

High-Frequency Induction Heat Sintering of Al/SiC/GNS Nanocomposites and Their Tribological Properties

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Abstract : High-frequency induction heat sintering (HFIHS) is a fast, efficient powder consolidation technique. In this work, aluminum (Al) powder was mixed with silicon carbide (SiC) and/or graphene nanosheets (GNS) in different proportions and compacted using HFIHS process to produce dense nanocomposites. The nanostructures dispersion was assessed via electron microscopy using both SEM and TEM. Tribological behavior of the nanocomposites was investigated at different loads to determine wear rate and coefficient of friction. The scratch profiles were examined under the microscope to correlate wear properties with the microstructure. While the addition of SiC nanoparticles enhances microhardness values, GNS incorporation promotes dry lubricity with strikingly different wear scratch morphologies. Such Al/SiC/GNS material compositions can be explored for use in automotive brake pad and thermal management applications.

Keywords : aluminum nanocomposites, silicon carbide, graphene nanosheets, tribology

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