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Probing the transport properties of graphene nanostructures produced by local anodic oxidation NILS FREITAG, II. Institute of Physics B, RWTH Aachen and JARA-FIT, Otto-Blumenthal-Strasse, 52074 Aachen, AVIRAL VAID, Dept. of Materials Science and Engineering, Indian Institute of Technology Kanpur, India 208016, MARCUS LIEBMANN, FELIX JEKAT, THERESA HECKING, ALEXANDER NENT, MARKUS MORGENSTERN, II. Institute of Physics B, RWTH Aachen and JARA-FIT, Otto-Blumenthal-Strasse, 52074 Aachen
— Graphene flakes exfoliated on 300 nm SiO_2/Si and contacted by Indium soldering are modified by local anodic oxidation in an atomic force microscope (AFM). By varying voltage, tip velocity and contact pressure, we produced either cuts or areas appearing as elevations in AFM. The width of the cuts and elevations ranged down to 15 nm and 35 nm respectively. However, the cuts are mostly surrounded by additional elevations. The elevations are insulating at room temperature with an areal resistance of several TΩ and exhibit a D and a 2D peak in Raman spectroscopy. Transport studies on an Aharanov-Bohm ring with a diameter of 600 nm showed magnetooscillations with a visibility of 0.2% at 300 mK and a strong peak around 0 T attributed to weak localization within the ring. Transport measurements on a Quantum Dot structure with a diameter of 60 nm and several side gates showed several Coulomb diamonds, however, with addition energies not compatible with the structured dot area. Nevertheless, the plunger gate was six times more effective than the back gate and charge rearrangements were seldom observed.

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