EURICE
EUROPEAN RESEARCH AND PROJECT OFFICE GMBH

Factsheet

FULL TITLE EMPHASIS – Efficient materials and processes for high-energy supercapacitors for smart textiles and electromobility applications

PROGRAMME HORIZON-CL4-2022-RESILIENCE-01-24

CONTRACT NUMBER 101091997

ABSTRACT EMPHASIS aims to develop a new science-oriented and circular-economy approach for the design and production of next-generation supercapacitors (SCs) achieving the technical specifications defined in the European SET plan targets for 2030. Three main SC components, i.e., electrodes, current collectors and electrolytes, will be optimised to achieve their best combination resulting in very high energy and power density, cyclability, and charge/discharge ratio, reducing at the same time production cost and environmental footprint in comparison to the extant technologies. Laser-assisted methods will be employed to transform biomass into high mass-density films of graphene and graphene/nanoclusters hybrids, offering a dry method for in-situ electrode fabrication. High-surface-area activated carbons and metal-free current collectors with 3D morphology will be produced starting from new bio-based (cellulose) precursors. Novel, green IL-based recyclable electrolytes operating over a wide temperature and voltage window will be designed and synthesised by industrially-relevant processes to ensure upscaling. Various concepts of SCs (symmetric, asymmetric, hybrid) will be designed and optimised for two specific end-user applications, flexible SCs for wearable technology (medical clothing) and the automotive industry (fuel cell-powered vehicles). In both applications, the custom-designed and implemented SCs target the replacement of batteries to eliminate the use of CRMs and unsafe/toxic chemicals. Life-cycle analysis will consider the environmental and cost-feasibility impact to ensure innovation in the frame of the circular economy. EMPHASIS will establish new value chains with energy storage products, essential to the future competitiveness and prosperity of the EU industry. In this direction, the project aspires to develop digital technologies that fulfil the Green Deal objectives for secure raw materials to pave the way for a twin green and digital transformation.

DURATION 36 months (01/01/2023 – 31/12/2025)

Project funding € 5,427,117.50

Coordinator
Antonios Vavouliotis
Pleione Energy SA
Email: vavouliotis@pleione-energy.com

Partners

- Pleione Energy SA
- Foundation for Research and Technology Hellas
- The new Aquitaine Composites & Advanced Materials Technology Center
- Wood K plus
- Keysight technologies GmbH
- University of Würzburg
- Centro Ricerche Fiat / Stellantis
- BORN GmbH
- University of Torino
- SOLVIONIC
- Eurice – European Research and Project Office GmbH
- Italian National Institute of Metrological Research
- Fraunhofer Institute for Integrated Systems and Device Technology

Contact at eurice
Djevaire Memedi
Project Manager
Email: d.memedi@eurice.eu

website www.emphasis-supercaps.eu