Experimental Study of Densification Effect on Al 2024 Plasma Electrolytic Oxidation Film

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This paper explored the densification effect on the plasma electrolytic oxidation (PEO) film coated on Al substrate under the transient self-feedback control mode. Film compactness and microstructure uniformity were carried out by different surface analysis and testing instruments. The results showed that the high-frequency carrier waveform kept a reasonable control on plasma discharge intensity during different stages, inhibited concentrated plasma discharge, prevented the mullite formation, promoted $\gamma \rightarrow \alpha$ Al₂O₃ phase transition sufficiently, and refined the α -Al₂O₃ grain distribution. These advantages basically stop the crack and defect generation and improve obviously the PEO film compactness and microstructure uniformity.

Keywords: Ceramics; Arc discharges; X-ray diffraction topography; Phase transitions

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