

Fabrication and Application of Nanopatterns Based on Baroplastic Block Copolymer

조아라, 김진곤*
POSTECH
(jkkim@postech.ac.kr*)

We prepared high-density nanopatterns on baroplastic polymer, polystyrene-block-poly(*n*-pentyl methacrylate) copolymer (PS-*b*-PnPMA), by using atomic force microscope (AFM) at room temperature. Because of baroplastic properties which enable the nanophase transition at relatively lower pressure and temperature, nanopatterns were easily fabricated by the indentation. To confirm the mechanism on the nanopattern formation, the inner structure was observed by both *ex-situ* and *in-situ* transmission electron microscopy (TEM). For application of data storage media, we can convert the depth of nanopattern to electric signal by using piezoelectric sensing method. In addition, the write-read-erase-re-write process was possible without thermal degradation of polymeric film. The array of nanopatterns could be used for ultrahigh density data storage media. We also prepared PS-*b*-PnPMA/gold nanoparticles composite where gold nanoparticles were incorporated in PS microdomain of the block copolymer. We investigated the effect of pressure on the morphology of PS-*b*-PnPMA and the gold nanoparticles locations.