

Ionically and mixed conducting electroceramics: bulk – interfaces – size effects

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The relevance of ionic conductivity for electroceramics is discussed as regards fundamentals of mass and charge transports as well as applications such as fuel cells, batteries, sensors, permeation membranes and electrochemical windows. Special emphasis is placed on the understanding of thermodynamics and kinetics of charge carrier concentration and mobilities, in particular on the dependence of the properties on the control parameters permitting the strategic design of materials in order to optimize electrochemical properties. In the second part of the contribution the introduction of interfaces and the use of the spacing of interfaces as a practical “degree of freedom” are discussed with regard to future applications. In particular the exploration of the nano-regime leads to exciting new findings with regard to ionic conductivity and storage capacity.