

Workable Performance of Alumina Loaded 2024 Aluminum Alloy Metal Matrix Composites

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ABSTRACT

Alumina (Al_2O_3) is found as the mineral corundum. It provides superior abrasion, high temperature and chemical resistance, and is also electrically insulating. This material has an excellent cost-to-part life performance record. Purity Applications include wear- and heat-resistant liners, mechanical and pump seals, nozzles, semiconductor equipment components, insulators, etc. Alloy 2024 is Al-Cu-Mg alloy. With its relatively good fatigue resistance, alloy 2024 continues to be specified for many aerospace structural applications. The fracture of particle reinforced metal matrix composites is dependent on the particle strength and particle/matrix interface strength. The toughness decrease slightly with decreasing particle size, the effect of particle size is less because decreasing particle results in a lower inter-particle spacing.

The present work was focused on the effects of heat treatments such as T3, T4 and T6 on the properties of alumina (Al_2O_3) reinforced AA2024 composites. The results obtained the finite element analysis (FEA) were validated with those of experimentation. The tensile strength and von Mises stress was greatly improved with the heat treatment, T6.

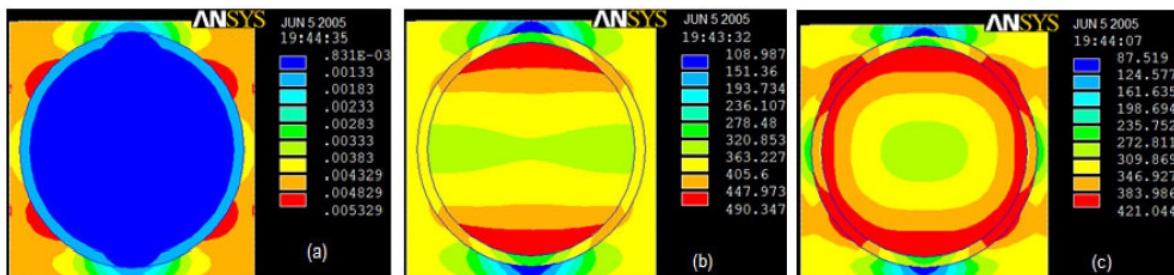


Figure 1: FEA results for heat treatment, T6 (a) tensile strain, (b) tensile strength and (c) von Mises stress.

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