Effect of Grain Size on Friction and Wear

Behavior of Ti$_3$SiC$_2$*

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The effects of grain size on the sliding friction, sliding wear, and two-body abrasive wear behavior of Ti$_3$SiC$_2$ were investigated. Samples with two different grain sizes, namely 5 $\mu$m (fine) and 100 $\mu$m (coarse), were used as discs in pin-on-disk sliding wear tests against a 440C steel pin and as retangular pins in diamond belt abrasion tests. In the fine-grained material, it was concluded that the wear mechanisms include grain pull out and grain fracture. Delamination, crack bridging, grain deformation, grain pull out, and grain fracture are the operative wear mechanisms observed in the case of the coarse-grained material.