

## **Synthesis of poly (methyl methacrylate) reinforced by graphene nanoplates**

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**P**oly(methyl methacrylate) (PMMA) is the transparent and clear thermoplastic and it has a lot of applicable usages in different industrial areas. Nevertheless, electrical conductivity, mechanical performance, and thermal stability are a disadvantage for PMMA. In the aim of enhancing its structural characteristics, several nanomaterials are utilized as fillers. Graphene nanoplatelets (GNPs) can be used as a nanofiller in PMMA synthesized by atom transfer radical polymerization (ATRP) method. GNPs have superior mechanical properties, thermal stability, and electrical conductivity also lower density of mass. The first step in the synthesis of the PMMA/GNPs is the dispersion of GNPs in the PMMA liquid monomers by combining the solutions. Then the crosslinked PMMA/GNPs composite samples were synthesis by using in-situ polymerization method. However, there is a challenging technical problem in the application of GNPs (which is bulk quantities). For the purpose of benefiting from the advantageous properties of GNPs (especially in bulk quantities), the major problem at the synthesis of PMMA/GNPs nanocomposite is the GNPs dispersion in the polymer matrix. This research focuses on solving that dispersion problem in the aim of enhancing nanocomposite samples' mechanical properties by utilizing more effective production technic such as ATRP method.

**Keywords:** Atom transfer radical polymerization method, Poly(methyl methacrylate), Graphene nanoplatelets, Nanocomposite.