

National Centre of Competence in Research

"Separations"



Revolutionising Environmental and Energy Sustainability by Accelerating Separation Science

► Brief description

In chemistry, separation technologies are essential for isolating specific components from gas, liquid or solid mixtures. They play a key role in addressing global challenges such as climate change, rising food demand, energy supply, environmental pollution and waste management. Yet current processes are highly inefficient: They achieve only 5-10% efficiency, consume 15% of global energy and generate significant CO₂ emissions. This creates enormous potential for innovation.

A major obstacle is the gap between research and industrial implementation. Promising technologies often fail because they are not economically or environmentally viable. The 18 research groups of the National Centre of Competence in Research (NCCR) "Separations" intend to overcome this challenge through interdisciplinary collaboration and new approaches to the development of separation technologies.

NCCR "Separations" seeks to close critical technology gaps to help Switzerland achieve its sustainability goals, accelerate progress towards global climate neutrality and strengthen the Swiss economy through targeted innovation.

The NCCR focuses on three key challenges:

1. CO₂ capture from air: Developing scalable, cost-effective processes to efficiently remove atmospheric CO₂.
2. High-temperature ammonia separation: Creating novel high-temperature separation technologies to make ammonia synthesis significantly more energy-efficient.
3. Recovery of critical metals: Developing processes to recover valuable metals such as lithium and cobalt from waste streams, enabling secure and sustainable material cycles.

NCCR "Separations" will develop specialised membranes and adsorbents – materials that selectively bind and separate substances at their surface. Its unique approach integrates material design from the outset with process modelling, cost analysis and environmental assessment, ensuring sustainable and economically viable solutions. With a consortium spanning materials science, chemistry, physics, computer science and engineering, the NCCR will accelerate technology transfer to industry and reinforce Switzerland's position as a hub for innovation.

► Facts and figures

Total funding (2026–2029): CHF 32.09 million

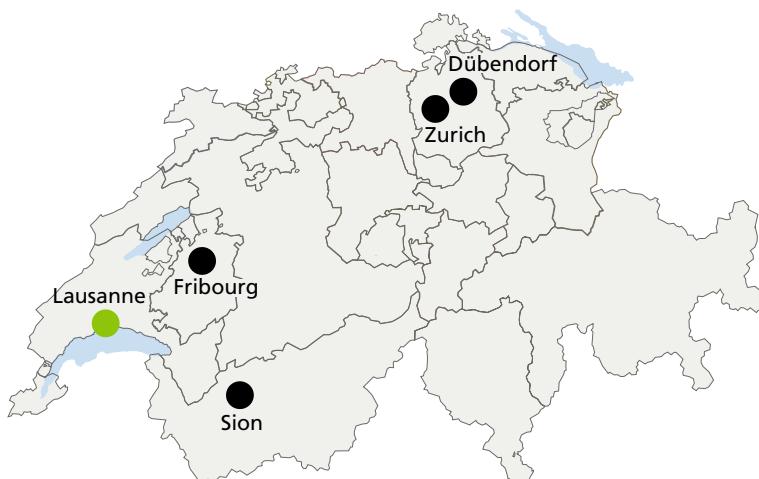
Federal funding (2026–2029): CHF 16.59 million

Host institution: EPFL

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Co-Director: Prof. Kumar Varoon Agrawal, EPFL

Deputy Director: Prof. André Bardow, ETH Zurich



Further information

www.sbfi.admin.ch/national-centres-of-competence-in-research

● Host institution (number of groups)
- EPFL (6)

● Network (number of groups)
- ETH Zurich (3)
- Empa (4)
- University of Fribourg (1)
- University of Applied Sciences and Arts Western Switzerland (HES-SO) (2)
- Northwestern University (USA) (1)
- University of Alberta (Canada) (1)



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Federal Department of Economic Affairs,
Education and Research EAER
**State Secretariat for Education,
Research and Innovation SERI**

Swiss Confederation