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Mechanical Properties and Microstructural Analysis of Al6061-Red Mud Composites

Authors : M. Gangadharappa, M. Ravi Kumar, H. N. Reddappa

Abstract : The mechanical properties and morphological analysis of Al6061-Red mud particulate composites were investigated. The compositions of the composite include a matrix of Al6061 and the red mud particles of 53-75 micron size as reinforcement ranging from 0% to 12% at an interval of 2%. Stir casting technique was used to fabricate Al6061-Red mud composites. Density measurement, estimation of percentage porosity, tensile properties, fracture toughness, hardness value, impact energy, percentage elongation and percentage reduction in area. Further, the microstructures and SEM examinations were investigated to characterize the composites produced. The result shows that a uniform dispersion of the red mud particles along the grain boundaries of the Al6061 alloy. The tensile strength and hardness values increases with the addition of Red mud particles, but there is a slight decrease in the impact energy values, values of percentage elongation and percentage reduction in area as the reinforcement increases. From these results of investigation, we concluded that the red mud, an industrial waste can be used to enhance the properties of Al6061 alloy for engineering applications.

Keywords : Al6061, red mud, tensile strength, hardness and microstructures
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