

Polymer nanocomposites with silver nanoparticles formed by low-energy ion implantation: Slow positron beam spectroscopy studies

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Abstract

© 2018, Springer Science+Business Media B.V., part of Springer Nature. Polymer nanocomposites formed by low-energy ion implantation were studied by means of positron annihilation spectroscopy with a variable-energy positron beam or slow positron beam spectroscopy. Silver ion implantation into polymethylmethacrylate (Ag:PMMA) and hybrid organic-inorganic ureasil (Ag:ureasil) was performed at different ion fluences with a constant energy of 30 keV and a current density of 1 $\mu\text{A}/\text{cm}^2$ in order to prepare Ag nanoparticles in the near-surface region of polymer matrix. Contribution of Doppler broadening slow positron beam spectroscopy technique for understanding Ag nanoparticles formation in Ag:PMMA and Ag:ureasil nanocomposite films is demonstrated.

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Keywords

Ion implantation, Nanocomposites, PMMA, Polymers, Positron annihilation, Silver nanoparticles, Slow positrons, Ureasil

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