Surface-modification of Silica Nanoparticles with Germanium-based Photoinitiators and Subsequent Surface-mediated Cationic Polymerizations

Zizheng Zhang[1], Matthias W. Müller[1], Nergis Arsu[2], Wolfgang Kern[1]

[1]Montanuniversität Leoben, Institute of Chemistry of Polymeric Materials, A-8700 Leoben, Austria
[2]Department of Chemistry, Yildiz Technical University, Davutpasa Campus, Istanbul 34220, Turkey

Nanoparticle's exceptionally high surface area and surface chemistry enable it to reach higher levels than other common drug delivery carriers. Surface modification based on "grafting from" techniques provided a versatile tool for industry. A novel and non-toxic, germanium-based photoinitiator[1] immobilised on the surface of silicon-based materials has been developed. Subsequent visible-light (405 nm) induced surface-initiated radical photopolymerization had remarkable efficiency and value. Herein, we report a combination of germanium-based photoinitiator immobilized on nanoparticles (20 nm and 200 nm) and diphenyliodonium hexafluorophosphate[2] which can initiate cationic polymerization under visible-light (450 nm). Employing visible-light-triggered surface-initiated polymerization of different functional monomers, including butyl/propyl vinyl ether and glycidyl isopropyl ether. The investigation of immobilization of the photosensitive moieties will be evidenced by FTIR, UV-Vis, TGA and XPS.

References

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