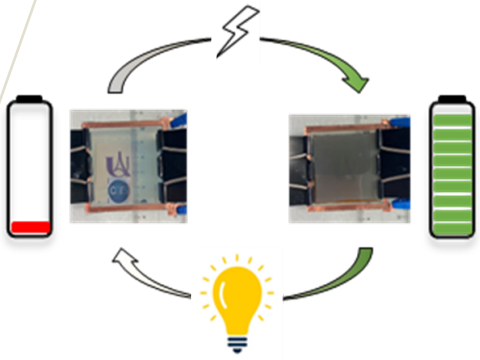
ZN-BASED ENERGY SAVING SMART WINDOWS

Exploiting reversible zinc electrodeposition at transparent electrodes for innovative dual-tinting bi-functional smart windows combining electrochromic and energy storage properties.

ERGANEO
L'AVENIR EST FAIT D'AUDACE

PRESENTATION

The development of bi-functional smart window, which combine reversible battery-type electrochemical energy storage and electrochromic properties, is an significant step forward to tackle the energetic footprint of buildings.
These innovative aqueous based devices can reversibly switch from a transparent discharged state to a colored (even fully opaque) charged state. When integrated in "green" buildings, they efficently regulate light and heat transfer, thus reducing the energy consumption and recycling stored energy.
The selling point of our approach lies in leveraging Reversible Zinc Electrodeposition (RZE) on a transparent conductive oxide anode, with the possibility of combining various electrochromic materials at the cathode.



Reversible zinc electrodeposition – Reversible metal electrodeposition
Electrochromic battery – Dual-tinting smart window

APPLICATIONS

- Smart windows
- Green buildings
- Battery state-of-charge sensor

COMPETITIVE ADVANTAGES

- Eco-sustainable devices relying on abundant and non-toxic chemicals, as well as a safe and mild aqueous-based electrolyte
- Active electrochromic material in-situ regenerated with each cycle for high durability, and allowing to reach full opacity over a wide wavelength range
- Bifunctional devices delivering a voltage > 1.2 V with high energy efficiency
- Low cost due to easy of assembly and lack of electrode preconditioning steps to achieve reversible zinc electrodeposition (Pt seeds avoided)

INTELLECTUAL PROPERTY

Patent

DEVELOPMENT PHASE

Proof-of-concept provided for bifunctional dual-tinting devices combining reversible zinc electrodeposition at the anode with a MnO_2 or a Prussian blue cathode. >1 000 cycles achieved for RZE on transparent conductive electrodes in small symmetric devices. Upscaling to 170 cm^2 devices expected in 2025.
TRL : 3

CONTACT

+33 (0)1 44 23 21 50
industriels@erganeo.com
Ref. project : 712

LABORATORIES

Electrochemical team - Université Paris Cité & CNRS