Synergistic Resistive Switching of Perovskite and Silicon Carbide materials for Advanced ReRAM micro Devices

Fact Sheet

Project Information

PerovSiC
Grant agreement ID: 746648
Funded under H2020-EU.1.3.2.

Project website

Start date 1 July 2017
End date 20 October 2019

Overall budget € 185 076
EU contribution € 185 076

Coordinated by CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS France

Objective

Perovskite oxides are one of the most promising materials for developing new ReRAM devices, because they show a Resistive Switching (RS) behaviour and multilevel (ML) storage properties through reversible nanoionics redox phenomena. However, several challenges remain to be addressed before introducing them in the emerging memories market. From a material point of view, it is still unclear how to tune and control the mass transport properties at the nanoscale to get the best resistive switch response. From a device point of view, the development of new heterostructures thermally and chemically stable and compatible with the microelectronics technology is required. The ‘PerovSiC’ project combines synergistically perovskite and carbide materials to overcome the current constraints. Starting from the recent breakthroughs of the hosting group, the project focuses on understanding the RS behaviour in perovskites using physical and chemical cutting-
understanding the RS behaviour in perovskites using physical and chemical cutting-edge characterization methods. Further, computational modeling will allow improving the RS process in the new carbide-based heterostructures. The final optimized configuration will be integrated in a highly stable ML ReRAM device. The results of the project will lead to unexpected breakthroughs for neuromorphic computation, memories and logic devices. The multidisciplinary approach proposed will allow the researcher candidate gaining a deep understanding and specialisation in material science - acquiring new competences in advanced techniques, such as XPEEM and operando Raman - and in Key Enabling Technologies, such as micro-technology. Moreover, the collaboration with the ENSC-Lille and the Institute Néel will complement the researcher’s training giving her unique skills in IEDP-ToF-SIMS and synchrotron measurements. Therefore, planned research and training activities in the ‘PerovSiC’ project will re-enforce a position of professional maturity in research and will provide the researcher new career perspectives.

Field of science
/social sciences/economics and business/business and management/commerce
/natural sciences/chemical sciences/inorganic chemistry/inorganic compounds
/natural sciences/physical sciences/electromagnetism and electronics/microelectronics
/social sciences/social and economic geography/transport

Programme(s)

Topic(s)

Call for proposal

H2020-MSCA-IF-2016

Funding Scheme

MSCA-IF-EF-ST - Standard EF

Coordinator

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS

Address
Rue Michel Ange 3
75794 Paris
France

Activity type
Research Organisations

EU contribution
€ 185 076