55号钢仿生非光滑表面高温耐磨性试验

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摘 要： 利用激光微细加工技术将根据仿生非光滑耐磨理论设计的仿生非光滑耐磨表面复制到55号钢模型试样上，在磨损试验机上进行影响凹坑形非光滑表面试样耐磨性多因素试验。采用试验优化设计技术中部分正交多项式回归设计试验方案，得出影响仿生非光滑凹坑表面耐磨性多因素回归方程。试验结果表明，各试验因素对耐磨性影响重要程度依次为温度、磨损时间、凹坑直径、转速和凹坑密度。最后对非光滑的耐磨机理进行初步分析。 The design of partial multinomial regression on wear resistance of specimen was performed according to the techniques of experimental designing optimization method. Test model specimens made of 55 steel with regular concaves were processed by laser texturing technology technique. Investigations into topographical and tribological features were conducted on MG 2000 wear and abrasion test machine. As one important test index, wear loss was taken to be detected by using partial polynomial regression plan, and three test factors of temperature （300 ℃, 500 ℃）, running time （180s, 300s）, rotating speed（400r/min, 600r/min）, non-smooth concave unit size （150μm, 200μm, 250μm,300μm）and unit distributing density（250μm,350μm at line and row has been fixed）were selected to investigate the effects on the surface wear loss of 55 steel samples. Multi-factor linear regression equation was derived from test data. According to their importance sorts to test results, the factors are temperature, running time, non-smooth concave unit size, rotating speed, unit distributing density respectively. Main wear-resistance mechanism of the non-smooth concave surface was analyzed at last.

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