

PROJECT

## SPICY

### Silicon and polyanionic chemistries and architectures of Li-ion cell for high energy battery

**Funding:** European (Horizon 2020)

**Duration:** May 2015 - Jul 2018

**Status:** Complete

**Total project cost:** €7,250,429

**EU contribution:** €6,896,054



**Call for proposal:** H2020-GV-2014

[CORDIS RCN : 194856](#)

#### Objectives:

SPICY is a collaborative research project associating 5 industrial partners (3 large groups and 2 SME) with 8 academic and research centres to the multidisciplinary development of a new generation of Li-ion batteries meeting the expectations of electrical vehicle end-users, including performances, safety, cost, recyclability and lifetime. For this purpose, SPICY will consider the development of new chemistry materials, cell architectures and packaging with the support of understanding and modelling activities. SPICY will address the whole value chain until the implementation of manufacturing.

SPICY will focus on polyanionic phosphates for the cathode material. LiFePO<sub>4</sub> is well known as a safer and more durable cathode material. Unfortunately, its energy density is low due to the electrochemical potential of Fe. One objective of SPICY will be to bind metals having a higher potential than Fe, allowing an increase of the material potential, and thus a higher energy. Regarding the anode material, SPICY will study two chemistries. Graphite is used in current Li-ion cells and remains one of the major anode materials for the next generation of Li-ion cells. Silicon is appropriate for high energy cell applications but has lower cyclability. Silicon will be investigated through new synthesis process methods providing nanoparticles and core-shell structures to improve particle stability.

Active and passive components will be harmonized for a higher energy density i.e: polyanionic phosphate /graphite up to 200 Wh/kg, and polyanionic/Si up to 230 Wh/kg. In addition, three cells architectures and packaging will be investigated. The thermal behaviour of these cells will be studied in ageing tests in order to model Li-ion cells. Finally, the industrial environment will be considered and SPICY solution will be assessed so as to optimise cost and to integrate eco-design, thereby supporting the future development of a strong industrial base in this field.

#### Parent Programmes:

[H2020-EU.3.4. - Horizon 2020: Smart, Green and Integrated Transport](#)

**Institute type:** Public institution

**Institute name:** European Commission

**Funding type:** Public (EU)

#### Lead Organisation:

**Commissariat A L Energie Atomique Et Aux Energies Alternatives**

**Address:**

RUE LEBLANC 25  
75015 PARIS 15

France

**Organisation Website:**

<http://www.cea.fr>

**EU Contribution:** €1,516,739

**Partner Organisations:**

**Vlaams Instituut Voor De Zee Vzw**

**Address:**

WANDELAARKAAI 7  
8400 OOSTENDE  
Belgium

**Organisation Website:**

<http://www.vito.be>

**EU Contribution:** €667,063

**Forschungszentrum Juelich GmbH**

**Address:**

Leo-Brandt-Strasse  
52425 JUELICH  
Germany

**Organisation Website:**

<http://www.fz-juelich.de>

**EU Contribution:** €254,724

**Wavestone Luxembourg Sa**

**Address:**

10 RUE DU CHATEAU D'EAU  
3364 LEUDELANGE  
Luxembourg

**Organisation Website:**

<http://www.kurtsalmon.com>

**EU Contribution:** €214,688

**Technische Universitaet Muenchen**

**Address:**

Arcisstrasse 21  
80333 MUENCHEN  
Germany

**Organisation Website:**

<http://www.tu-muenchen.de>

**EU Contribution:** €962,125

**Prollion Sas**

**Address:**

RUE DU TOUR DE L EAU 20  
38400 SAINT MARTIN D HERES CEDEX  
France

**Organisation Website:**

<http://www.prollion.com>

**EU Contribution:** €23,241

**Recupyl Sas****Address:**

Rue De La Metallurgie  
38420 Domene  
France

**EU Contribution:** €314,599

**Centre Technique Industriel De La Plasturgie Et Des Composites****Address:**

RUE PIERRE ET MARIE CURIE 2  
01100 BELLIGNAT  
France

**Organisation Website:**

<http://www.poleplasturgie.com>

**EU Contribution:** €339,611

**Belife****Address:**

RUE JOSEPH WAUTERS 120  
4480 ENGIS  
Belgium

**EU Contribution:** €0

**Karlsruher Institut Fuer Technologie****Address:**

Kaiserstrasse  
76131 Karlsruhe  
Germany

**Organisation Website:**

<http://www.kit.edu>

**EU Contribution:** €486,989

**Hahn-Schickard-Gesellschaft Fuer Angewandte Forschung E.v.****Address:**

WILHELM-SCHICKARD-STRASSE 10  
78052 Villingen  
Germany

**Organisation Website:**

<http://www.hsg-imit.de>

**EU Contribution:** €337,250

**Tekna Plasma Europe****Address:**

200 BOULEVARD DE LA RESISTANCE

71000 MACON  
France

**EU Contribution:** €311,750

### **Fundacion Cidetec**

**Address:**

PASEO MIRAMON 196 PARQUE TECNOLOGICO DE MIRAMON  
20014 SAN SEBASTIAN  
Spain

**Organisation Website:**

<http://www.cidetec.es>

**EU Contribution:** €847,523

### **Prayon S.a**

**Address:**

RUE JOSEPH WAUTERS 144  
4480 Engis  
Belgium

**Organisation Website:**

<http://www.prayon.com>

**EU Contribution:** €619,754

### **Eidgenoessische Materialpruefungs- Und Forschungsanstalt**

**Address:**

Ueberlandstrasse 129  
8600 DUEBENDORF  
Switzerland

**Organisation Website:**

<http://www.empa.ch>

**EU Contribution:** €0

## **Technologies:**

Electric vehicle batteries (and energy management)  
Lithium-ion batteries with novel anode/cathode materials

**Development phase:** Research/Invention

Transport

**STRIA Roadmaps:** electrification

**Transport mode:** Road transport

**Transport sectors:** Passenger transport, Freight transport

**Transport policies:** Environmental/Emissions aspects

**Geo-spatial type:** Other