

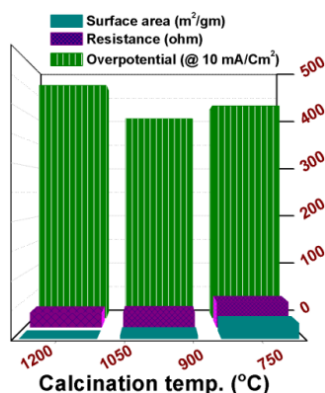
Morphology Variation of Perovskite Oxide Nanostructures and their Influence in Electrochemical Water Oxidation

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The catalyst composition and morphology are important parameters in controlling the electrocatalytic performance.¹ For oxygen evolution and reduction reaction (OER & ORR) perovskite oxides (ABO_3 , $A = Ln^{3+}$, $B =$ transition metal) are attractive catalysts due to their high resistivity towards corrosion, very good catalytic activity and structural stability.² Doping at both A-site with bivalent rare earth cations and B-site with other transition metal ions are common protocols to enhance the activity.³ Apart from e_g electron density and oxygen nonstoichiometry which are well studied before, herein we have demonstrated the effect of morphology on the mechanism of electron transport towards OER. We have made different morphologies of $La_{0.7}Sr_{0.3}Co_{0.7}Fe_{0.3}O_3$; LSCF by varying the synthesis conditions. Three noticeable morphologies were achieved after calcination at 750, 975 and 1200°C in air which show overpotential values of 400, 390 and 430 mV versus RHE, respectively for electrochemical OER in 1M KOH at 10 mA/cm². The current density observed for these samples at 1.7 V versus RHE are 40, 52 and 19 mA/cm², respectively. The best catalytic activity was observed for the sample calcined at 975°C because of its relatively better electronic conductivity as well as the existence of more catalytically active sites.



References:

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