Minority bulk and surface proton conduction in ceramic positrodes for proton ceramic electrochemical cells

Introduction

The positrode is critical for proton ceramic electrochemical cells for **hydrogen** and ammonia, as a major contribution to the over-potentials and hence losses in the whole cell. It is challenging to characterise the proton transport in predominantly electronic conductors.

We want to establish theory and methodology for **measuring minority protonic** conductivities in *electronic conductors.* The results will be used as input to other project which perform computer simulations to seek strategies for optimization and effects on electrodes in scaled-up cells.

Primary objective

• Characterizing the proton concentration and migration in the bulk and on surfaces of positrode materials.

Secondary objectives

- P-type oxide model materials.
- Theoretical model of the protonic and electronic conduction.







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Related projects: FME HYDROGENi

I am doing PhD in Materials Chemistry at the Electrochemistry group with Truls Norby as my supervisor.

Bachelor in Environmental Engineering - Huazhong University of Science and Technology, China.

Master of Research in Green Chemistry: Energy and Environment -Imperial College London, UK.

Estimated progress of the PhD project:

Just started	< 50 %	> 50 %	Almost done 🕲

Planned deliverables

• Manuscript on surface protonics and electronic conduction on NiO.





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