عنوان مقاله:

Evaluation of Hot Corrosion of Hot Dip Aluminized Coated Superalloy IN۷۳۸LC in Melted Na۲SO۴-۲۵wt% NaCl Salt

محل انتشار:

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خلاصه مقاله:

Superalloy IN۷۳۸LC is categorized as one of the most frequently utilized nickel base superalloys in the production of hot section components due to its multiphase microstructure maximizing its strength under elevated temperatures. In this study, a hot dip diffusion coating of aluminum was employed on the nickel-base superalloy Inconel ۷۳۸LC substrate to enhance the hot corrosion resistance required for high-temperature applications, such as turbine blades. The aluminizing salt bath included Al powder with a particular composition, NaCl, KCl, Na۳AlF۶, and NaF. A thickness of about ۴۸ μm was attained by applying the coating for ۳۰ minutes at ۷۲۰ ℃. Bare and aluminized coated specimens were subjected to hot corrosion assessment in molten salt, with a composition of Na۲SO۴-۲۵wt% NaCl at ۷۲۰ C being exposed for ۶۰ and ۱۴۰ hours. Scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), and X-ray diffraction (XRD) were conducted on the coating sample to ensure the successful deposition of the hot dip aluminized layer. The aluminized sample exhibited excellent corrosion resistance owing to the formation of an Al۲O۳ layer, which meant that after ۱۴۰ hours of testing; very little coating deterioration was detected. In contrast, the naked sample suffered severe degradation and showed poor hot corrosion resistance. It was thought that the aluminized sample's superior hot corrosion resistance resulted from the uniform and dense growth of an Al۲O۳ protective scale without any cracks on the superalloy surface

کلمات کلیدی:

Nickel-Based Superalloy, IN۷۳۸LC, hot-dip coating, Hot Corrosion, Aluminizing, Molten Salt