool to tune the functional properties of conventional widely available materials and turn them into high performance, tailor-made active materials.

The seminar will focus on the development of two innovative approaches for the exploitation of solar energy based on earth-abundant, nanostructured materials:

- Silicon nanocrystals** functionalized with photoactive molecules for semi-transparent, re-absorption free **Luminescent Solar Concentrators**.³
- Titanium-doped **hematite photoelectrodes** employed for the **photo-oxidation of organic compounds** and the simultaneous low-bias proton reduction in a double-environment photoelectrochemical cell.⁴

La presenza della S. V. sarà molto gradita

Prof. Mauro Sambi

Il Direttore del Dipartimento
Prof. Michele Maggini

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1. R. Mazzaro, A. Vomiero, *Adv. Energy Mater.* **8**, 1801903 (2018).
 2. I. Roger, M. A. Shipman, M. D. Symes, *Nat. Rev. Chem.* **1**, 0003 (2017).
 3. R. Mazzaro *et al.*, *Adv. Energy Mater.*, submitted.
 4. R. Mazzaro *et al.*, *Nano Energy*. **61**, 36–46 (2019).