ABSTRACT

In the field of material science and engineering, there is a great impact ever since the invention of composite materials. High strength and lightweight remain the winning combination that propels composite materials into new arenas. Composite materials replace conventional materials like steel, cast iron, and aluminum alloys to their superficial properties. As works of literature were collected, it could be found that metal matrix composites are under serious consideration as potential candidate materials. To replace conventional materials in aerospace and automotive applications. In this project, composites based on aluminum alloy (AA7075) were reinforced with a 6% volume fraction of Silicon Carbide particulates, 3% volume fraction of Zirconium particulates, and 2% volume fraction of Graphite particulates are produced by Ultrasonic Assisted Stir Casting method. The fabricated composite is tested in order to find its mechanical properties they are Density of Al7075/SiC/Gr/Zr was marginally higher than pure Aluminium by 3.24% and lower than Al7075 by 1.42% respectively. Hardness increased by 65.94% in comparison with pure Aluminium and 22.85% compared to Al7075. Tensile strength using Universal testing machine, the tensile strength increased 59.9% with comparison of pure Aluminium and 44.68% increased than Al7075. Impact strength using Charpy impact tester has a decrease in impact strength of 79% with pure Aluminium and 75% with Al7075. The yield strength of the composite is increased at 64.94% compared to pure Aluminium and 16.27% with Al7075. Percentage elongation of the hybrid metal matrix composite was found to be lower than the pure Aluminium and Al7075. In SiC/Gr/Zr reinforcements the addition of SiC lowers the ductility of the composite. The hybrid metal matrix composite has lower elongation of 71.94% compared to pure Aluminium and 25% with Al7075.