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TRIBOLOGICAL BEHAVIOUR OF AL-1100-COCONUT SHELL ASH (CSA) COMPOSITE AT ELEVATED TEMPERATURE

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Abstract

Wear behaviour of Al1100- coconut shell ash (CSA) composites at high temperature is investigated. The composites such as Al-5%CSA, Al-10%CSA and Al-15%CSA is prepared, using stir casting technique. The specific strength of Al-15%CSA alloy composite is enhanced by 70% over Al-1100 base alloy. Regression analysis has enabled to quantify slopes of all the materials. While the pressure exceeds the critical value, abrasion increases rapidly, resulting in adhesive wear. When, the temperature increases, the coefficient of friction initially increases up to 6 N/mm^2 and then decreases due to the presence of oxides in debris, which are liberated from tribo surfaces. XRD and EDAX analyses have revealed presence of oxide phases in the debris. SEM micrographs have confirmed abrasive nature of wear.

Keywords: AMCs, Coconut shell ash, Elevated Temperature, Wear rate, Coefficient of friction, Regression analysis.

1. Introduction

Particulate reinforced Al/Al-alloy composite (PRAC) materials are used for making automobile components [1,2]. SiC/ Al_2O_3 are usually added to the liquid matrix of Al/Al-alloy to make the composites [3,4]. Cost of SiC and Al_2O_3 particulates are \$2/kg and \$1.5/kg respectively. In comparison, the estimated cost for coconut shell/ rice husk is around 0.5\$ per kg. The agro waste materials are waste materials and therefore, need only processing cost. Since reinforcing agents such as SiC/Al_2O_3 particulates are costlier, therefore, they can easily