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Investigation of Parametric Influence on the Properties of Al6061-SiC<sub>p</sub> Composite

(Conference Paper)

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## Abstract

The influence of process parameter in stir casting play a major role on the development of aluminium reinforced silicon carbide particle (Al-SiC<sub>p</sub>) composite. This study aims to investigate the influence of process parameters on wear and density properties of Al-SiC<sub>p</sub> composite using stir casting technique. Experimental data are generated based on a four-factors-five-level central composite design of response surface methodology. Analysis of variance is utilized to confirm the adequacy and validity of developed models considering the significant model terms. Optimization of the process parameters adequately predicts the Al-SiC<sub>p</sub> composite properties with stirring speed as the most influencing factor. The aim of optimization process is to minimize wear and maximum density. The multiple objective optimization (MOO) achieved an optimal value of 14 wt% reinforcement fraction (RF), 460 rpm stirring speed (SS), 820 °C processing temperature (PT<sub>emp</sub>) and 150 secs processing time (PT). Considering the optimum parametric combination, wear mass loss achieved a minimum of  $1 \times 10^{-3}$  g and maximum density value of 2.780g/mm<sup>3</sup> with a confidence and desirability level of 95.5%. © Published under licence by IOP Publishing Ltd.

## Indexed keywords

**Engineering controlled terms:** Aerospace engineering; Aluminum; Processing; Reinforcement; Silicon carbide

Central composite designs; Composite properties; Influence of process parameters; Multiple-objective optimization; Process parameters; Processing temperature; Reinforced silicon carbides; Response surface methodology

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