IAP Seminar

Tuesday, 17th January 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/7332600640

Markus Felber

TU Wien, IAP, FB Angewandte Grenzflächenphysik

Towards identifying the charge carriers in tribocharging

If two electrically neutral materials are brought into contact, an exchange of charge can occur. This effect is called tribocharging and has been known for over 2500 years, yet it is still poorly understood. Perhaps the most important unresolved issue is the unknown identity of the charge-carrier itself. While it is often assumed that the carriers are electrons, they could also be ions, and different experiments in different circumstances provide suggestive evidence for both cases. In order to address this fundamental issue, an experiment whose aim is to clearly identify the carrier responsible for tribocharging is being built. For this, tribocharging experiments with insulating samples in vacuum are being carried out. After contact and charge exchange, we heat one sample near the entrance to a single-charge sensitive quadrupole mass spectrometer (QMS), which can measure ionic charges leaving the sample in real time and with single ion sensitivity. Simultaneously, a charge measurement with a Faraday cup is used to cross check the QMS measurement. If the charge leaving the sample corresponds to the amount of ions detected by the QMS, the ions in question can be identified. In the case of no particle detection a charge exchange through electrons is strongly suggested.

Selina Götz

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Oxide layer design for flexible transparent electrodes

Recently, dielectric/metal/dielectric (DMD) transparent electrodes have emerged as promising alternative to the commonly used indium-tin oxide (ITO) in solar cells and LEDs, providing high flexibility as well as device-specific energy level matching. To this end, MoO_3, molybdenum-titanium oxide and Nb-doped TiO_2 are investigated as dielectric materials, aiming to combine the transparent electrode with the hole/electron-selective layer. The metal oxide thin films are deposited by DC sputtering from specifically designed oxide targets and their optical, electronic and structural properties are studied and optimized for application in DMDs. Special focus lies on the water stability of MoO_3. It is shown that the mixed molybdenum-titanium oxide has increased water stability, while the desired high work function of MoO_3 is maintained. Finally, the DMD performance is tested via implementation in lab-scale perovskite solar cells and organic LEDs.

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)