

论文

微弧等离子喷涂AT13纳米涂层的工艺优化

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摘要 根据微弧等离子喷涂在不同工艺参数下制备的AT13纳米涂层结合强度和显微硬度的测试结果, 运用遗传神经网络算法对喷涂工艺参数与涂层结合强度和显微硬度之间的非线性关系进行建模与仿真, 并应用遗传算法和多目标优化理论对AT13纳米涂层的性能进行了优化. 研究表明, 仿真值与实验值相一致, 相对误差<0.5%; 喷涂电流、Ar流量和Ar压力分别为150A、64m³/h和0.38MPa时, AT13纳米涂层综合性能最佳.

关键词 [微弧等离子喷涂](#) [遗传神经网络](#) [多目标优化](#)

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Optimization of the Process Parameters of Nanostructured AT13 Coatings Prepared by Micro-plasma Spraying

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Abstract According to the test results of the bonding strength and microhardness of nanostructured AT13 coatings prepared by micro-plasma spraying on conditions of different processing parameters, using genetic algorithms and neural networks, the non-linear model on the relationship between the properties of nanostructured AT13 coatings and the process parameters was set up and simulated. The optimization was based on the genetic algorithms and multi-objective optimization theory. The results show that the simulated results agree with experimental values, and the relative error is less than 0.5%. The optimum parameters are that spraying current is 150A, argon flow is 0.64m³/h, argon pressure is 0.38MPa, and the overall properties of nanostructured AT13 coatings are the best.

Key words [micro-plasma spraying](#) [genetic algorithms and neural networks](#) [multi-objective optimization](#)

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