Defect/oxygen assisted direct write technique for nanopatterning graphene

High resolution nanopatterning of graphene enables manipulation of electronic, optical and sensing properties of graphene. In this work we present a straightforward technique that does not require any lithographic mask to etch nanopatterns into graphene. The technique relies on the damaged graphene to be etched selectively in an oxygen rich environment with respect to non-damaged graphene. Sub-40 nm features were etched into graphene by selectively exposing it to a 100 keV electron beam and then etching the damaged areas away in a conventional oven. Raman spectroscopy was used to evaluate the extent of damage induced by the electron beam as well as the effects of the selective oxidative etching on the remaining graphene.

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