عنوان مقاله:

The effect of Halloysite nanotube on phase separation and shape memory of polyurethane

محل انتشار:

هشتمین کنفرانس و نمایشگاه بین‌المللی مهندسی مواد و متالورژی و سیزدهمین همایش ملی مشترک انجمن مهندسی متالورژی و مواد ایران و انجمن ریخته گری ایران (سال: 1398)

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خلاصه مقاله:

Polyurethane is a polymer formed from the step-growth polymerization reaction of isocyanate and diol. Due to its mechanical properties and excellent processability, this polymer has numerous applications such as foams, coatings, adhesives, artificial vessels and so on. Some classes of polyurethanes have a two-phase structure and have recently been considered by researchers as smart materials. These materials can respond to external stimuli such as temperature, light, pH, humidity, electricity, solvent, and magnetic fields. Adding a variety of nanoparticles can change the properties of your polyurethane. This effect on shape memory is not yet fully known. In this study, Halloysite nanotubes with 1 and 2 weight percent were used to study the effect of nanoparticles on phase separation and thermally shape memory of polymers. Polyurethane/Halloysite nanotube nanocomposite was prepared from Hexamethylene diisocyanate as a solid phase, 1,4-butanediol and Poly (tetramethylene ether) glycol with a molecular weight of 2000 g/mol as a soft phase and Dimethylacetamide as a solvent by in situ synthesis method. Pure polyurethane specimen was compared with nanocomposites. The results of the Dynamic Mechanical Thermal Analysis (DMTA) indicated that the desired nanoparticle tended to a hard phase, indicating the effect of the nanoparticle on phase separation. With absorptions peaks in the attenuated total reflectance Fourier transform infrared spectroscopy (ATR-FTIR) was calculated the degree of phase separation. The shape memory of the specimens was measured by Dynamic mechanical analysis (DMA) and the highest amount of memory in nanocomposite containing two percent nanoparticle was observed.

کلمات کلیدی:

Smart material, Polyurethane, Halloysite nanotube, Shape memory polymer, Phase separation

لینک ثابت مقاله در پایگاه سیویلیکا: