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Microscopic insights in the morpho-chemical changes of functional components in model energy-conversion devices using scanning photoelectron microscopy

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Scanning PhotoElectron Microscopes (SPEM) combining chemical imaging and microprobe spectroscopy have made important contributions to understanding key factors controlling structural, chemical, electronic and transport properties at surfaces and interfaces of many technologically relevant materials, where issues of complexity at microscopic length scales and modifications induced by the working ambient should be faced and understood [1]. The talk will be focused on the most recent achievements in characterization the morphology and chemical composition of key functional components used in energy-conversion devices. The results include monitoring simultaneously chemical state and induced local potential in operating simplified versions of externally-driven and self-driven solid oxide fuel cells and comprehension of events occurring during ageing of electrocatalysts for oxygen reduction reaction [2]. They will illustrate how monitoring in-situ the lateral evolution of the status of the electrochemical device constituents has allowed us to gain insight into electrochemical and chemical processes and structural changes and correlate them to the actual operation conditions. Ongoing efforts for development and implementing of new set-ups that allow working closer to the realistic operational conditions reactions will be outlined and briefly discussed [3].

References
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