

## The Role of Initiator in the Synthesis of Poly(Methyl Methacrylate)-Layered Silicate Nanocomposites through Bulk Polymerization

**Authors :** Tsung-Yen Tsai, Naveen Bunekar, Ming Hsuan Chang, Wen-Kuang Wang, Satoshi Onda

**Abstract :** The structure-property relationship and initiator effect on bulk polymerized poly(methyl methacrylate) (PMMA)–organomodified layered silicate nanocomposites was investigated. In this study, we used 2, 2'-azobis (4-methoxy-2,4-dimethyl valeronitrile and benzoyl peroxide initiators for bulk polymerization. The bulk polymerized nanocomposites' morphology was investigated by X-ray diffraction and transmission electron microscopy. The type of initiator strongly influences the physicochemical properties of the polymer nanocomposite. The thermal degradation of PMMA in the presence of nanofiller was studied. 5 wt% weight loss temperature (T5d) increased as compared to pure PMMA. The peak degradation temperature increased for the nanocomposites. Differential scanning calorimetry and dynamic mechanical analysis were performed to investigate the glass transition temperature and the nature of the constrained region as the reinforcement mechanism respectively. Furthermore, the optical properties such as UV-Vis and Total Luminous Transmission of nanocomposites are examined.

**Keywords :** initiator, bulk polymerization, layered silicates, methyl methacrylate

**Conference Title :** ICCMAS 2018 : International Conference on Composite Materials in Airplane Structures

**Conference Location :** Berlin, Germany

**Conference Dates :** May 21-22, 2018