

The Effects of Boronizing Treatment on the Friction and Wear Behavior of 0.35 VfTiC- Ti₃SiC₂ Composite

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Abstract : The effects of boronizing treatment on the friction coefficient and wear behavior of 0.35 Vf TiC- Ti₃ SiC₂ composite were investigated. In order to modify the surface properties of Ti₃SiC₂, boronizing treatment was carried out through powder pack cementation in the 1150-1350 °C temperature range. After boronizing treatment, one mixture layer, composed of TiB₂ and SiC, forms on the surface of Ti₃SiC₂. The growth of the coating is processed by inward diffusion of Boron and obeys a linear rule. The Boronizing treatment increases the hardness of Ti₃SiC₂ from 6 GPa to 13 GPa. In the pin-on-disc test, it was found that the material undergoes a steady-state coefficient of friction of around 0.8 and 0.45 in case of Ti₃SiC₂/Al₂O₃ tribocouple under 7N load for the non treated and the boronized samples, respectively. The wear resistance of Ti₃SiC₂ under Al₂O₃ ball sliding has been significantly improved, which indicated that the boronizing treatment is a promising surface modification way of Ti₃SiC₂.

Keywords : MAX phase, wearing, friction, boronizing

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