

# Energy



The energy challenge concerns many industrial sectors, ranging from renewable energies to electro-mobility. The Chimie Balard Cirimat Carnot Institute research groups help companies meet this challenge through the development of new materials and devices for the production and storage of energy.



## Research skills and areas:

- ▶ Materials and devices for energy conversion and storage
- ▶ Lithium and sodium batteries
- ▶ Supercondensers
- ▶ Fuel cells
- ▶ Photovoltaic cells and light-absorbing semi-conductors
- ▶ Thermoelectricity and piezoelectricity
- ▶ New solid, liquid and polymer electrolytes
- ▶ Hydrogen production
- ▶ Hydrogen sensors
- ▶ New fuels
- ▶ Development of selective multifunctional catalysts

## Targeted industries

- Automotive industry
- Aeronautics
- Defence
- Energy



## Services we offer

- Patents/Licenses • Studies and Engineering •
- Technology Platforms • Advising •
- Technical Services



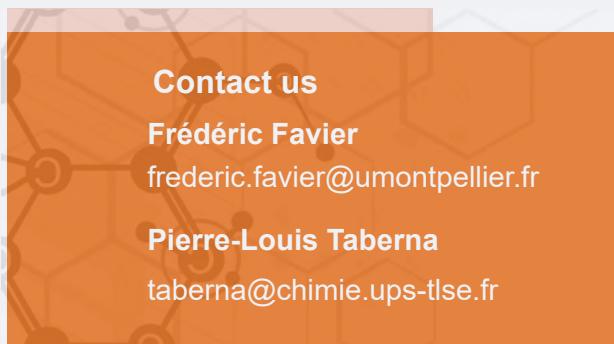
## Industrial innovations and projects:

- ▶ Catalysts with hierarchical porosity for applications in refining and organic synthesis
- ▶ Fuels obtained by oligomerisation of light olefins and by hydrocracking of alkanes
- ▶ Li-ion batteries operating at high temperature (60-80°C)
- ▶ Surface fluorination for electrode protection
- ▶ Na-ion battery prototypes
- ▶ Membranes and assemblies for fuel cells operating at intermediate temperatures of 100 to 200° C
- ▶ Stabilisation of non-noble metal catalysts
- ▶ Materials, modules and pilot plants for the production, extraction and purification of H<sub>2</sub>
- ▶ Polymer/oxide thermoelectric composites

### Our partners

Total • Solvay • IFPEN • EDF • Hutchinson • Airbus Defense and Space • Thales • Imerys  
• Hotlock Onboard • Kemet • SAFT • Nanomakers • Varta • Johnson Matthey • Umicore •  
Bulane • Arkema • BMW • ITM Power • Air Liquide • Saint Gobain CREE • CTI • Safran  
• SME • Snecma • Fumatech • Nedstack • SymbioFCell • EADS • Areva • Astrium

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