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Microstructure and tribological properties of SiC matrix composites infiltrated with an aluminium alloy

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Abstract

A simple melt infiltration process was adopted to form $Ti_3Si(Al)C_2$ on the surface of SiC ceramics. The $Ti_3Si(Al)C_2$ content increases with longer infiltration at 900°C. At 1000°C, the reaction layer contains mainly TiC and SiC. The tribological properties of the samples were investigated by wear testing. The hardness of the SiC ceramic with a $Ti_3Si(Al)C_2$ layer is 610±82 HV, while its friction coefficient is 0.34–0.38, which is ~75% that of pristine SiC. The $Ti_3Si(Al)C_2$ layer produced a good antifriction effect because plastic deformation occurs in the $Ti_3Si(Al)C_2$, and $Ti_3Si(Al)C_2$ debris continually fills in the grooves during wear.

Keywords: Infiltration, $Ti_3Si(Al)C_2$, Tribological properties, Microstructure

1. Introduction