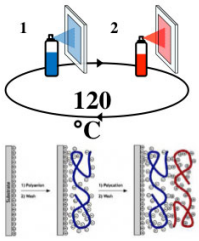
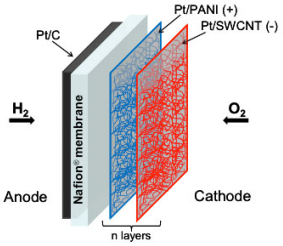
LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY

EnergyCell

Spray deposition of polyelectrolyte-polyelectrolyte and/or polyelectrolyte-nanoparticle complexes for the design of durable fuel cell electrodes





INSPIRATION

Coatings based on the alternate adsorption of oppositely charged species constitute a promising way to confer specific functionalities to treated surfaces (better electrical conductivity, selective interaction with the environment, etc.). However, the deposit of polyelectrolyte multilayer films is currently limited to small surfaces, mainly for biomedical applications and high added value microelectronics.

INNOVATION

With EnergyCell, researchers aim to design electrodes for fuel cells that are quick to make and long lasting. They will develop a method to deposit films, with identical properties to polyelectrolyte multilayer films, on macroscopic substrates for fuel cell applications. These films, made up of polyelectrolyte-polyelectrolyte and polyelectrolyte-nanoparticle complexes (substances formed by the interaction of at least two chemical groups) instead individual polyelectrolytes, will be deposited by means of horizontal spray.

Researchers will use the equivalent of multilayer polyelectrolyte films in fuel cell applications, applications that require membranes of controlled proton (positively charged electrical particles) permeability and electrical conductivity.

Before the development of large-scale methods, researchers will carry out a study in order to better understand the coalescence (phenomenon allowing the fusion of elements coming into contact with each other) of polyelectrolyte complexes, which is essential for forming homogeneous films from these complexes during the spraying process.

IMPACT

EnergyCell will not only make it possible to produce well-structured and long-lasting electrodes on a large scale, but will also provide a significant boost to their performance, making this concept applicable to industry. Beyond fuel cell applications, the new concept developed could also be used for sensors or photovoltaic devices.

Partners

- University of Strasbourg (FR)

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