



SEMINARIO

Mattia Gaboardi

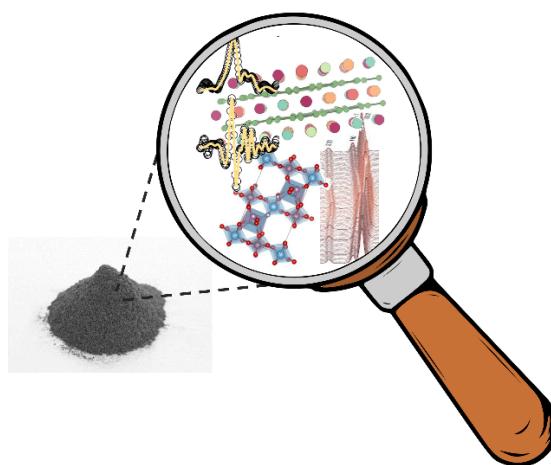
Elettra Synchrotron, Trieste

**INVESTIGATION OF ENERGY-RELATED MATERIALS AT
SYNCHROTRON-LIGHT SOURCES**

At the early stage of the 21st Century, the human impact on the Environment has been largely acknowledged to pose a serious threat toward a sustainable future. In this concerning scenario, scientists in all fields have the chance to turn the course of technology development toward greener energy solutions. No areas are left behind in this race, but physics and chemistry doubtlessly play a crucial role. In the last decades, structural and spectroscopic techniques at large scale laboratories, such as neutron and synchrotron-light sources, have gained progressively increasing importance in taking standard characterization techniques to the next level. Today more than ever, these techniques are largely employed for the study of materials in the field of energy storage, conversion, and harvesting.

In-situ and *operando* studies are common practice at synchrotron laboratories and powerful analytic tools allow us to follow structural evolution in real-time with variation of external parameters such as temperature, pressure, atmosphere, and voltage. At the same time, powerful combinations, such as high-resolution X-ray powder diffraction (XRPD) and X-ray absorption fine structure (XAFS) spectroscopy enable the combined study of both long-range and short-range domains of order.

In this talk I will focus on how the use of photons produced at synchrotron radiation sources can contribute to achieve deep structural and mechanistic insights for a multitude of key-enabling technologies and materials, encompassing roles in hydrogen storage, ion-batteries, solar energy harvesting, heat storage, and fusion power control. Few case studies will be presented, with particular regard to *operando* investigations in batteries and the localization of disorder in high-entropy ceramic materials.



July 7th, 2022 - 14:00

Seminar Room “U.M. Grassano”

Ref.: Prof. Carla Andreani