Large-scale Growth of Graphene Pattern from Polystyrene film with UV treatment

박범진, 박재성[1], 변진석, 유성욱, 전금혜, 이다감, 김광수,
홍병희[1], 김진곤*
포항공과대학교; [1]서울대학교
(jkkim@postech.ac.kr*)

The patterning of graphene has received a great attention, because it is essential to be utilized practically. However, when a top-down method is employed, the excellent property of graphene is lost due to the disordered structure in the edge. Here, we introduce a direct patterned growth of graphene on poly(styrene) (PS) film via UV irradiation. Because PS is crosslinked by UV-irradiation, a selective cross-linked region is prepared on the PS film/copper foil. When the sample is heated a high temperature under 1 Torr of Ar/H2 atmosphere, only non-crosslinked regions are converted into grapheme, while cross-linked regions becomes amorphous carbon. The patterned grapheme is characterized by Raman spectroscopy, scanning electron microscopy (SEM), and X-ray photoelectron spectroscopy (XPS).
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