



Visiting Professor Program Academic Year 2024/2025

TEACHING COMMITMENT: 16 hours

COURSE TITLE

Materials for Energy: Superconductors, H2 Storage and Batteries

TEACHING PERIOD

1st term

SCIENTIFIC AREA

Materials

LANGUAGE USED TO TEACH

English

COURSE SUMMARY

Energy production, harvesting, storage, use and saving represent crucial issues for the development of sustainable economies and societies. The development of advanced materials along with their relevant technologies plays an important role in implementing effective solutions for these challenges. The present course is intended to face these problems by presenting the properties of a few classes of materials that are playing an increasing role in the life cycle of energy.

Materials for energy storage, energy harvesting and batteries will be discussed with special attention to hydrogen storage materials and thermoelectric materials. Principles for energy storage, energy harvesting and batteries will be described together with the strategies for the development of materials suitable for the applications.

LEARNING OBJECTIVES

-Ability to describe the fundamental principles of hydrogen storage and energy harvesting;

- Knowledge of the main hydrogen storage materials, thermoelectric materials and materials for batteries and knowledge of their properties;
- Understanding of the relationship between compositions, microstructures and properties of hydrogen storage materials and thermoelectric materials.

VISITING PROFESSOR PROFILE

The visiting professor should have experience in materials synthesis and processing particularly dedicated to energy-related technologies (i.e. metallurgical synthesis, ball milling, web-chemistry etc.). Furthermore, extensive experience with materials characterization techniques will complete the profile (i.e., powder diffraction analysis, differential scanning calorimetry, thermogravimetry and gas sorption analysis, neutron imaging, infrared spectroscopy, scanning electron microscopy). Deep knowledge of materials for batteries, hydrogen handling, thermoelectricity and on hydrogen-related technologies should be the core of the candidate in order to teach the basic principles and applied examples or present results of related research projects to international students (teaching language: english).

CONTACT REFERENT

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