



ЕВРОПЕЙСКИ СЪЮЗ
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ОПЕРАТИВНА ПРОГРАМА
НАУКА И ОБРАЗОВАНИЕ ЗА
ИНТЕЛИГЕНТЕН РАСТЕЖ

Materials and Processes for the Next Generation Non-volatile Memories, Neuromorphic Computing and Energy Conversion

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The development of our society and its increasing demands determine significantly the horizon and tasks for the modern science. Three sectors appear especially important – Nanoelectronics & Communications, Energy Conversion & Storage and Medicine/health. All three strategic directions have a common focus – developing of new materials exploring nanoscale phenomena and processes. These new materials should fulfil the requirements for extended functionalities, higher efficiency, low cost, low power consumption and must be environmental friendly.

The lectures, will present the latest achievements and developments in the field of nanoelectrochemistry and its applications on memristive elements for next generation memories, cognitive (neuromorphic) computing and energy conversion.

The first lecture will cover the fundamentals of nanoelectrochemistry, electrochemistry with insulators and criteria for selection of materials. This includes discussions on deviations from macroscopic thermodynamics and effects on the kinetics of the electric double layer, field accelerated diffusion, Joule heating etc. New techniques and approaches for studying nanoscale processes will be presented as well as challenges and prospective for further developments.

The second lecture will introduce the applications of these processes and materials in the nanoelectronics & communications and energy conversion, on the show cases for memristive devices (or memristors) for memories and beyond von Neumann computing, and oxygen evolution reaction for electrochemical water splitting.

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