World Academy of Science, Engineering and Technology
International Journal of Materials and Metallurgical Engineering
Vol:11, No:04, 2017

Effects of Stirring Time and Reinforcement Preheating on the Porosity of Particulate Periwinkle Shell-Aluminium 6063 Metal Matrix Composite (PPS-ALMMC) Produced by Two-Step Casting

Authors : Reginald Umunakwe, Obinna Chibuzor Okoye, Uzoma Samuel Nwigwe, Damilare John Olaleye, Akinlabi Oyetunji

Abstract : The potential for the development of PPS-AlMMCs as light weight material for industrial applications was investigated. Periwinkle shells were milled and the density of the particles determined. Particulate periwinkle shell of particle size 75µm was used to reinforce aluminium 6063 alloy at 10wt% filler loading using two-step stir casting technique. The composite materials were stirred for five minutes in a semi-solid state and the stirring time varied as 3, 6 and 9 minutes at above the liquidus temperature. A specimen was also produced with pre-heated filler. The effect of variation in stirring time and reinforcement pre-heating on the porosity of the composite materials was investigated. The results of the analysis show that a composition of reinforcement pre-heating and stirring for 3 minutes produced a composite material with the lowest porosity of 1.05%.

Keywords : composites, periwinkle shell, two-step casting, porosity
Conference Title : ICMET 2017 : International Conference on Materials and Engineering Technology
Conference Location : Lisbon, Portugal
Conference Dates : April 16-17, 2017