

论文

电弧离子镀梯度 (Ti,Al)N涂层的结构与抗氧化性能研究

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摘要:

采用电弧离子镀(AIP)技术在航空发动机压气机用1Cr11Ni2W2MoV不锈钢上沉积 (Ti, Al) N梯度薄膜, 并研究其微观结构和高温抗氧化性能。结果表明, 薄膜均匀致密, 与基体结合良好; 薄膜为B1型(NaCl)单相结构, 具有(220)择优取向; 薄膜是内层富TiN、外层富(Ti, Al) N的梯度薄膜; 梯度薄膜在700 °C和800 °C氧化后, 表层形成富Al₂O₃的保护膜, 在700 °C较长时间内和800 °C短时间内对不锈钢基体具有良好的保护作用。

关键词: 电弧离子镀 梯度(Ti Al)N薄膜 结构 氧化

STRUCTURE AND OXIDATION BEHAVIOR OF GRADIENT (Ti,Al)N COATING PREPARED BY ARC ION PLATING

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Abstract:

Abstract Gradient (Ti,Al)N coating was deposited on 1Cr11Ni2W2MoV stainless steel for aero-engine compressor blades by arc ion plating. The XRD results showed that the gradient coating had a B1(NaCl) structure with (220) preferred orientation. The elemental gradient distributions of Ti and Al were confirmed by electron probe microanalysis (EPMA). The oxidation test of the coatings was carried out by heating the samples at temperatures of 700°C and 800°C respectively in the air for selected time. The surface and cross-sectional morphologies of the as-deposited and oxidized coatings were investigated by scanning electron microscopy (SEM/EDS). The oxidation results indicated that the gradient coatings were protective at 700°C for long time and at 800°C for short time. It was found that protective layers rich in amorphous alumina formed on top of the gradient (Ti,Al)N film during the elevated temperature oxidation which protected the film from further oxidation.

Keywords:

收稿日期 2006-02-24 修回日期 2007-07-05 网络版发布日期 2008-02-25

DOI:

基金项目:

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