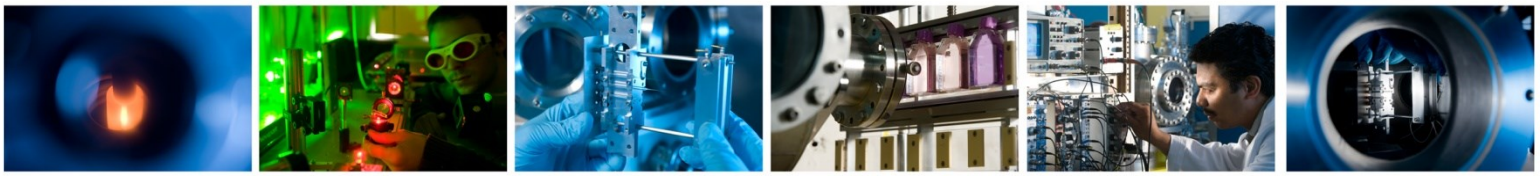

CiMap

Jeudi 18 Novembre
de 14h à 15h
(TEAMS ou Salle F200 du bâtiment F)

“Design of new materials for the energy storage”

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CRISMAT

One of the major challenges of the 21st century is our ability to solve energy-related problems caused by ever-higher consumption, demography and standard of living. It is therefore imperative to anticipate this energy demand and this in a context of sustainable development. Storage technologies are highly dependent on the materials used and it is necessary to search for new materials with advanced properties that are also ecological and economical. Despite the high performance of lithium-based materials, its cost is driving scientists to develop alternative systems based on sodium, magnesium, potassium…, which are widely abundant in the earth's crust.
In addition, with the aim of making lithium batteries safer for large scale application on electric car, the scientific community is looking in recent years to replace the flammable liquid solvents used as electrolyte with a solid ionic conductor compound. Thus new solid state ionic conductors used either as electrode or electrolyte needs to be discovered. We will discuss our strategy to generate such materials.

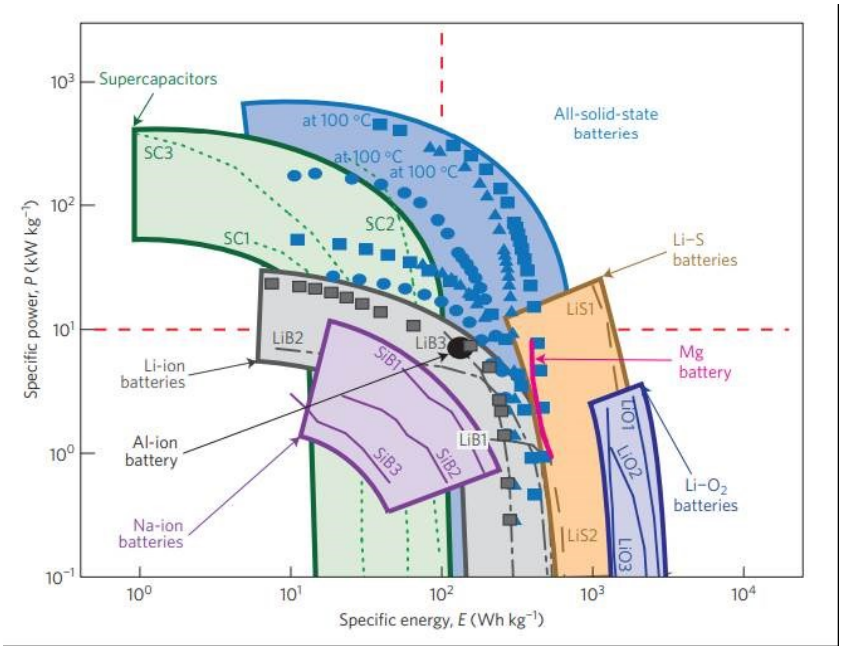

Fig. The Ragone plot.
The Ragone plots of the cells prepared in this study and previously reported batteries and capacitors. The red dashed line indicates the specific energy E = 102 Wh kg−1 and specific power P = 10 kW kg−1. The devices powered by liquid electrolytes show the inverse relationship between specific energy and power. The prepared all-solid-state cells simultaneously achieved high energy and power (E > 102 Wh kg−1 andP > 10 kW kg−1), which is di-cult to achieve for conventional devices.
[from Kato, Y., Hori, S., Saito, T. et al. High-power all-solid-state batteries using sulfide superionic conductors. Nat Energy 1, 16030 (2016). https://doi.org/10.1038/nenergy.2016.30]