

FAST DETECTION OF WATER NANOPOCKETS UNDERNEATH WET-TRANSFERRED GRAPHENE

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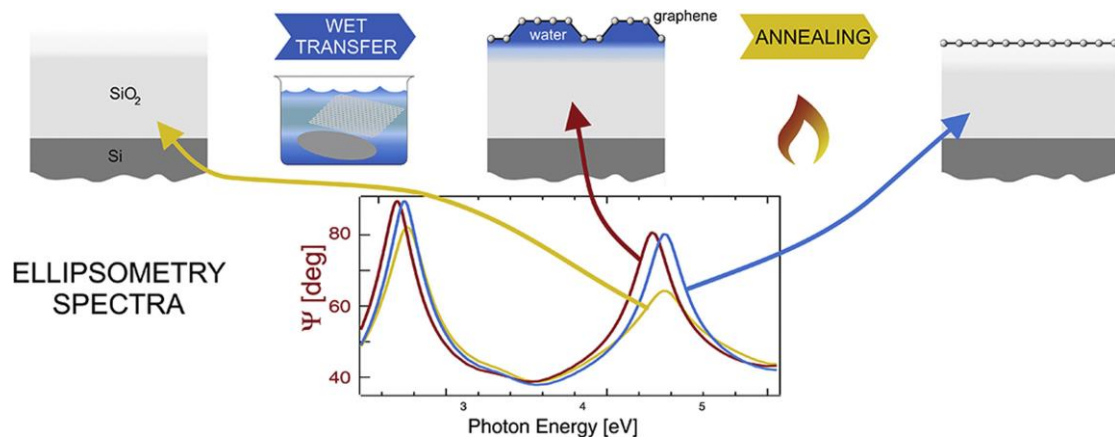
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We report an investigation of the graphene/substrate interface morphology in large-area polycrystalline graphene grown by chemical-vapour deposition and wet-transferred onto Si wafers. We combined spectroscopic ellipsometry, X-ray photoelectron spectroscopy and atomic-force microscopy in order to yield morphological and chemical information about the system. The data showed that wet-transferred samples may randomly exhibit nanosized relief patterns indicative of small water nanopockets trapped between graphene and the underlying substrate. These pockets affect the adhesion of graphene to the substrate, but can be efficiently removed upon a mild annealing in high vacuum. We show that ellipsometry is capable of successfully and reliably detecting, via multilayer dielectric modelling, both the presence of such a spurious intercalation layer and its removal [1]. The fast, broadly applicable and noninvasive character of this technique can therefore promote its application for quickly and reliably assessing the degree of adhesion of graphene transferred onto target substrates, either for ex-post evaluation or in-line process monitoring.

[1] M. Magnozzi et al., Carbon, 118, 2017

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