Hybrid Inorganic/Organic Systems for Opto-Electronics

Collaborative Research Centre 951

Special Colloquium Announcement

of the Collaborative Research Centre 951
"Hybrid Inorganic/Organic Systems for Opto-Electronics"

Antoine Kahn

Dept. of Electrical and Computer Engineering, Princeton University, Princeton, USA

Molecular Dopants and other Tools to control Metal Halide Perovskite Films and Interfaces

Time: Monday, 27.02.2023, 15:15

Place: Erwin-Schrödinger-Zentrum, Rudower Chaussee 25 Room 0'119.

Meeting-ID: 615 2251 9123
Password: 209487

Collaborative Research Centre 951
Department of Physics
Humboldt-Universität zu Berlin

Email: sfb951@physik.hu-berlin.de
Tel.: +49 30 2093 66380
www.physik.hu-berlin.de/sfb951

Partners

Molecular Dopants and other Tools to Control Metal Halide Perovskite Films and Interfaces

Antoine Kahn
kahn@princeton.edu

Dept. of Electrical and Computer Engineering, Princeton University, Princeton, NJ 08544

This talk outlines recent work done in our lab on the control of metal halide perovskite (MHP) thin film surfaces and interfaces using various tools. We first look at fundamental studies of electronic structure performed on systems modified with organic molecular dopants. We justify the effectiveness of interface doping, based on the ability to move the Fermi level across the gap of the perovskite. We review work on molecular oxidants and reductants deposited on MHP surfaces and the impact of these dopants on energy level alignment with substrate and charge transport layers, as well as on device performance. We also look at recent work on bulk p-doping of the perovskite layer with molecular dopants. We then turn to two methods aimed at enhancing MHP film stability: the introduction of a disulfide chemical recycler, to mitigate the loss of halide and formation of Pb^0, and the use of an ultra-thin N_yN layer to passivate the NiO_x surface and the NiO_x-perovskite film interface.