POLYMERIC SYSTEMS MODIFIED BY ZNO NANOPARTICLES

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Abstract

Nano zinc oxide is in terms of the application potential one of the most promising metal oxides in nanoform. Nanosized ZnO is known namely for its antimicrobial properties. However, ZnO in nanoform can find number of other applications such as semiconductor in photonics, photovoltaics and electronic equipment [1,2]. Great attention is paid to the nano ZnO also for his extraordinary piezoelectric properties. Further, a very important application for ZnO in powder form are UV absorbers [3,4]. The advantage of ZnO is its complete absorption of both UVA and UVB radiation. Nano ZnO exhibits in comparison with TiO_2 much better performance as a filter of UV radiation [5,6]. Powerful UV filters containing nanosized ZnO can be prepared conveniently in form of transparent films. In case of coating applications the attention must be paid to potential and undesired formation of aggregates during the film formation. Various types of ZnO nanoparticles were synthetized within the presented study. Their surfaces were modified in situ or by post off method using tailored modifiers in order to achieve the best compatibility with selected polymeric environment. The modifiers were attached to the surface of nanoparticles by physical or chemical bonds. Suitable dispersion methods were used for dispersion of the prepared nanoparticles to polymeric systems. The quality of nanoparticle dispersions were studied by XDC, AFM, TEM. The relation between studied nanofilled polymeric systems properties and nanoparticles concentration, modification type and size of nanoparticles were investigated. The properties of optimized polymeric systems with relatively low concentration of nano ZnO have potential for application in coating industry.

Keywords: Polymers, nanoparticles, ZnO, mechanical properties

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