

A sub-stoichiometric $\text{CaTiO}_{3-\delta}$ perovskite as additive of Pt-based electrocatalysts for Oxygen Reduction Reaction

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Oxygen reduction reaction (ORR) is one of the most important process for metal-air batteries and fuel cells devices.[1] Although Pt/C catalysts are widely used in low temperature fuel cells as oxygen electrode, there is still the need to find new, efficient, stable and less expensive materials to be used as cathodes.[2] Considerable efforts, in the last decade, were addressed to improve the electrochemical oxygen reduction reaction and to reduce Pt loading in order to achieve low-cost targets.

To this purpose, we here propose a study based on the use of a sub-stoichiometric perovskite calcium titanate ($\text{CaTiO}_{3-\delta}$, CTO), as co-catalyst for the oxygen reduction reaction (ORR).

Several physical chemical investigations for the understanding of functional features of the proposed materials will be presented.

Composite Pt/C electrodes, with different amounts of CTO, were prepared and their catalytic performances were investigated by rotating-disk electrode (RDE) techniques.[3] A commercial Pt/C catalyst was used as reference. The obtained results proved a higher catalytic activity for the composite electrode, with respect to pure Pt/C, in terms of electrochemically active surface area, oxygen reduction current density, onset potential and stability.

References

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