

عنوان مقاله:

Influence of electroplating parameters on microstructure and amount of ceramic particle deposition in Ni-Co-CeO₂ composite coating

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خلاصه مقاله:

Chromium alloy steels are the best choice for materials used in interconnect plates used in solid oxide fuel cells. At operating temperature of solid oxide fuel cells chromium can alert to unstable Cr^{+۶} species. These unstable species can precipitate at the cathode site, causing cathode contamination and reducing cathode efficiency. Therefore, protection of these steels at high temperatures is essential. Therefore, applying surface coatings it is one of the best effective methods to extend the life of these components against oxidation. In this study, Ni-Co-CeO₂ composite coating was created by direct electrodeposition on the surface of AISI ۴۳۰ ferritic stainless steel. In order to obtain proper coating, the effect of parameters of CeO₂ particle concentration, current density and pH in the bath was investigated. Influence of CeO₂ content (۵, ۱۰, ۱۵ and ۲۰ g/L), current density (۱۵, ۱۷, ۲۰ and ۲۲ mA/cm^۲) and pH (۲.۵, ۳, ۳.۵ and ۴) on the amount of CeO₂ ceramic particle deposition and microstructure of coating was investigated. Scanning electron microscopy (SEM) and EDX analysis were used to determine the morphology of Ni-Co-CeO₂ composite coating. The results showed that with increasing CeO₂ and pH the amount of CeO₂ particle deposition increased and then decreased. Also with increasing current density the deposition of CeO₂ particles decreased.

کلمات کلیدی:

Electroplating, Microstructure, Composite coating, CeO₂

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