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PLASMA CHARACTERIZATION IN THE PRODUCTION OF ZrO2-Ni COATINGS BY CO-SPUTTERING

In this experimental study, the focus was on characterizing the plasma generated during the production of ZrO_2-Ni films using a Co-Sputtering system. The primary objective is to analyze the plasma through optical emission spectroscopy (OES) to identify the density of emitted species (ions and electrons), the electron temperature, and to correlate these characteristics with the structure and chemical composition of the resulting coatings. The ZrO_2-Ni coatings were deposited using a pulsed RF-DC Co-Sputtering system, with variations in the working pressure and discharge power of the two sources (RF and DC). Argon was employed as the gas to generate the discharge once the working pressure of 10^{-3} mbar was achieved. Optical characterization was performed using a spectrometer equipped with a 400 lines/mm diffraction grating. The structure of the coatings was analyzed using X-ray diffraction (XRD), and the chemical composition was determined via energy-dispersive X-ray spectroscopy (EDX). This analysis aids in improving the synthesis process of ZrO_2-Ni films for solid oxide fuel cell applications, offering a deeper understanding of the relationship between plasma characteristics and the quality of the deposits.

Keywords

Optical, ZrO_2-Ni, Sputtering, Plasma

Reference

[1] R. M. Andrii Rednyk, Liquid plasma spraying of NiO-YSZ anode layers applicable for SOFC., Materials Today Communications, Volume 38., 2024.

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