

Synthesis and Analysis of Wear Depictions on Al 6061 alloy reinforced with SiC/Graphite Particles Hybrid MMCs through Stir Casting

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Abstract: *The stir-casting method offers an efficient approach to produce higher-grade metal matrix composites (MMCs) using Al composites. Among the various methods available, stir-casting is frequently employed. This study focuses on the formation of Al6061/SiC+Gr hybrid MMCs, incorporating different weight percentages of SiC/Gr(2%, 4%, 6%, and 8%). The microstructures clearly revealed the uniform distribution of SiC/Gr particles in the Al matrix. The hardness of the in-situ Al-SiC/Gr based composites increased by 10.58%, 22.35%, 50.58% and 41.17% compared to the matrix with the addition of 2, 4, 6 and 8 wt.% SiC/Gr reinforcements, respectively. The tensile strength of the 2, 4, 6 and 8 wt.% SiC/Gr hybrid composites increased by 9.08%, 15.91%, 19.09% and 7.27%, respectively, compared to the matrix, whereas the ductility decreased by 8.9%, 12.5%, 18.75 % and 25%, respectively. A pin-on-disk tester was used to perform a dry sliding wear test at different loads and sliding speeds. In comparison to the Al matrix, the composite materials showed improved wear resistance. Furthermore, in the entire applied loads and sliding velocities, the wear rate decreased with the increase in SiC/Gr content. The composites displayed lower wear rates due to their high hardness and strong interfacial bonding between the in-situ reinforcement and the matrix alloy*

Keywords: Al6061 alloy; SiC; Gr; Hybrid composites; Microstructure; Wear analysis

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