

Effects of Biocompatible Substrates on the Electrical Properties of Graphene

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Abstract : Graphene is a single-atomic two-dimensional crystal of carbon atoms that has considerable properties due to its unique structure and physics with applications in different fields. Graphene has sensitive electrical properties due to its atomic-thin structure. Along with the substrate materials and their influence on the transport properties in graphene, design and fabrication of graphene-based devices for biomedical and biosensor applications are challenging. In this work, large-area high-quality graphene nanosheets were prepared by low pressure chemical vapor deposition using methane gas as carbon source on copper foil and transferred on the biocompatible substrates. Through deposition of titanium and gold contacts, current-voltage response of the transferred graphene on four biocompatible substrates, including PDMS, SU-8, Nitrocellulose, and Kapton (Fig. 2) were experimentally determined. The considerable effect of the substrate type on the electrical properties of graphene is shown. The sheet resistance of graphene is changed from 0.34 to 14.5 k Ω /sq, depending on the substrate.

Keywords : biocompatible substrates, electrical properties, graphene, sheet resistance

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