Special Issue

Solid Oxide Electrolysis Cell: Latest Advances and Prospects

Message from the Guest Editors

The green production of hydrogen from renewable energies is crucial and a strategic role is represented by the Solid Oxide Electrolysis Cells (SOEC) technology. Many efforts have been made in the past decade, that lead to the maturity of Solid Oxide Cells, especially in fuel cell operation mode (SOFC). However, SOEC as well as the reversible approach SOFC/SOEC in which the same device produces hydrogen thanks to renewable resources and uses it in a second time as fuel for power generation, have not reached the industrial scale yet. For these reasons, research needs to be pushed in the coming years, in order to cover the gap that is still present for the large-scale implementation of SOEC systems. Research efforts still need to be made, especially, but not only, on the materials involved at the cell as well as at the system level, their tailoring, and processing, together with a deep understanding of the long-term degradation phenomena involved in these devices. Furthermore, new cell and system design and production methods will be also fundamental to increase their efficiency and durability, making SOEC suitable for industrial production on a large scale.

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