

Experimental Study of the Microstructure and Properties of Aluminum Alloy Composites Reinforced with Pod Ash Nanoparticles Composites

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Abstract : The experimental study of the microstructure and properties of Al-Cu-Mg alloy/bean pod ash (BPA) nanoparticles was investigated. The aluminium matrix composites (AMCs) were produced by varying the BPA nanoparticles from 1-4wt%. The microstructure and phases of the composites produced were examined by SEM/EDS and XRD. Properties such as: hardness, tensile strength, impact energy, fatigue and wear were evaluated. The results showed that tensile strength and hardness values increased by 35 and 44.1% at 4wt% BPA nanoparticles with appreciable impact energy. The fatigue limit of 167MPa, 135 MPa and 75Mpa were obtained for the nano-particle (55nm), micro-particle (100µm) BPA composites and unreinforced alloy respectively. The wear properties of the as-cast Al-3.7%Cu-1.4%Mg/BPA nanoparticle have been improved significantly even with a low weight percent of BPA nanoparticle. The properties of the as-cast aluminium nanoparticles (MMNCs) have been improved significantly even with a low weight percent of nano-sized BPAp.

Keywords : bean pod ash nanoparticles, al-cu-mg alloy, mechanical properties, wear, microstructures

Conference Title : ICMET 2015 : International Conference on Materials Engineering and Technology

Conference Location : Paris, France

Conference Dates : October 29-30, 2015