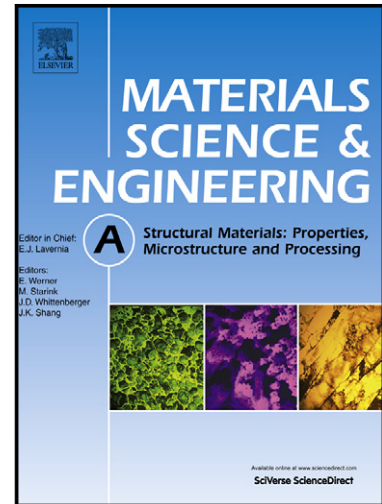


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Investigating aluminum alloy reinforced by graphene nanoflakes

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Abstract: As one of the most important engineering materials, aluminum alloys have been widely applied in many fields. However, the requirement for enhancing their mechanical properties without sacrificing the ductility is always a challenge of the aluminum alloys development. Thanks to the excellent physical and mechanical properties, graphene nanoflakes (GNFs) have been applied as promising reinforcing elements in various engineering materials, including polymers and ceramics. However, the investigation of GNFs as reinforcement phase in metals or alloys, especially in aluminum alloys, is still very limited. In this study, the aluminum alloy reinforced by GNFs was successfully prepared via powder metallurgy approach. The GNFs were mixed with aluminum alloy powders through ball milling and followed by hot isostatic pressing. The green body was then hot extruded to obtain the final GNFs reinforced aluminum alloy nanocomposite. The scanning electron microscopy and transmission electron microscope analysis shows that GNFs were well dispersed in the aluminum alloy matrix and no chemical reaction were observed at the interfaces between the GNFs and aluminum alloy matrix. The mechanical properties testing results show that with increasing filling content of GNFs, both tensile and yield

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