

Organic photovoltaic cells using UV/ozone-treated graphene sheets as hole extraction layers

권기찬, 동완재¹, 이종람¹, 김수영*
중앙대학교 화학신소재공학부; ¹포항공대 신소재공학과
(sooyoungkim@cau.ac.kr*)

Organic photovoltaic (OPV) cells with a longer lifetime than that of PEDOT:PSS-based ones were fabricated using UV/ozone-treated graphene sheets as hole extraction layer. The intensity of the C-C, C-O, and C=O bonds in XPS spectra increased with increasing UV/ozone treatment time, indicating the formation of carbon-oxygen bonds. The UPS data showed that the work function of graphene increased from 4.3 eV to 4.85 eV after UV-ozone treatment for 9 min. However, the OPV cell with 5-min-treated graphene HEL displayed the best efficiency (3.0 %) because the graphene sheet was damaged by UV/ozone exposure after 7 min. The efficiency of the reference device rapidly decreased to 0 % after 14-hour exposure in humid conditions while the UV/ozone-treated device continued to operate for 26 hours. These results suggested that UV/ozone-treated graphene under optimized condition is a good HEL candidate in OPV cells as a replacement for the conventional PEDOT:PSS layer.