**International H₂ Summer School**
Second Edition

At University of Porto – FEUP, Portugal
5th – 8th September, 2022

**PROGRAM:** Electrochemistry and H₂ Purification

**DAY 1**

08:30 – 09:00  | Registration

09:00 – 09:10  | **Opening: Introduction to the H₂ Summer School**

09:10 – 10:10  | A new vision on the hydrogen economy  
*Prof. Adélio Mendes (FEUP, Portugal)*

10:10 – 10:25  | Discussion

10:25 – 10:45  | COFFEE BREAK

10:45 – 11:45  | Fundamentals of Electrochemical Energy Technology  
*Prof. Ulrich Stimming (TUM, Germany)*

11:45 – 12:00  | Discussion

12:00 – 13:00  | LUNCH

13:00 – 13:05  | **Opening: Power-to-X**

13:05 – 14:05  | Low-temperature Water Electrolysis: Ready for the Gigawatt Scale  
*Prof. Andreas Friedrich (DLR, Germany)*

14:05 – 14:20  | Discussion

14:20 – 14:50  | DEMS studies using isotope-labeling for unraveling mechanistic details in CO₂/CO electroreduction reaction  
*Dr. Jorge Ferreira (Tu Berlin, Germany)*

14:50 – 15:00  | Discussion
PROGRAM: Electrochemistry and H₂ Purification

DAY 1

15:00 – 15:05  Opening: Hydrogen Purification

15:05 – 16:05  Membrane Engineering in H₂ Generation and Purification
   Dr. Adolfo Iulianelli (ITM-CNR, Italy)

16:05 – 16:20  Discussion

16:20 – 16:40  COFFEE BREAK

16:40 – 17:10  Hydrogen from different sources and its purification by Pressure Swing Adsorption technology
   Dr. Frederico Relvas (AmnisPura, Portugal)

17:10 – 17:20  Discussion

17:20 – 17:50  Carbon Molecular Sieve Membranes: the missing keystone for a swift decarbonisation of the energy
   Prof. Adélio Mendes (FEUP, Portugal)

17:50 – 18:00  Discussion
International H₂ Summer School

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PROGRAM: Fuel Cells and Photoelectrochemical Cells

DAY 2

09:00 – 09:05 Opening: Solar-assisted H₂ Production

09:05 – 09:35 The EIC role and ambition to foster the innovation in green hydrogen technologies and processes

  Dr. Antonio Marco Pantaleo (EIC, Belgium)

09:35 – 09:45 Discussion

09:45 – 10:25 PEC Applications: Devices and Upscaling

  Dr. Paula Dias (FEUP, Portugal)

10:25 – 10:40 Discussion

10:40 – 11:00 COFFEE BREAK

11:00 – 11:45 Mesoscopic photosystems for the generation of electricity and fuels from sunlight

  Prof. Michael Grätzel (EPFL, Switzerland)

11:45 – 12:00 Discussion

12:00 – 12:30 Design guidelines for competitive photoelectrochemical devices and systems

  Prof. Sophia Haussener (EPFL, Switzerland)

12:30 – 12:40 Discussion

12:40 – 13:55 LUNCH

Funded by the Horizon 2020 Framework Programme of the European Union.
**PROGRAM:** Fuel Cells and Photoelectrochemical Cells

**DAY 2**

13:55 – 14:00 **Opening: Fuel Cells**

14:00 – 15:00 **Solid Oxide Cells & Power-to-X**
   *Dr. Rémi Costa (DLR, Germany)*

15:00 – 15:15 Discussion

15:15 – 16:00 **Intermediate temperature Fuel Cells**
   *Tiago Lagarteira (FEUP, Portugal)*

16:00 – 16:15 Discussion

16:15 – 16:35 **COFFEE BREAK**

16:35 – 17:20 **Low-temperature Fuel Cells**
   *Dr. Paulo Ribeirinha (FEUP, Portugal)*

17:20 – 17:35 Discussion
PROGRAM: Catalytic Methane Decomposition

09:00 – 09:05 Opening: High-risk, high-profit approaches for the energy decarbonisation

09:05 – 09:35 A swift pathway for the energy decarbonisation: the low temperature methane decomposition

Prof. Adélio Mendes (FEUP, Portugal)

09:35 – 09:50 Discussion

09:50 – 10:20 Design of carbon materials with tuned surface and textural properties

Prof. Fernando Pereira (FEUP, Portugal)

10:15 – 10:30 Discussion

10:30 – 10:50 COFFEE BREAK

10:50 – 11:50 Tandem catalysis for power-to-commodity chemicals processes

Dr. Gonzalo Prieto (ITQ, Spain)

11:50 – 12:05 Discussion

12:05 – 13:05 LUNCH

13:05 – 13:10 Opening: Catalytic Methane Decomposition

13:10 – 14:10 Ab initio simulation to improve the resistance to inactivation and enhance recovery of nickel-based catalysts for methane

Prof. Simone Meloni (University of Ferrara, Italy)

14:10 – 14:25 Discussion
## PROGRAM: Catalytic Methane Decomposition

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<th>Time</th>
<th>Session</th>
<th>Presenter and Affiliation</th>
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<td>14:25 – 14:55</td>
<td>Development of Proton Conducting Ceramic Cells in an Innovative Metal Supported Architecture and Its Application to Hydrogen Pumping</td>
<td>Dr. Noriko Sata (DLR, Germany)</td>
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<td>14:55 – 15:05</td>
<td>Discussion</td>
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<td>15:05 – 15:35</td>
<td>Life Cycle Assessment of H₂ Production</td>
<td>Dr. Ancelin Coulin and Dorian Marchal (Quantis, Switzerland)</td>
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<td>15:45 – 16:05</td>
<td>COFFEE BREAK</td>
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<td>16:05 – 16:35</td>
<td>Lead engineer – Product Management &amp; business development Power to Liquid Hydrogen</td>
<td>Ludivine Piezanowski (Paul Wurth, Germany)</td>
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<td>16:35 – 16:45</td>
<td>Discussion</td>
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<td>16:45 – 17:15</td>
<td>Potential use of Carbon Solid as the Methane Decomposition By-product in Construction Materials - Cement case study</td>
<td>João dos Santos (IST, Portugal)</td>
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<td>17:15 – 17:25</td>
<td>Discussion</td>
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PROGRAM

09:00 – 12:30  Open Day

12:30 – 14:00  LUNCH

14:00 – 16:00  Round Table: “The Hydrogen Era”, with

Moderator: Prof. Adélio Mendes

Invited: Dr. Paulo Partidário (DGEG), Dr. Francesco Matteucci (EIC), Dr. José Nogueira (Bondalti), and Eng. Pedro Furtado (REN)

16:00 – 16:30  COFFEE BREAK and Networking

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