

Insight in densification improvement of sintering-aid-free Y-doped BaZrO₃ functional tape for proton conductive application

Barium zirconate-based perovskites are promising electrolyte materials for proton-conducting electrolysis cells due to their high chemical stability and bulk proton conductivity at intermediate-to-high temperatures. However, their poor sinterability and the strong contribution of grain boundary resistance significantly limit the total conductivity. Understanding microstructure evolution during sintering and its relation to functional properties is therefore essential.

In this work, Y-doped BaZrO₃ (BaZr_{0.8}Y_{0.2}O_{3-δ}, BZY20) electrolytes were fabricated by water-based tape casting, avoiding the use of sintering aid. Grain growth and final density were controlled by systematically modifying intermediate step of the thermal cycle.

A comparative microstructural and phase analysis was carried out to correlate sintering parameters with densification behavior, grain size distribution, and phase stability. Particular attention was given to the evolution of grain boundaries and their impact on the expected electrical performance.

The results provide insight into the relationship between processing conditions and microstructure development, highlighting the possibilities of sintering-aid-free routes for optimizing electrolyte performance in proton-conducting electrolysis applications.

Professional Status of the Speaker

Doctoral or Master Student

Interest in submitting a paper in a special issue of

No interest

Invitation letter for visa

No

Author: TORAZZI, Fabio (University of Trento)

Co-author: Prof. SGLAVO, Vincenzo Maria (University of Trento)

Presenter: TORAZZI, Fabio (University of Trento)

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