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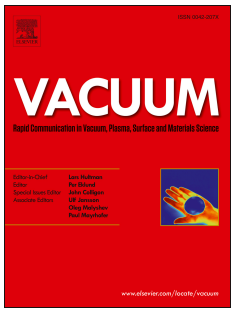

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Wear characteristics of hybrid aluminum-matrix composites reinforced with well-dispersed reduced graphene oxide nanosheets and silicon carbide particulates

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Abstract: In the present study, hybrid composites consisting of a hypoeutectic aluminum-silicon (Al-Si) matrix with silicon carbide (SiCp) (10 wt.%) and various reduced graphene oxide (RGO) (0.3–0.7 wt.%) contents were fabricated using a combined solution-mixing and powder metallurgy (PM) route. The tribological behaviors of these composites against a GCr15 steel ball were studied under dry sliding-wear conditions using a ball-on-disc configuration. The effects of the RGO content and applied loads on the coefficient of friction (COF) and wear rates were evaluated. To study the wear mechanism, comprehensive characterization of the worn surfaces and debris was performed using scanning electron microscopy (SEM). In contrast with the Al-Si/SiCp composite, the hybrid Al-Si/SiCp/RGO composites showed reduced wear rates because of the stabilized COF, and the self-lubricating effects of the incorporated RGO. In the case of all the composites, the wear rate increased as the load increased. Delamination wear is the dominant wear mechanism of the