

Pembuatan komposit aluminium 6061 berpenguat Al_2O_3 melalui proses stir casting dengan menggunakan single blade stirrer = Fabrication of aluminium 6061 reinforced Al_2O_3 composite by stir casting process using single blade stirrer

Rizky Dwi Septian, author

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Abstrak

Kebutuhan akan material yang memiliki sifat mekanik yang baik serta berbobot ringan sudah semakin tinggi saat ini, terutama untuk aplikasi yang memerlukan performa tinggi. Komposit aluminium berpenguat Al_2O_3 (AMC) menawarkan keunggulan tersebut. Pada penelitian ini, fabrikasi komposit dilakukan menggunakan paduan aluminium 6061 dan penguat serbuk Al_2O_3 berukuran 60 μm melalui proses stir casting. Dalam penelitian ini diketahui pengaruh penambahan kadar Al_2O_3 serta Mg sebagai agen pembasahan terhadap sifat mekanik komposit. Variasi kadar Al_2O_3 yang ditambahkan sebesar 10% dan 15% fraksi volume serta kadar Mg 8%, 10%, dan 15%.

Hasil penelitian menunjukkan bahwa kekuatan tarik optimal sebesar 202 MPa diperoleh pada komposit dengan kadar Al_2O_3 10% dan Mg 10%. Selain itu, kekerasan dan ketahanan aus komposit meningkat seiring penambahan kadar Al_2O_3 dan Mg. Porositas juga meningkat ketika kadar Al_2O_3 yang ditambahkan semakin besar.

Demand of materials with good mechanical properties and have light weight increased in recent years especially for high performance applications. Aluminium reinforced Al_2O_3 composite (AMC) provide this superiority. In this research, composite was fabricated from Aluminium Alloy 6061 and 60 μm Al_2O_3 reinforce particles by stir casting process. This research investigated the effect of addition Al_2O_3 content and Mg as wetting agent to mechanical properties of composite. The addition of Al_2O_3 into Al melt was 10% and 15% of volume fraction and Mg was 8%, 10%, and 15%.

The result showed that the optimum tensile strength of 202 MPa was obtained in composite with 10% volume fraction of Al_2O_3 and 10% Mg. Moreover, hardness and wear resistant of composite increased with the addition of Al_2O_3 and Mg content. Porosity also increased when greater amount of Al_2O_3 content was added.