

Stabilized Zirconia-Based Inert Anodes for Green Synthesis of Metals from Their Oxides

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Abstract

The goal of the paper is to demonstrate the technical viability of a new process for the production of magnesium metal directly from its oxide. This process employs an inert solid-oxide-oxygen-ion-conducting-membrane-based anode in a high temperature electrolytic cell (SOM cell). This process exhibits several advantages over existing magnesium production routes, including improved economics and reduced environmental impact. This article will report the recent progress of an on going laboratory-scale effort to better characterize the properties of the individual cell components, and overall performance of the SOM cell. Topics of investigation include: stability of the zirconia membrane in the selected molten electrolyte (flux), volatility of the flux, potentiodynamic sweeps, electrolysis experiments for magnesium production from its oxide in the flux, and analysis of the magnesium metal produced.

