

## 微弧氧化 Al-Si-O陶瓷涂层的结构与结合强度

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摘要 使用微弧氧化方法在铝合金表面制备了包含Al-Si-O的复合氧化物陶瓷涂层.

利用XRD和SEM分析了陶瓷涂层的组成和结构, 通过机械冲击、热冲击和拉伸法评价了涂层与基体的结合强度.

结果显示, 陶瓷涂层由 $\alpha$ -Al<sub>2</sub>O<sub>3</sub>、 $\gamma$ -Al<sub>2</sub>O<sub>3</sub>和莫来石组成. 涂层表面粗糙, 有大量等离子体放电产物.

陶瓷涂层能承受机械和600℃热冲击, 说明涂层与基体结合好, 具有很好的延展性、抗热震性. 拉伸结果显示, 涂层与基体结合强度高于20MPa.

关键词 [铝合金](#) [微弧氧化](#) [陶瓷涂层](#) [结合强度](#)

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## Microstructure and Adhesion Strength of Al-Si-O \Micro-arc Oxidation Coating

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### Abstract

A complex Al-Si-O ceramic coating was deposited on aluminium alloy by micro-arc oxidation (MAO). The composition and structure were analyzed by XRD and SEM, and the adhesion strength of the coating to substrate was investigated by thermal impact, mechanical impact and tensile tests. The results show that the coating consists of a mixture of  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>,  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> and mullite. The coating surface is rough with a number of the plasma discharge products. The coating can suffer mechanical impact and thermal impact of 600℃, it indicates that the coating possesses of good ductibility, thermal shock resistant and adhesion strength to the substrate. The tensile test shows that the adhesion strength of the coating to substrate is higher than 20MPa.

**Key words** [aluminium alloy](#) [micro-arc oxidation](#) [ceramic coating](#) [adhesion strength](#)

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