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Rotating ring-disk electrode as a quantitative tool for the investigation of the oxygen evolution reaction

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Abstract

In this work we analyze the applicability limits of the rotating ring-disk electrode (RRDE) technique for quantifying the amount of oxygen produced during the oxygen evolution reaction (OER). We utilize a state-of-the art IrO₂ oxide as a carbon-free OER catalyst and La_{1-x}Sr_xMn_{0.5}Co_{0.5}O_{3-δ}, x=0.25 and 0.5 perovskites, which are studied in the presence of carbon. RRDE experiments are performed at different IrO₂ loadings under both potentiodynamic and potentiostatic modes. The experimental data allow us to formulate the requirements to the experimental conditions necessary to avoid underestimation of the oxygen yield.

Keywords: Rotating Ring-Disk Electrode (RRDE), Oxygen evolution reaction (OER), Faradaic efficiency, Catalyst loading, Carbon corrosion

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