

## Mechanical and Tribological Properties of Al7075 Reinforced with Graphene-Beryl Hybrid Metal Matrix Composites

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**Abstract :** The emerging technologies and trends of present generation requires downsizing the unwieldy structures to light weight structures on one hand and integration of varied properties on other hand to meet the application demands. In the present investigation an attempt is made to familiarize and best possibilities of reinforcing agent in aluminum 7075 matrix with naturally occurring beryl (Be) and graphene (Gr) to develop a new hybrid composite material. A stir casting process was used to fabricate with fixed volume fraction of 6wt% weight beryl and various volume fractions of 0.5wt%, 1wt%, 1.5wt% and 2wt% of graphene. The properties such as tensile strength, hardness and dry sliding wear behavior of hybrid composites were examined. The crystallite size and morphology of the graphene and beryl particles were analyzed with X-ray diffraction (XRD) and scanning electron microscopy (SEM) respectively. It was observed that ultimate tensile strength and hardness of the hybrid composite increased with increasing reinforcement volume fraction as compared to specimen without reinforcement additions. The dry sliding wear behavior of the hybrid composites decreases as compared to Al7075 alloy without reinforcement.

**Keywords :** Al7075, beryl, graphene, TEM, wear

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