



**VABILO NA PREDAVANJE
V OKVIRU DOKTORSKEGA ŠTUDIJA
KEMIJSKE ZNANOSTI**

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z naslovom:

**Fundamental understanding of
electrochemical interfaces in energy
conversion and storage systems**

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Vljudno vabljeni!

Abstract:

Electrochemistry is by definition a study of reactions that involve transformation of chemical energy into electrical energy or vice-versa. There are a number of electrochemical reactions that take place in our every-day lives that are of tremendous importance. In nature, photosynthetic transformation of CO₂ and water into carbohydrates and oxygen is an electrochemical process. In industry, production of aluminum, titanium and chlorine through electrolysis are all electrochemical processes. No matter whether in big electroplating plants or in a small household CO detector, whether in a fuel cell of a nuclear submarine or in a Li-ion battery of a personal car, electrochemical reactions are engrained into our daily routines and without them, life as we know it would not exist. Electrochemical reactions take place at the electrochemical interface, the region in which the properties change from those in the bulk of the electronic conductor (electrode) to those in the bulk of the ionic conductor (electrolyte). The electrochemical interface is a vastly complex phenomenon where changes from the bulk properties manifest themselves in a variety of ways: i) differences in atomic arrangements close to or at the electrode surface, e.g. surface relaxation or reconstruction, ii) differences in electrode composition close to the surface, e.g. segregation profile in alloys, iii) adsorption of species from electrolyte onto the electrode surface – the so called spectator species, iv) ordering of solvent and/or electrolyte molecules observed in the proximity of the surface, v) changes in electrolyte composition within up to 10 nm from the electrode. *As such, the electrochemical interface is extremely hard to control. However, to control the interface means to control the electrochemical reaction.*

In this seminar, a general outline of the fundamental understanding of aqueous and non-aqueous electrochemical interfaces in energy conversion and storage systems will be given and then supported with more specific examples from our recent studies.