عنوان مقاله:

Synthesis and Characterization of Polymer/Nanosilicagel Nano-composites

محل انتشار:

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خلاصه مقاله:

In this study, a polymer-silica nanocomposite using the sol-gel method was synthesized in three steps at room temperature. The nanocomposite material was formed with an organic compound (polyethylene glycol) and inorganic silica nanoparticles. Furthermore, the size and the distribution of nanoparticles in the polymer matrix were characterized by a transmission electron microscope (TEM). In addition, the refractometer analysis was used to measure the refractive index of the nanocomposite. Following that, Fourier transform infrared (FTIR) spectroscopy and small-angle X-ray diffraction and high X-ray diffraction have also used to characterize the polymer and the inorganic part of the nanocomposite. TEM studies showed the distribution of nanoscale silica particles of the size of 50-100 (nm) in the polymer matrix. Furthermore, the refractive index of the nanocomposite was measured about 1.4, which was very close to the refractive index of the natural lens (1.411). Additionally, the FTIR spectra showed OH groups in FTIR spectroscopy, which confirmed the hydrophilic property of silica nanoparticles and the two sharp peaks at the angles of 19° and 23° in the X-ray diffraction analyses, which were in the nature of the crystallinity of polyethylene glycol. Finally, the results showed the surface modification of nanoparticles and their incorporation in a polymer matrix, which led to the formation of the desired nanocomposite that was made of inorganic (silica nanoparticles) and an organic (polyethylene glycol) compound.

کلمات کلیدی:

Nanocomposite, Biocompatible polymer, Silica, Sol-gel, refractive index, Rheology, Intraocular lenses