RUHR-UNIVERSITÄT BOCHUM
FAKULTÄT FÜR PHYSIK UND ASTRONOMIE

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Surface and Interface Spectroscopic Studies for High-Efficiency Energy Conversion Applications

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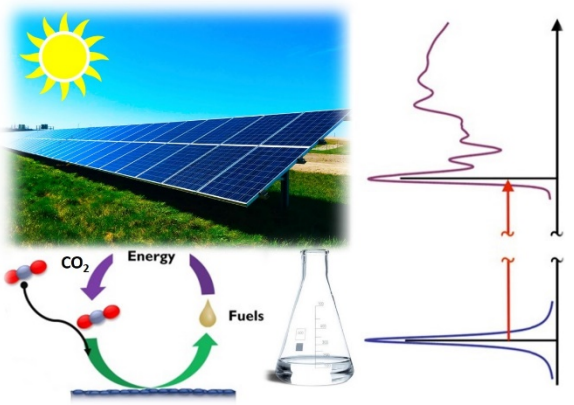

The development of high-efficiency energy conversion devices can be promoted by systematically correlating the macroscopic performance of operating model systems with atomic-scale information of the constituent materials. Targeted knowledge of the structural, electronic and morphological properties of the employed compounds and fundamental understanding of how these properties are modified in surface and sub-surface regions, in quantum confined systems, such as two-dimensional thin films and functional nanostructures, and particularly at interfaces with other solid systems or with gaseous and liquid environments, are crucial for the customization of the materials. Adjusting the energy level offsets at solid / solid interfaces, tailoring morphological dimensions to match charge carrier diffusion lengths, and optimizing surface structure, chemical state and elemental composition at the interfaces with liquid and gas environments are all prerequisites for improving the efficiency of photovoltaic, photoelectrochemical, optoelectronic and catalytic devices. This lecture will briefly address current challenges in energy science and will provide an overview of the various ways in which state-of-the-art X-ray spectroscopy methods, combined with complementary experimental techniques, can help in the effort to develop high-efficiency energy conversion applications by providing element-specific, chemical-state-sensitive and atomic-site-characteristic information of the investigated systems, shedding light on their electronic properties in a selective and targeted way under operating environmental conditions.

Einführung: Prof. Dr. Evgeny Epelbaum

Die Fakultät lädt alle Interessierten herzlich ein.