ST-P001

Degradation Pattern of Black phosphorus Field Effect Transistor

이병철[1], 주민규[2], 진준언[1], 이재우[1], 김규태[1]

고려대학교[1] 성균관대학교[2]

We investigate the degradation pattern of Black phosphorus (BP) field effect transistor (FETs) investigated by using an mechanically exfoliated BP that react O2 and water vapor in ambient condition, degradation. The BP FETs was electrically measured every 20 minutes (1cycle) in the air, the total cycle is 100. We show electrical changes with Mobility, On/off ratio, Current and a significant positive shift in the threshold voltage. We extracted the current level at Vgs-Vth = 0, −10, −20 and fitting with Swiss-cheese model. This model suggested that Swiss-cheese model is well fitted with degradation pattern of BP FETs.

Keywords: Black phosphorus, degradation

ST-P002

Femtosecond laser induced photo-expansion of organic thin films

채상민[1,2], 이명수[1], 최지연[2], 이현휘[3], 김효정[1]

[1]부산대학교 유기소재시스템공학과, [2]한국기계연구원, [3]포항공대 가속기연구소

We propose a novel direct writing technique with a femtosecond laser enabling selective modification of not only the morphology of conducting polymer thin films but also the orientation and alignment of the polymer crystal. Surface relief gratings resulting from photoexpansion on P3HT:PCBM and PEDOT:PSS thin films were fabricated by femtosecond laser direct writing. The photoexpansion was induced at laser fluence below the ablation threshold of the thin film. The morphology (size and shape) of photoexpansion could be quantitatively controlled by laser writing parameters such as focused beam size, writing speed, and laser fluence. GIWAX results showed that face-on P3HT crystals were largely increased in the photoexpansion in comparison with pristine region of the thin film. In addition, the face-on P3HTs in the photoexpansion were aligned with their orientation along the polarization of the laser. The micro-RAMAN spectra confirmed that neither chemical composition change nor the polymer chain breaking was observable after femtosecond laser irradiation. We believe that this laser direct writing technique opens a new door to the fabrication of more efficient OPVs via non-contact, toxic-free approach.

Keywords: femtosecond laser, laser direct writing, conducting polymer, organic thin film, OPVs, morphology, alignment