

Obtaining of graphene/polymer composites by hydrosilylation reaction for SLA printer

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Three-dimensional (3D) printing is often considered synonymous with additive manufacturing. Several types of 3D printers are known where we usually used polymers are. Stereolithography (SLA) employs a single beam laser to polymerize or crosslink a photopolymer resin. By drawing on the liquid photopolymer resin with a light beam, thin layers of polymer are stacked layer by layer. Elastomer based on polydimethylsiloxanes (PDMS) are important class of materials, because of properties such as chemical inertness, flexibility, optical transparency, also they have a very low surface tension (20.4mN/m) and glass transition temperatures (146K). It is possible to print a support material that holds the PDMS prepolymer in place until it can be cured by UV light using a photoactive cross-linking agent. It is possible to graft photoactive group on PDMS backbone and obtain new UV curable polymer.

The aim of presented work is obtaining of photopolymers based on PDMS. For purpose, we have conducted hydrosilylation reaction of polymethylhydrosiloxane (PMHS) with allyl acrylate and vinyltriethoxysilane in the presence Karstedt's catalyst in Toluene. Obtained polymer is liquid which are well soluble in organic solvents with specific viscosity $\eta_{sp} \approx 0.4$. The end of reaction was tested by FTIR, where peak at 1260 cm^{-1} disappears which belongs to Si-H bonds. After this the polymer distilled in vacuum, cross-linking agent was adding about 1% and curried by UV during 1h.

Speaker Biography

Natia Jalagonia has completed her PhD at the age of 31 years from Tbilisi State University, Georgia. She is the head of Chemical Technology Laboratory of Ilia Vekua Sukhumi Institute. She has over 30 publications.

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