SYLLABUS DEL CORSO

Technologies for production and conversion of green hydrogen

2223-116R-M4

Titolo

Technologies for production and conversion of green hydrogen

Docente(i)

Dr. Carlo Santoro

Lingua

English

Breve descrizione

The course aims to provide a description of the electrochemical systems for the production and conversion of green hydrogen. The course will focus on materials and reaction mechanism with particular attention to fuel cells and water electrolyzers. Within the course, reactions mechanism occurring on the electrodes, electrochemical processes, electrodes and electrolyte synthesis methods, technological operation and electrochemical performance will be evaluated.
The following topics will be addressed.
LECTURE 1 (2h)
Title: Hydrogen vector and electrochemical tools

Hydrogen as green vector; production of hydrogen (status and perspective); green hydrogen production; green hydrogen within the EU decarbonization goal for 2050.
LECTURE 2 (2h)
Title: Electrolyzers with focus on materials and performance
Type of electrolyzers (AEL, PEMEL, AEMEL, SOEC, CO_2 electrolyzers); reaction mechanisms involved (hydrogen evolution reaction, oxygen evolution reaction); identification of performance, polarization curves, losses, durability issues;
organic, inorganic and hybrid materials for electrocatalysts and membranes/separators.
LECTURE 3 (2h)
Title: Fuel cells with focus on materials and performance
Type of fuel cells operating with gaseous feedstock (PEMFC, AEMFC, AFC, MCFC, SOFC); reaction mechanisms involved (hydrogen oxidation reaction, oxygen reduction reaction)
Identification of performance, polarization curves, losses, durability issues; organic, inorganic and hybrid materials for electrocatalysts and membranes.
LECTURE 4 (2h)
Title: Overcoming limitations and perspectives
Identification of gaps in electrolyzers, fuel cells and solution proposed.

CFU / Ore

1 CFU / 8 hours

Periodo di erogazione

Sustainable Development Goals

ENERGIA PULITA E ACCESSIBILE