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Activation/Deactivation Phenomena in the Electrochemical Reduction of Nitric oxide and Oxygen on LSM perovskites

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The effect of anodic pretreatment on $LaMnO_{3+\delta}$, $La_{0.85}Sr_{0.15}MnO_{3+\delta}$ and $La_{0.5}Sr_{0.5}MnO_3$ point electrodes were investigated using cyclic voltammetry in the temperature range 200 to 400 °C in either 10% oxygen in argon or 1% nitric oxide in argon. The electrodes, in most cases, were deactivated in oxygen-containing gas and activated in nitric oxide-containing gas after anodic polarization. This was thought to be due to potential-induced SrO segregation to the surface of the electrodes and annihilation of oxygen vacancies. This work shows that the effect in some cases is significant and must be considered when evaluating the electrodes. In addition, the activity of the electrodes increases with increasing strontium content with respect to the reduction of both oxygen and nitric oxide. The electrodes were all more active with respect to the reduction of nitric oxide than with respect to the reduction of oxygen in the investigated temperature range.

Keywords: LSM; NO; O_2; Activation; Deactivation

FULL TEXT

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