

Tuesday, 17th October 2023, 16:00 s.t.

TU Wien, Institut für Angewandte Physik, E134
1040 Wien, Wiedner Hauptstraße 8-10
Yellow Tower „B“, 5th floor, SEM.R. DB gelb 05 B



The seminar will be also held as a Zoom Meeting

<https://tuwien.zoom.us/j/68212492773?pwd=a1NtVXJtZzZTV1d5bHVZd29EWE9Edz09>

Matteo Olgiatei

TU Wien, IAP, FB Angewandte Grenzflächenphysik / CEST GmbH

Visualising and quantifying adsorption on muscovite mica with AFM

In the present contribution, we discuss how high-resolution atomic force microscopy (AFM) imaging enables us to visualize the lateral distribution of individual mono- and multi-valent ions on the surface of mica. Thanks to this approach, we are able not only to resolve the crystal structure of mica immersed in aqueous solution, but also to transiently picture the population of adsorbed ions from the salt-rich solutions at different concentrations. By using an automated triangulation algorithm, the ion adsorption coverage as a function of concentration can be quantified in a first order approximation. This methodology highlights the possibility to outline a certain competitive behaviour of charged species at the surface. Understanding such competition as a function of type and concentration of ions allows us to unravel the interfacial thermodynamics directly from AFM data, which has been so far mainly exclusive to MD simulations.

Florian Feldmann

TU Wien, IAP, FB Angewandte Grenzflächenphysik / Dörken Coatings GmbH & Co. KG

Characterization of the Galvanic Protection of Zinc Flake Coating by Spectroelectrochemistry and Industrial Testing

The properties of hot-dip galvanised and electroplated zinc coatings on steel have been widely studied, but the corrosion mechanisms of zinc flake coatings have not yet been investigated in similar detail. Here, we present the protective effect of inorganic lamellar zinc coatings, comparing the metallic dissolution rates of different zinc, aluminium and alloyed flakes using an Inductively Coupled Plasma Mass Spectrometry (ICP-MS) flow cell. These experiments were carried out on both intact and pre-damaged coatings with different electrolytes. Data is also compared to accelerated laboratory corrosion tests and outdoor weathering results. The chloride concentration, and its effect on the passive oxide film, appears to be a key aspect moderating the dissolution rate and hence sacrificial zinc dissolution under various conditions. The complementary use of accelerated tests and ICP-MS flow cell analysis provides new insights into both the influence of the corrosive environment and the impact of the zinc flake (alloy) used. Based on this approach tailored coating solutions using zinc flake coatings can be developed.

All interested colleagues are welcome to this seminar lecture(s)
(2 x 30 min. presentations followed by discussion).

Friedrich Aumayr
(LVA-Leiter)

Markus Valtiner
(Seminar Chair)