

ALUMINUM METAL MATRIX NANO COMPOSITES (AL MMNCS) – MANUFACTURING METHODS: A REVIEW

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ABSTRACT

Applications of Aluminum alloy structural components are many in automobiles, aircrafts and many other defense systems due to their enhanced properties and strength to weight ratios. The mechanical tribological and other properties of Aluminum alloys would be increased considerably if reinforced by nano ceramic particles such as SiN, SiC, SiO₂, and Al₂O₃ etc. However, it is very challenging to disperse the nano ceramic particles uniformly in the various aluminum alloy melts for solidification process of bulk Aluminum metal matrix nano composites(Al MMNCs). There are several methods mentioned in the literature for fabrication of Al MMNCs such as solid state, liquid state and deposition process. Various researchers have tried various methods including powder metallurgy, stir casting, in situ and other methods and every method has its advantages and limitations and achieving uniform distribution of reinforcements with nano ceramic particles in Al alloy melts is the whole some objective. A thorough review of various methods and proposals published during last 15 years for manufacturing of Al MMNCs. for enhanced properties –comparisons were presented.

KEYWORDS: Aluminum, Metal Matrix Nanocomposites (Al Mmncs), Ultrasonic Cavitation, Nanoparticle Dispersion, Solidification Processing