

Wear Damage of Glass Fiber Reinforced Polyimide Composites with the Addition of Graphite

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Abstract : The glass fiber (GF) reinforced polyimide (PL) composites filled with graphite powders were fabricated by means of hot press molding technique. The friction and wear properties of the resulting composites sliding against GCr15 steel were investigated on a model ring-on-block test rig at dry sliding condition. The wear mechanisms were also discussed, based on scanning electron microscopic examination of the worn surface of the PL composites and the transfer film formed on the counterpart. With the increasing normal loads, the friction coefficient of the composites increased under the dry sliding, owing to inconsistent influences of shear strength and real contact areas. Experimental results revealed that the incorporation of graphite significantly improve the wear resistance of the glass fibers reinforced polyimide composites. For best combination of friction coefficient and wear rate, the optimal volume content of graphite in the composites appears to be 45 %. It was also found that the tribological properties of the glass fiber reinforced PL composites filled with graphite powders were closely related with the sliding condition such as sliding rate and applied load.

Keywords : composites, fiber, friction, wear

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