Guest Lecture

Simulation of Nanosystems for Energy Conversion, Prof. Alessio Gagliardi

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"Interfaces matter:
probing the energetic alignment and chemical interaction between halide perovskites and adjacent transport layers"

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Abstract

In recent years, the interest in halide perovskites rose at a rapid pace due to their tremendous success in the area of photovoltaics; but other fields, like light emitting diodes, show great potential as well. In optoelectronic devices, the function and performance depend crucially on the proper alignment of the energy level landscape throughout the device, i.e. allowing for efficient charge transport across the various interfaces.

In perovskites it turned out that these interfaces can be rather complex. On the one hand, interface dipoles and band bending occur. But more importantly, the perovskite composition and formation can be significantly influenced by chemical reactions taking place at these interfaces.

In this talk I will show how UV as well as X-ray photoelectron spectroscopy measurements can help to probe and understand the processes going on at the various bottom contact materials. Intriguingly, clear differences are found between the formation of interfaces to organic materials and to metal oxides.

Curriculum Vitae

Dr. Selina Olthof obtained a M.Sc. in Physics in 2006 at the University of Stuttgart followed by a Ph.D. on the topic of organic semiconductors under Prof. Karl Leo's Supervision from TU Dresden in 2010.

After that, she went to Princeton University (USA) for two years, where she worked as a PostDoc at the Department of Electrical Engineering with Prof. Antoine Kahn.

Since 2013, she is a Junior Researcher at the Institute for Physical Chemistry where she is Head of the Surface Science Group.

In 2018, she held a position as Eleonore-Trefftz Visiting Professor at the TU Dresden, after which she returned to Cologne.