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Self-healing PMMA nanocomposites

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Poly (methyl methacrylate) (PMMA) is a wiedly used thermoplastic polymer material because of its advantages including light weight, easy processability, high impact resistance, chemical stability, high resistance to weathering and excellent heat resistance etc. PMMA is an ideal candidate for aerospace, automotive, marine applications. However, long-term durability and reliability of polymeric materials are still problematic when they serve for structural application. Hence, in this study we added several nanomaterials to improve the weak properties of PMMA. PMMA was synthesized by Atom Transfer Radical Polymerization (ATRP) technique; nanofillers are dispersed at 5 different concentration levels such as 0.1, 0.25, 0.5, 1.0 and 2.0 wt. % via *in situ* polymerization method. The changes in the properties of PMMA nanocomposites examined by SEM, TGA/DSC tensile, impact and hardness tests. PMMA nanocomposite with the low nanofiller loading ratio showed noticeable enhancements in their mechanical and thermal aspects. In this study, we also synthesised self-healing PMMA nanocomposite. Encapsulate GMA was served as self-healing agent. Emulsion polymerization was applied to encapsulate GMA with poly (melamine-formaldehyde) (PMF) as the wall substance. GMA was added to PMMA nanocomposite solutions via melt compounding method. Self-healing performance of the PMMA nanocomposites was evaluated via impact test.

Biography

Maihemuti Maimaitituersun completed his Master study in 2017 from department of Physics Engineering, Istanbul Technical University. Now he is continuing his Ph.D. Study in department of Physics Engineering, Istanbul Technical University.

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