

**PhD in Materials for Sustainable Development**

**Teaching Activity 2023/24**

**MATERIALS AND DEVICES FOR ENERGY APPLICATIONS:  
CHARACTERIZATION TECHNIQUES**

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- **Location:** *Seminar Room* Department of Chemical Science and Technologies
- **Calendar** 12<sup>th</sup>, 19<sup>th</sup>, 24<sup>th</sup> April -- 3<sup>rd</sup> May.
- **Time:** 14:30 – 16:30

**Syllabus**

Developing efficient energy storage and conversion systems able to compensate for intrinsic intermittency of renewable sources is the most immediate and reliable route towards a sustainable energetic scenario after the fossil fuels phase out. Batteries, electrolyzers, fuel cells, solar cells, etc., represent the frontier in applied materials science research. For those not familiar with the subject, such devices can be roughly referred to as functional multi-layered structures, whose working principles rely on the specific properties of single components and on their interplay. A thorough physical and chemical characterization of the individual building blocks and the interfaces between them is of paramount importance for diagnostics of already-operating devices as well as for coming up with new device designs.

This series of lectures is intended to provide an insightful overview onto common characterization methods for energy devices. For each of the presented and discussed technique, application examples from recent, high-quality literature will be provided.

Contents:

**12<sup>th</sup> April 2024** : *Introduction – Focus on structure and morphology: Part I*

**19<sup>th</sup> April 2024** : *Focus on structure and morphology: Part II*

**24<sup>th</sup> April 2024** : *Spectroscopies for elemental analysis*

**3<sup>rd</sup> May 2024**: *There's a lot happening at the border: Electrochemical Impedance Spectroscopy*