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Mechanical and dry sliding wear behaviour of hot rolled hybrid composites produced by direct squeeze casting method

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Abstract

Aluminium Copper alloys reveals several specific and attractive properties that qualify them to be used in many automotive and aeronautical applications. Aluminium matrix composites have good mechanical and physical properties, when reinforced with SiC and fly ash particle. In the present work, the number of cast samples of Al-Cu/fly ash/SiC composites was prepared by combination effect of stir and squeeze casting followed by hot rolling. The percentage inclusions is fixed for 4%fly ash and varied SiC from 1 to 6wt%. The composites prepared with a stirring speed of 400 rpm and squeeze casted at 750°C with a pressure of 120MPa. The results showed improved hardness and tensile strength. Wear resistance is superior for higher percentage of reinforcement with increase in pull out of rolling. Higher weight percentage of reinforcements with higher reduction results in shrinkage cavities and particle cracking during rolling. Consecutive hot rolling process resulted in declining void and the agglomeration clusters and thus superior mechanical properties are achieved.

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1. Introduction

Nowadays production of light weight, low cost, high performance aluminium has undergone significant evolution. However, more the changes introduced around processing, more the based composites challenges faced because of higher number of critical parameters [1-6]. The SiC is commonly used reinforcement in almost all Al-alloys and proved better mechanical properties [7-12]. Production of composites by reinforcing fly ash and SiC to Al-Cu alloy by stir cast method enhances hardness, tensile strength compression and impact strength [13, 14].

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