

Pengaruh penambahan % Vf Nano SiC terhadap karakteristik komposit aluminium A356/Nano SiC dengan penambahan modifier Sr melalui metode pengecoran aduk = Effect of % Vf Nano SiC on characteristics of aluminum A356/Nano SiC composite with Sr addition as modifier produced via stir casting

Muhammad Tsabit Ayman, author

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Abstrak

Komposit aluminium A356/nano SiC dapat menjadi material alternatif blok rem kereta dikarenakan sifatnya yang ringan, ulet, dan dapat ditingkatkan sifat mekanisnya. Pada penelitian ini digunakan variasi penambahan % Vf nano SiC sebesar 0.05%, 0.10%, 0.15%, 0.20%, dan 0.25% ke dalam matriks aluminium A356, serta dilakukan penambahan modifier Sr 0.046 wt% dan Mg 2 wt%.

Hasil dari penelitian didapatkan peningkatan kekuatan yang optimum sebesar 175.45 MPa dengan elongasi sebesar 7.914% pada penambahan nano SiC 0.10 % Vf. Ketahanan aus juga meningkat seiring dengan peningkatan kekerasan komposit A356/nano SiC. Sedangkan kekuatan impak hanya berkurang sedikit akibat penambahan % Vf nano SiC. Peningkatan kekuatan mekanis terjadi akibat terbentuknya fasa MgAl₂O₄ pada antarmuka partikel nano SiC dan matriks Al A356 dan persentase porositas yang kecil. Penambahan modifier Sr menyebabkan fasa Si eutektik yang terbentuk menjadi halus.

.....A356/nano SiC composite is an alternative material as train's brake shoe because of its light weight, ductility, and the ability to improve its mechanical properties. In this work, the casting is done via stir casting method by various additions of 0.05%, 0.10%, 0.15%, 0.20%, and 0.25% volume fraction. Small amounts of Sr (0.046 wt%) and 2 wt% of Mg are also added into A356 matrix.

The results show the optimum UTS reach 175.45 MPa with elongation of 7.914% at addition of 0.10 % Vf nano SiC. The wear resistance of this composite also increase as the hardness increases as increasing of addition of nano SiC particle. Meanwhile, the impact strength just slightly decreases as the increasing of nano SiC addition. The improvement of mechanical properties of A356/nano SiC composite is contributed by formation of thin layer MgAl₂O₄ surrounding the nano SiC particles and low percentage of porosity. The addition of Sr caused the morphology of eutectic Si in the microstructure fine and fibrous.