TECHNOLOGY OFFER | ENGINEERING & MATERIALS

Hygroscopic composite material & salt apparatus

KEYWORDS

- Thermal energy storage
- Long-term storage
- Chemical process

THE TECHNOLOGY IN A NUTSHELL

Nomastock/Corrostock are two patents developing an innovative thermal energy storage method, using:

- A new composite material (Nomastock)
- A new storage environment that reduces corrosion (Corrostock)

STATE OF THE ART

The Thermal Storage market can be segmented into 3 distinct technologies: sensitive storage, latent storage, and thermochemical storage:

Thermochemical storage has a very high energy density, very high efficiency (theoretically zero energy losses), and allows energy to be stored over very long periods (the only technology allowing inter-seasonal storage with reduced volumes). It is also the technology that allows the storage in a large temperature range, and is therefore also the most promising technology for the recovery of energy waste from industries for supplying homes and commercial buildings (waste convertible into very high temperature thereafter)

THE INVENTION

The invention relates to the development of a composite material based on a hygroscopic salt (e.g. SrBr2) coupled with a porous matrix (e.g. activated carbon or silica gel) for applications in the field of thermal energy storage. This association makes it possible to stabilize the chemical absorbent which has a higher heat of absorption (compared to physical adsorption).

The originality of our invention lies in the use of SrBr2 in the pores of an activated carbon or silica gel matrix. SrBr2 is a commonly investigated salt for heat storage applications but is generally tested pure or in combination with expanded graphite to improve heat transfer. The invention allows a high salt percentage (and hence high energy densities) while keeping the material stability over cycles.

Collaboration type
License agreement
R&D collaboration

IP status
Nomastock :
EP3161099
Corrostock :
EP3201285

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KEY ADVANTAGES OF THE TECHNOLOGY

- Better stability (kinetic and thermodynamic)
- Higher energetical density
- Lower reactor corrosion

CONTACT

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TECHNOLOGY READINESS LEVEL 1 2 3 4 **5** 6 7 8 9

TRL 5

POTENTIAL APPLICATIONS

The technology could be used to ensure thermal energy flow regulation, and/or long-term energy storage. The use of such a flexible technology for indirect storage of green electricity (after its conversion into heat) is also possible.
It can also be used for developing thermal sorption machine for heat or cold generation as well as for heat transformation.

THE INVENTOR(S)

Marc Frère develops research activities in the field of complex energy systems for the energy supply of buildings (cooling and heating needs). This activity consists in proposing architectures of energy systems, establishing the dimensioning rules for each component and testing and evaluating the envisaged solutions by simulation. The evaluation mainly concerns the rate of coverage of needs by renewable energies. This activity is itself fuelled by other research. These concern heat pumps and thermal energy storage using thermochemical technology and include prototyping, testing and performance evaluation in real-life situations. More specifically the activities related to heat storage by thermochemical technology include the synthesis and characterization of innovative reaction solids.

RELEVANT PUBLICATION(S)

> De Goede, Michiel, et al. "Al 2 O 3: Yb 3+ integrated microdisk laser label-free biosensor." *Optics letters* 44.24 (2019): 5937-5940.

Acharyya, Nirmalendu, Mohamed Maher, and Gregory Kozyreff. "Portable microresonator-based label-free detector: monotonous resonance splitting with particle adsorption." *Optics express* 27.24 (2019): 34997-35011.

> Press releases:
https://www.youtube.com/watch?v=9CaI8wlKAVE
https://projects.leitat.org/press-release-the-european-project-glam-develops-a-multiplexed-biosensor-for-personalized-diagnosis-and-therapy-for-bladder-cancers/