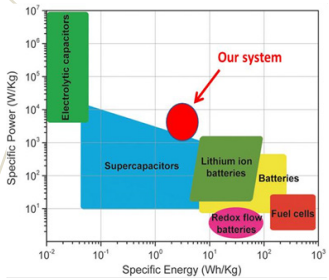
ORGANIC BATTERIES

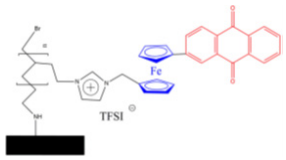
New families of electroactive ionic liquids allowing the development of flexible organic batteries and accepting power peaks similar to a supercapacitor.

ERGANEO
L'AVENIR EST FAIT D'AUDACE

PRESENTATION

The technology developed makes it possible to produce new type of binder-free organic electrodes which, in addition to eliminating lithium and bringing a flexible character to the system, improve the performance of the energy storage by presenting a hybrid operation between the battery and the supercapacitor, thus making it possible to accommodate peaks in consumption or to increase charging speeds.





Ragone plot of poly (N-Ferrocenylmethyl-N-ethylene amidoanthraquinoneimidazolium) in 0.1 mol/L HTFSI (bis(trifluoromethanesulfonyl)imide acid) aqueous solution
Credit : Erganeo

Hybrid supercapacitor / Electrochemical energy storage devices
Nanostructured materials for electrochemical energy storage /
Electroactive ionic liquids / Electroactive ionic liquid polymers

APPLICATIONS

- Electrochemical energy torage devices.
- Mobile battery for mobile phone, laptop, tablet applications.
- Hybrid supercapacitor / organic battery system.
- Flexible batteries application for connected textiles, flexible screens, connected objects.
- Storage with transparent electrodes with charge monitoring.

COMPETITIVE ADVANTAGES

- Energy storage combining the properties of supercapacitor and organic batteries.
- Rocking-chair electrochemical energy storage system using the same active material for the anode and cathode.
- High charging/discharging rate capabilities.
- Flexibility in the choose of the electrolyte solutions: organic or aqueous solvents.
- Towards high energy and high power electrochemical energy storage devices.

DEVELOPMENT PHASE

- ☑ The electrochemical responses were studied in acetonitrile and aqueous solutions in the presence of various electrolytes, and in ionic liquid.
- ☑ The influence of pH was analyzed in aqueous solutions.
- ☑ Various current collectors can be used (carbon, nickel foam)
- ☑ Active electrodes prepared by means of electrodeposition, surface-initiated atom transfer radical polymerization (SI-ATRP) and electrospinning from the monomer.
- ☑ TRL 3

INTELLECTUAL PROPERTY

Patent reference n° WO 2017/191481
Extension reference PCT n° PCT/IB2016/000750

PUBLICATIONS

[1] PhD defense of Ms. Van Bui-Thi-Tuyet on June 4, 2015 at Université Paris Diderot, France [2] PhD defense of Thuan-Nguyen Pham-Truong on November 29, 2018 at Université Paris Diderot, France [3] Thuan-Nguyen Pham-Truong, Hyacinthe Randriamahazaka, Jalal Ghilane, Electrochemistry of bi-redox ionic liquid from solution to bi-functional carbon surface, Electrochim. Acta, 354 (2020) 136689. https://doi.org/10.1016/j.electacta.2020.136689

CONTACT

+33 (0)1 44 23 21 50
industriels@erganeo.com
Ref. project : 305