

TECHNOLOGY OFFER: PREDICTION OF OXYGEN FLUX IN PEROVSKITE TYPE MEMBRANE FROM MEASUREMENTS ON POWDER

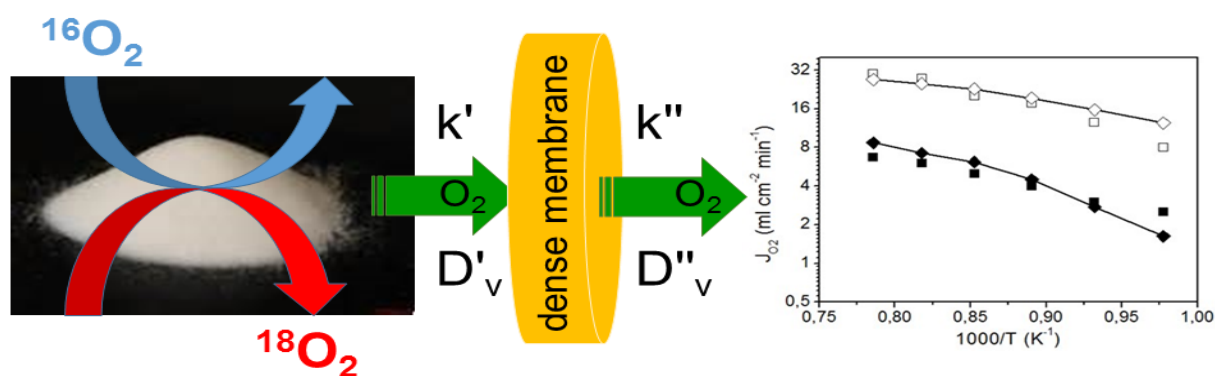
OVERVIEW

Category: Membrane , Catalyst , Reactor , Process , R&D knowledge , Other

Benefit summary: Characterization & kinetic modeling method allows predicting with high confidence, the oxygen flux of perovskite membranes. The methodology accelerate the discovery of performing mixed ionic-electronic oxygen-conducting (MIEC) membranes and SOFC cathode materials.

Development status: The methodology is validated on four different oxygen conducting membranes

IP status: Public



NOVELTY

- Technology benefit description:** Our characterization/modeling method allows predicting with high confidence, the oxygen flux of perovskite membranes using kinetic parameters which have been determined on corresponding powders. Without tedious membrane preparation and testing, the performances of the membranes including the effect of operating conditions can now be pre-screened using this modeling approach. We believe that the presented methodology shall accelerate the discovery of performing mixed ionic-electronic oxygen-conducting (MIEC) membranes and SOFC cathode materials in guiding the selection of candidate materials in relevant process conditions of pressures and temperature.
- Technology uniqueness and comparison vs state-of-the-art:** Experts said that the prediction of oxygen flux starting from characterization of powder is *impossible*. We've tackled it!

DEVELOPMENT

- Development status:** Fully validated on benchmarks. Ready for screening application of novel conducting materials.

TECHNOLOGY PROVIDER

- Technology provided by:** Characterization facilities and modeling tools are available at CNRS laboratory
- Related expertise:** Oxygen adsorption/desorption and transport in oxygen transport membrane and Mixed Ionic Electronic Conducting materials (MIEC), $^{18}\text{O}_2/^{16}\text{O}_2$ exchange in a plug flow reactor.

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TECHNICAL DETAILS

- ▶ **Description:** Details of the methodology can be found in the following publication and other publications to come.
- ▶ *Determination of oxygen adsorption–desorption rates and diffusion rate coefficients in perovskites at different oxygen partial pressures by a microkinetic approach*, M. Rochoux, Y. Guo, Y. Schuurman and D. Farrusseng, *Phys. Chem. Chem. Phys.*, 2015,17, 1469-1481 -DOI: 10.1039/C4CP04243C
- ▶ Prediction of oxygen flux in dense perovskite membranes using microkinetic constants measured on corresponding powders, M. Rochoux, Y. Guo, Y. Schuurman, D. Farrusseng, submitted

EXPLOITATION/LICENSING

- ▶ **Collaboration type sought:** Transfer of knowhow - Exploitation of this methodology by third party (R&D centers or private companies)
- ▶ **Support provided:** Construction and technology demonstration and training on the methodology

CONTACT DETAILS

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