Fabrication of Gated Corbino Discs on CVD Grown, Monolayer Graphene

MICHAEL GASPER, RYAN TOONEN, University of Akron, NICHOLAS VARALJAY, ROBERT ROMANOFSKY, FLIX MIRANDA, NASA Glenn Research Center — Using commercially available, CVD grown, monolayer graphene deposited on thermally oxidized silicon wafers, we have fabricated a variety of test structures that are suited for on-chip probing. The test structures include Corbino discs with inner disc diameters ranging from 20 µm to 120 µm and gap lengths ranging from 55 µm to 105 µm. Additionally, a new type of structure that we call the twinaxial Corbino ellipse was fabricated on the same chip with minor axes set to 230 µm and major axes that varied from 276 µm to 460 µm. Inner disc electrodes with diameters ranging from 20 µm to 120 µm were placed at the foci of the elliptical devices. Our fabrication process involved the use a sacrificial aluminum layer, which prevented delamination during metal lift-off processes and kept polymer residues from degrading Ohmic contact quality. Gated current-versus-voltage traces from the Corbino discs revealed Dirac point operation corresponding to gate voltage values, which exhibited dependence on device dimensions and drain-to-source bias, ranging from 5 V to 15 V.

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