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Mo电极电火花强化与喷丸复合提高Ti合金微动疲劳抗力

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摘 要:采用Mo电极分别在空气和硅油中对Ti 811钛合金表面进行电火花强化处理(ESS), 探讨消除强化层中裂纹缺陷的途径。将ESS与喷丸强化复合, 拟使Ti合金微动疲劳(FF)抗力得到显著改善。结果表明: Mo电极在空气中电火花强化处理Ti 811钛合金表面后, 强化层出现明显的微裂纹缺陷, 由此导致其微动疲劳抗力降低。在硅油中用Mo电极电火花处理Ti 811合金不仅消除了表面裂纹缺陷, 而且使钛合金表面具有良好的减摩擦润滑作用, 显著改善了钛合金基材的耐磨性能; 再经喷丸强化处理, 使钛合金基材的微动疲劳抗力显著提高。

关键字: 钛合金; 微动疲劳; 电火花表面强化; 喷丸; 摩擦磨损

Electrospark surface strengthening by Mo electrode and shot peening on improving fretting fatigue resistance of Ti alloy

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Abstract: The surface of Ti811 alloy was treated by electrospark surface strengthening (ESS) with Mo electrode in the air and in the silicone oil environment to explore ways to eliminate the strengthening layer cracks and flaws. ESS was combined shot peening in order to synergistically improve the fretting fatigue (FF) resistance of Ti alloy. The results show that the Ti811 alloy treated by ESS in the air induces the Ti alloy surface cracking, which leads to its fretting fatigue resistance decreasing. The Ti811 alloy treated by ESS in the silicone oil not only eliminates the surface micro cracks, but also significantly improves the wear resistance of Ti alloy due to the better lubrication. The fretting fatigue resistance of Ti alloy is also improved synergistically by ESS in the silicone oil combined shot peening post treatment

Key words: titanium alloy; fretting fatigue; electrospark surface strengthening; shot peening; friction and wear

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