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“Oxygen surface exchange and transport kinetics of mixed ionic-electronic conducting oxides”

Solid oxide fuel cells (SOFCs) and electrolysis cells (SOECs) based upon fast oxygen ionic conducting oxides have great potential economic and ecological benefits. One of the challenges for researchers in this field is to develop electrode materials showing fast ionic-electronic transport and fast oxygen surface exchange kinetics. This lecture describes progress in the author’s laboratory in this area, emphasizing on the importance of gaining a fundamental understanding of the factors controlling oxygen transport, such as defect chemistry and defect-related properties, degree of oxygen non-stoichiometry, surface composition and grain boundary properties.