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Study of mechanical behavior and microstructure of Al/SiC/Gr manufactured by squeezed casting for ballistic application

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The development of composite for armor material research is increasing for the optimization. Aluminium matrix composite is one potential material to substitute steel as the main material in the military industry. Improving the ballistic behavior can be done by enhancing the hardness to the optimal value and the ductility. The impact of SiC and Graphite reinforcement on mechanical properties and microstructure of Al-10Zn-6,1Mg were investigated. Graphite was added with fraction 0, 2, and 4 vol.% to increase the mechanical properties of Al with 10, 8, 6, 0 vol.% SiC to obtain the ballistic performance. The composite fabricated through squeeze casting with 2 minutes stirrer time, samples were prepared then precipitation strengthened at 200° C for 2 hours to improve the toughness. The characterized results showed with addition of graphite it doesn't change significantly the microstructural condition like grain size, sdas size, porosity size, and porosity percentage but there's improvement on hardness where the optimum hardness was reached at 6% SiC plus 4% Gr with the value of 153 BHN, and optimum impact toughness was reached at 8% SiC plus 2% Gr with the value of 0,0523 J/mm², the increasing hardness indicates that the surface bond between the matrix and reinforcement by cohesion adhesion force is passable. On SEM-EDS shows the presence of MgAl₂O₄ spinel confirmed by XRD, this is the reaction between Mg and oxide in aluminium matrix composite when stirring process, the presence of Mg₂Zn also confirmed that lead to mechanical properties of composite.

Biography

Dwita R K Pertiwi is a master graduate student in Metallurgy and Materials Engineering, currently doing her project thesis in Aluminium Matrix Composite for Ballistic Application and hoping can Graduated this year.

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