

## Nanostructured thin films of ytterbium stabilized zirconia prepared by ultrasonic spray pyrolysis

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Ionic conductors like stabilized zirconia are commonly used as electrolyte material in solid oxide fuel cells (SOFC) and oxygen sensors due to its chemical and thermal stabilities, and its high oxygen ionic conductivity at high temperature. However, in order to improve the performance of these devices, a lower operation temperature is desired. One approach to reduce this temperature is to increase the ionic conductivity of the electrolyte by decreasing its thickness as much as possible. Some studies in this direction show that the ionic conductivity can be enhanced by preparing cubic or tetragonal polycrystalline films with grain sizes in the nanometer range.

Several physical and chemical processes have been employed to prepare thin films of ionic conductors. Among them, the spray pyrolysis techniques are very attractive for the industry of planar SOFCs, because they allow the deposition of a wide variety of ceramic films over large areas.

Ultrasonic spray deposition (USD) allows the deposition of homogeneous thin films with excellent physical properties. In the present work, ultrasonic spray deposition was used to deposit ytterbium stabilized zirconia films, the spray solution precursor was zirconium acetylacetonate and ytterbium acetylacetonate hydrate, dissolved in anhydrous methanol.

The temperature of the heating plate was controlled in the range of 300–550 °C, and the deposition time was varied between 5 and 45 min.

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