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Sensing Properties of Impedancemetric Solid-Electrolyte NO_x Sensor Using Perovskite-Type Lanthanum Manganite-Based Receptor

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Solid-state impedancemetric NO_x sensor devices composed of the perovskite-type oxide ($La_{0.8}A_{0.2}MnO_3$; A = La, Na, K) as a receptor material and a $Li_{1.5}Al_{0.5}Ti_{1.5}(PO_4)_3$ (LATP) disc as a solid-electrolyte transducer were investigated for the detection of NO_x (NO and NO_2) in the range of 100–500 ppm at 400°C. The lanthanum manganite/LATP-based sensor devices showed NO_x sensing responses that could be divided into two components of resistance and capacitance. While the sensitivities to NO_x were largely affected by the type of receptor material used, the $La_{0.8}K_{0.2}MnO_3$/LATP-based impedancemetric sensor element showed excellent NO sensing properties. FT-IR measurements revealed that the interaction between NO and $La_{0.8}K_{0.2}MnO_3$ was the strongest among the receptor materials.

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