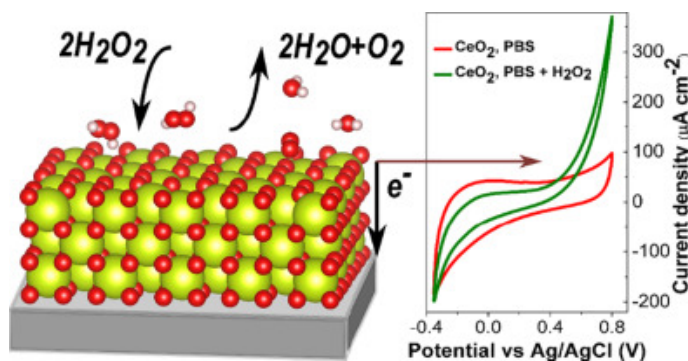


Title	DEVELOPMENT OF CERIUM OXIDE BASED ELECTROCHEMICAL SENSORS FOR DETECTION OF ENVIRONMENTAL POLLUTANTS
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Project description:

The use of inorganic materials for the development of organic electrodes with well-defined morphology and physicochemical properties shows great promise in constructing novel sensing devices for monitoring environmental pollutants. In particular, cerium dioxide has gained attention due to its unique electronic properties and successful applications in catalytic and healthcare systems. Previous studies have demonstrated that cerium oxide thin films can serve as enzyme-free electrode materials for the electrochemical detection and quantification of hydrogen peroxide [1, 2]



This PhD project aims to study and develop an electrochemical model sensor based on cerium oxide film [3, 4] for the detection of commonly used herbicides in agriculture, such as glyphosate, glufosinate, bialaphos molecules, and more.

The project will combine electrochemical and analytical techniques with surface science techniques to evaluate the activity of cerium oxide electrodes towards herbicide molecules. Surface analysis of the electrodes will be performed using

synchrotron radiation-based techniques (SRPES, RPES, NEXAFS, etc.) at the Materials Science Beamline of Elettra Synchrotron in Trieste.

References:

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3. Potin V, Lavkova J, Bourgeois S, et al (2015) Structural and Chemical Characterization of Cerium Oxide Thin Layers Grown on Silicon Substrate. *Mater Today Proc* 2:101–107. <https://doi.org/10.1016/J.MATPR.2015.04.014>
4. Lavkova J, Khalakhan I, Chundak M, et al (2015) Growth and composition of nanostructured and nanoporous cerium oxide thin films on a graphite foil. *Nanoscale* 7:4038–4047. <https://doi.org/10.1039/C4NR06550F>

Collaborations/Network:

Dr. Natilya Tsud and Prof. Iva Matolinová from Charles University in Prague and Elettra Synchrotron in Trieste.