

عنوان مقاله:

Tribological properties of UHMWPE/HDPE/ MWCNT nanocomposites

محل انتشار:

کنفرانس بین المللی فرآورش پلیمرها (سال: 1390)

تعداد صفحات اصل مقاله: 5

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خلاصه مقاله:

Ultra high molecular weight polyethylene (UHMWPE) is a polymer with unique physical and mechanical properties and it has good impact, abrasion and wear resistant and low friction coefficient thus it has been the choice as a major bearing surface material of total joint replacement prostheses. In this study high density polyethylene (HDPE) was selected for blending with UHMWPE, due to its good processability and desired mechanical properties and creep resistant. UHMWPE/HDPE blending was performed with 80 wt% of UHMWPE. Multi wall carbon nanotubes (MWCNTs) were added on UHMWPE/HDPE blend to improve the tribological properties. The mixing of UHMWPE/HDPE/MWCNTs was conducted with 0.5, 1 and 2 wt% of MWCNTs on blend in an internal mixer. Wear and frictional properties of UHMWPE, HDPE, UHMWPE/HDPE blend and UHMWPE/HDPE/MWCNTs nanocomposites were examined in a ring-on-flat wear testing machine. The results of wear test showed that incorporating of HDPE decreases wear resistant in UHMWPE/HDPE blend while adding of MWCNTs on blend increases wear resistant and friction coefficient in nanocomposites. The surface of the samples after wear tests were observed by a scanning electron microscope (SEM). SEM micrographs revealed that wear of HDPE was occurred by abrasion mechanism while in the case of UHMWPE and UHMWPE/HDPE blend and nanocomposites were occurred by fatigue mechanism.

کلمات کلیدی:

لینک ثابت مقاله در پایگاه سیویلیکا:

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