

Performance Evaluation and Characterization of Aluminium Silicon Alloy Reinforced Orthoquartzite Composites

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Abstract

Reinforced orthoquartzite is a matrix composites (MCs) used to solve the challenges of low cost reinforcement in Engineering application. In this research, orthoquartzite ore was obtained, pretreated and reinforced with aluminium silicon alloy using single weight percent ratio method and the orthoquartzite composite was characterized using Raman Transformation Infrared Spectrophotometer (RTIS), Scanning Electron Microscope (SEM) and Hounfield Tensometer Testing Machine (HTM). The result showed the presence of SiO₂ with 99% in the composition of orthoquartzite ore which improved the strength of the developed composite. In the same vein, the composition of Al-Si alloy (as received) showed Al (95.98 wt%), Si (4.02 wt%) with Young Modulus of 12.45 N/m². The hardness and tensile strength tests showed that the developed composite has better mechanical properties of hardness and tensile strength when compared to Al-Si alloy. The Young Modulus of 10.16 N/m² of the developed composite revealed that it is a resilient material.

Keywords: Aluminum-silicon; Composite; Characterization; Orthoquartzite; Metal matrix

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