

## The Effects of Boronizing Treatment on the Friction and Wear Behavior of 0.35 VfTiC- Ti<sub>3</sub>SiC<sub>2</sub> Composite

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**Abstract :** The effects of boronizing treatment on the friction coefficient and wear behavior of 0.35 Vf TiC- Ti<sub>3</sub> SiC<sub>2</sub> composite were investigated. In order to modify the surface properties of Ti<sub>3</sub>SiC<sub>2</sub>, boronizing treatment was carried out through powder pack cementation in the 1150-1350 °C temperature range. After boronizing treatment, one mixture layer, composed of TiB<sub>2</sub> and SiC, forms on the surface of Ti<sub>3</sub>SiC<sub>2</sub>. The growth of the coating is processed by inward diffusion of Boron and obeys a linear rule. The Boronizing treatment increases the hardness of Ti<sub>3</sub>SiC<sub>2</sub> 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 Ti<sub>3</sub>SiC<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> tribocouple under 7N load for the non treated and the boronized samples, respectively. The wear resistance of Ti<sub>3</sub>SiC<sub>2</sub> under Al<sub>2</sub>O<sub>3</sub> ball sliding has been significantly improved, which indicated that the boronizing treatment is a promising surface modification way of Ti<sub>3</sub>SiC<sub>2</sub>.

**Keywords :** MAX phase, wearing, friction, boronizing

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