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Oxygen evolution reaction: activity vs. oxygen vacancies in PrBaCo2O5+δ

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Cobalt-based layered perovskites have emerged as promising electrocatalysts for the oxygen evolution reaction, but important fundamental questions regarding the reaction mechanisms and the design principles for highly active perovskite electrocatalysts are still open. An important development in this sense has recently emerged in a study by Fabbri et al.[1], who demonstrated that oxygen vacancies can play a critical role in the oxygen evolution reaction mechanism and thus, on the perovskite electrochemical activity.
Double perovskite oxides, such as PrBaCo₂O_{5+δ} (PBCO) [2,3], are known to be able to incorporate a large amount of oxygen vacancies, and also to show high oxygen mobility [4-5]. These properties make them ideal candidates for oxygen evolution reaction electrocatalysis. In this work we combine high-resolution neutron and X-ray diffraction, XAS, magnetic and electrochemical analysis to understand the correlation between catalyst activity and oxygen vacancy amount and distribution.

References
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