





## Supplementary materials

### Electrochemistry and energy conversion features of protonic ceramic cells with mixed ionic-electronic electrolytes

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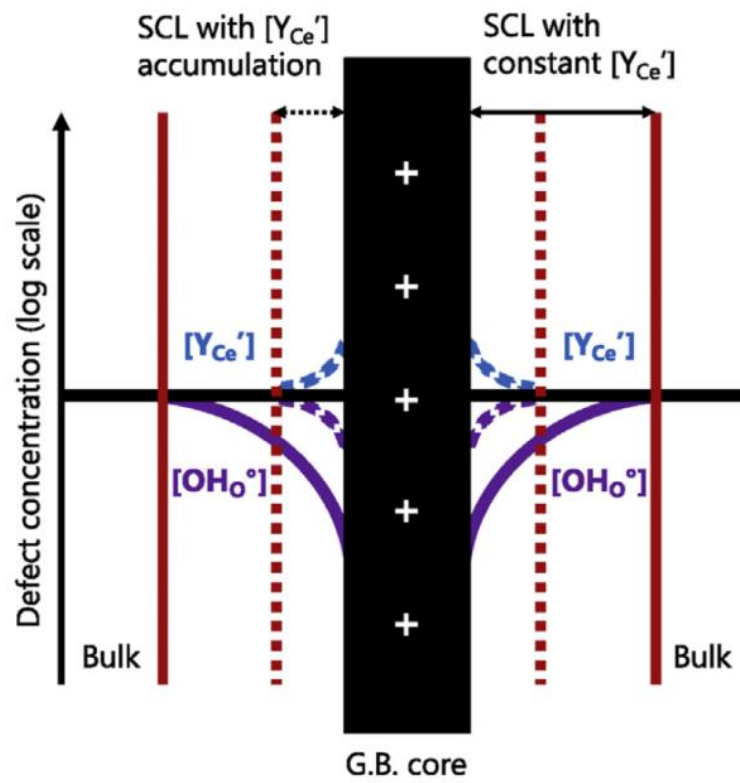


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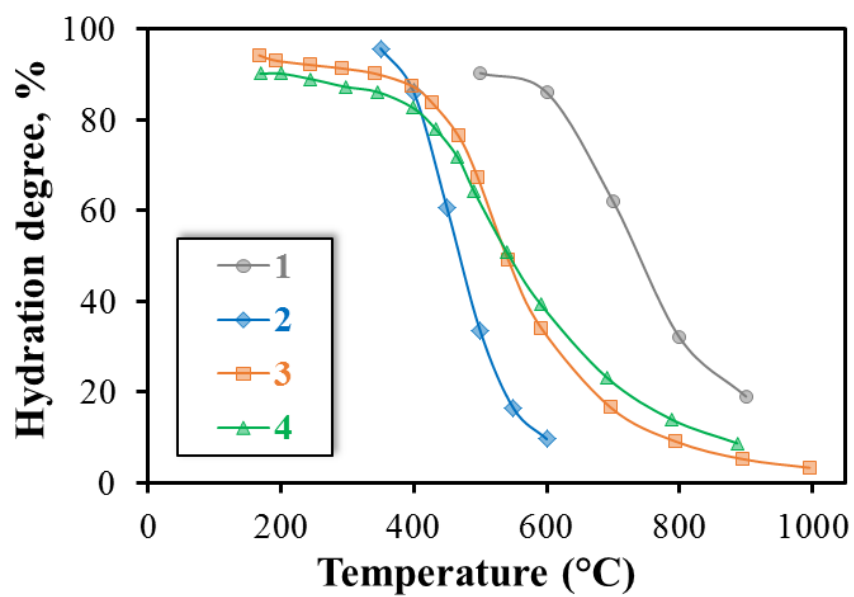


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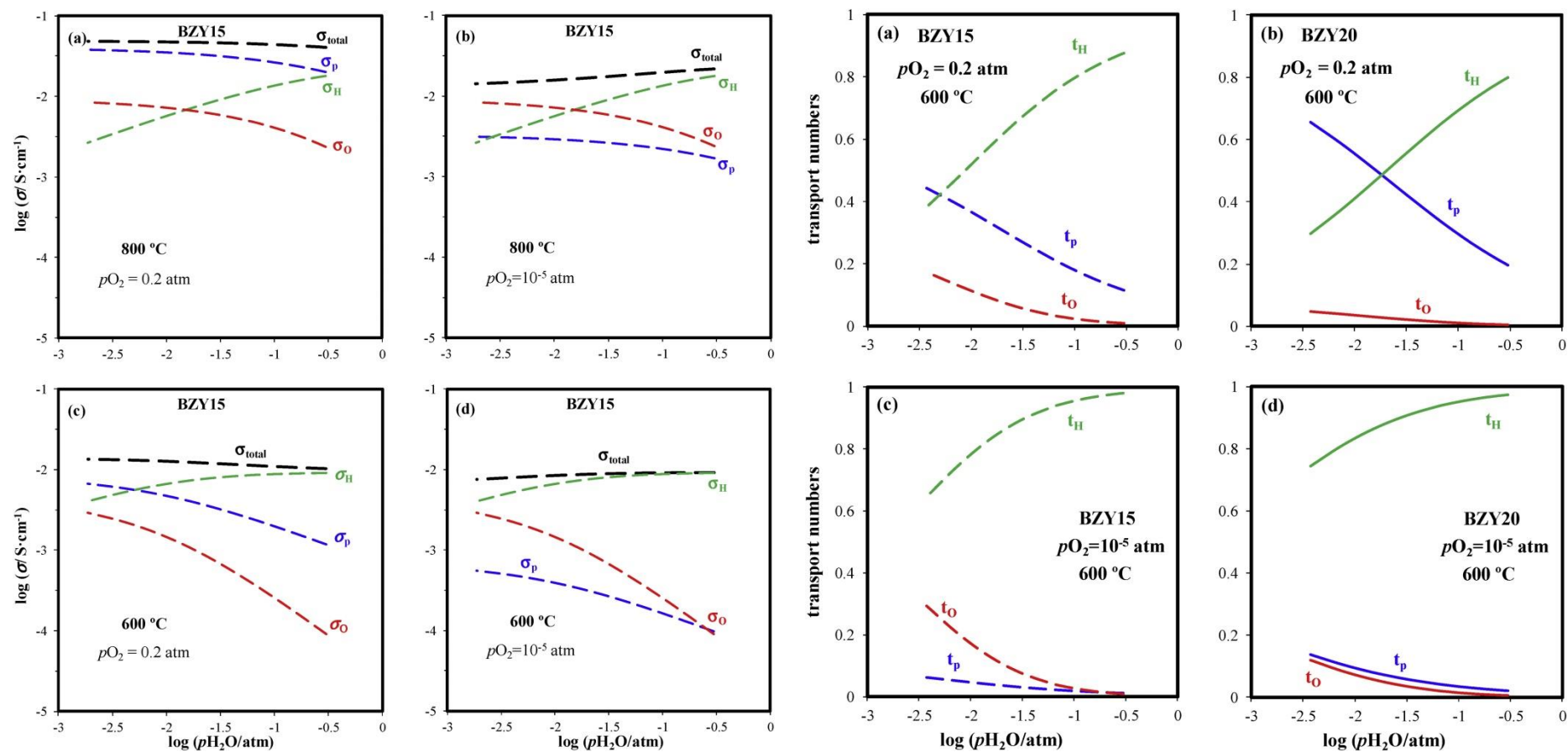
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4 Figures**



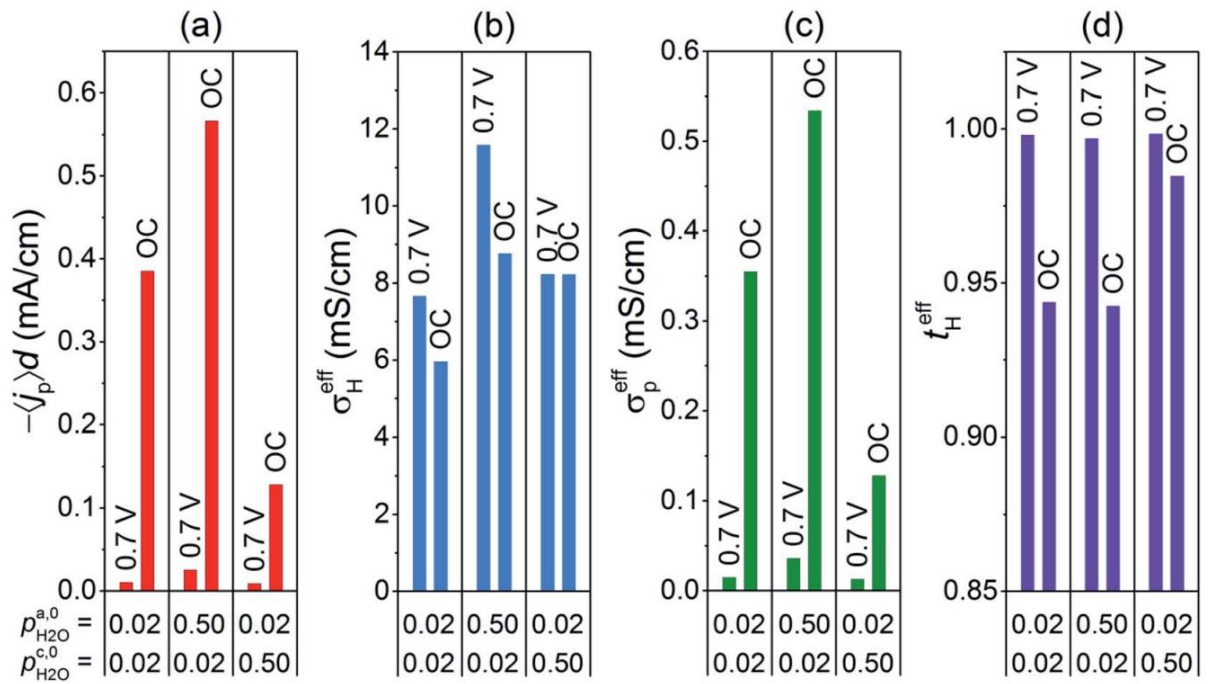
**Figure S1.** Schematic space charge layer model for proton-conducting ceramic materials.<sup>1</sup>



**Figure S2.** Hydration capability of BaCeO<sub>3</sub>- and BaZrO<sub>3</sub>-based ceramic materials: 1 – BaCe<sub>0.9</sub>Y<sub>0.1</sub>O<sub>3-δ</sub>,<sup>2</sup> 2 – BaCe<sub>0.9</sub>Y<sub>0.1</sub>O<sub>3-δ</sub>,<sup>3</sup> 3 – BaZr<sub>0.4</sub>Sc<sub>0.6</sub>O<sub>3-δ</sub>,<sup>4</sup> 4 – BaZr<sub>0.8</sub>Sc<sub>0.2</sub>O<sub>3-δ</sub>.<sup>4</sup>



**Figure S3.** Dependences of total and partial conductivities of oxide ions, protons and electron holes, as well as the corresponding transference numbers for  $\text{BaZr}_{0.8}\text{Y}_{0.2}\text{O}_{3-\delta}$  as a function of  $p\text{H}_2\text{O}$  at different  $T$  and  $p\text{O}_2$  values.<sup>5</sup>



**Figure S4.** Comparison of the fuel cell parameters calculated under different operating conditions:<sup>6</sup> (a) p-type electronic current density; (b) effective proton conductivity; (c) effective hole conductivity; (d) effective proton transference number.

## References

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