



BioWings

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THE BIOWINGS PROJECT

BioWings is a project funded by the European Commission in the **Horizon 2020 framework**, under the **Future Emerging Technologies** (FET) Open programme. It is a Research Innovation Action (RIA) aligned with the key goal of the FET programme: supporting the early stages of science and technology research and innovation around new ideas, towards radically new future technologies.

Discovering new materials for biomedical devices

Understanding the unique properties of a new class of smart materials for developing miniaturized biomedical systems

Innovative methodologies for device manufacturing

Controlling materials' features and identifying the most suitable techniques for producing biomedical devices

Demonstration in real medical applications

Integration in Micro-Electro-Mechanical Systems (MEMS), thus enabling smart devices with diagnostic, prognostic and therapeutic functions

PROJECT OBJECTIVES

1. RESEARCH: Fundamental understanding of giant ES in ceria and biocompatibility

The objective is to explore the fundamental boundaries of the ES phenomenon in ceria, understanding the mechanism underlying it, and defining the methodology to design and implement actuators with the characteristics required by the specific applications.

2. IMPLEMENTATION: Designs and architectures (electrodes and substrates) that maximize the ES effect on bio substrates

The objective is to identify the optimal composition of the material for its integration in MEMS and other bio-substrates. The steps expected at this stage include materials engineering aspects of the electrostrictive materials based on doped ceria, as well as theoretical modelling and simulations of the ES-based actuators and of the ES-actuated microfluidic devices.

3. APPLICATIONS: use on devices

The objective of this phase is to select possible designs for bio-med-MEMS for various applications both for the membrane design and the fully supported films by implementing the materials designed and tested. After defining the device portfolio, we will proceed with lab-scale prototyping in two medical applications: Performance in removing blood cells from the blood plasma and image analysis of focused blood cells in a microfluidic acoustic resonator, thus enabling accurate estimation of the haematocrit level (HCT) of a blood sample.

PARTNERS



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 801267

