Natural and industrial origin reinforced LM6 aluminum composite materials – A comparative study

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**Abstract**

Aluminum alloy is one of the most common and basic metallic alloys used as a composite material due to its higher strength-to-weight ratio, thermal conductivity, stiffness as well as wear and corrosion resistance properties. Aluminum based composite materials have become an obvious entry into many industries such as automobile, aerospace, construction, household appliances, and food packaging industries. The commonly reinforcement materials to fabricate aluminum composites are aluminium oxide, silicon carbide, boron carbide, boron nitride, titanium carbide, tungsten carbide and titanium diboride. However, most of the ceramic based reinforcement materials are expensive and not environmentally or human friendly. Recent research has been tailored to the use of industrial waste as a reinforcement for aluminum composites such as slag, red mud, fly ash, arc furnace dust and waste glass. The use of natural materials such as glass and marble waste is promising which also cheaper than conventional ceramic reinforcement and also might enhance the properties of the composite. Therefore, the aim of this study is to compare LM6 aluminum- matrix composite with two different types of new reinforcement materials. This paper present experimental work on the new synthesized composite using 5% marble wastes as a natural reinforcement and 5% graphene oxide as an industrial origin reinforcement with LM6 aluminum with the results from laboratory tests on mechanical characterization like tensile strength, hardness and impact test. Elemental analysis and microstructure properties using optical microscope and SEM as well as XRD and EDS.