UNIVERSITÀ DEGLI STUDI DI MILANO BICOCCA
DEPARTMENT OF
MATERIALS SCIENCE
Via Roberto Cozzi, 55
I-20125 Milano (I)

Friday Materials Science Colloquia

Seminars: **Friday, July 1st 2022, 12 p.m., Seminar Room, U5 Building.**
University of Milano-Bicocca – Department of Materials Science – Via R. Cozzi 55, Milano, Italy.

Chairman: **Prof. Francesco Montalenti**

This event will establish a series of seminars aimed to introduce new researchers and to promote new collaboration.

Lecturer: **Dr. Roberto Nisticò**

Title: **Hybrid Inorganic-Organic Magnetic Systems for Environmental Applications**

Abstract: Heterogeneous processes based on the application of hybrid inorganic-organic magnet-responsive nanomaterials (MRNs) are receiving great attention in wastewater remediation treatments as alternative technologies exploitable both in light-enhanced advanced oxidation processes (AOPs), and in more traditional sorption routes. Such MRNs are based on magnetite/maghemite nanoparticles functionalized by two different biowaste-derived macromolecules (i.e., either humic-like substances or chitosan), following the "Waste Cleaning Waste" approach. In view of showing the potentiality of these hybrid systems, three case studies are discussed, namely: i) the removal of caffeine via light-enhanced AOPs at circumneutral conditions [1], the removal of anthracene and naphthalene via sorption mechanism [2], and the removal of As(III) and As(V) via sorption mechanism [3].

References:
[1] **F. Franzoso, et al., Chemical Engineering Journal 2017, 310, 307-316.**
[2] **R. Nisticò, et al., ACS Sustainable Chemistry and Engineering 2017, 5, 793-801.**
[3] **R. Nisticò, et al., Journal of Hazardous Materials 2018, 342, 260-269.**

Lecturer: **Dr. Davide Campi**

Title: **High-throughput search, characterization and engineering of novel 2D and 1D materials**

Abstract: Low-dimensional materials have emerged as promising candidates for next-generation applications in the fields of electronics, optoelectronics and energy storage. In a first study [1] we performed an extensive high-throughput screening of experimentally known inorganic materials, identifying more than 1800 compounds exfoliable into novel two-dimensional monolayers. Thanks to the inclusion of new structures obtained from an additional experimental database, new versions of the original sources and a refined screening procedure, we have added 1200 candidates to our portfolio[2]. We also completed a broad characterization of their properties, focusing on relevant descriptors for field-effect applications, superconductivity and photocatalysis. More recently we started exploring how the properties of these materials can be engineered by controlled layering, strain and functionalizations. Finally, using a similar screening procedure but with a different focus, we identified more than 800 1D or quasi-1D wires that could be isolated from their vdW-bonded parents.

References:
[1] **N. Mounet, et al, Nat. Nanotechnol. 13, 246 (2018)**
[2] D. Campi, et al, Submitted (2022). (**https://www.materialscloud.org/discover/mc2d**).