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Surface segregation in the electrolyte material $La_{0.9}Sr_{0.1}Ga_{1-x}Mg_xO_{3-\delta}$ investigated by means of low energy ion scattering

Henning Schraknepper, Tatsumi Ishihara

In oxide based energy conversion devices, e.g. fuel and electrolyser cells (SOFCS and SOECS), predominantly materials crystallizing in the perovskites structure are employed as both, electrodes and electrolyte. Being exposed to realistic operation conditions, however, both components suffer from various degradation phenomena. Here surface segregation and interface diffusion are of pivotal practical importance, as both phenomena are known to deteriorate device performance.
In this contribution degradation phenomena in one of the most promising electrolyte material - $La_{0.9}Sr_{0.1}Ga_{1-x}Mg_xO_{3-\delta}$ (LSGM)- were investigated. Samples of different Mg content x were subjected to anneals at high-(> 1000 K), intermediate (1000< *T*/K < 650) and low temperatures (>650 K). The composition of the very outermost surface layer was subsequently analyzed by means of low energy ion scattering (LEIS). In analyzing the results, the focus was set on differences in A and B side surface coverage and changes with temperature, time and composition.