

Supplementary Information

Semiconducting Properties of Perchlorate Doped Graphene Using Electrochemical Method

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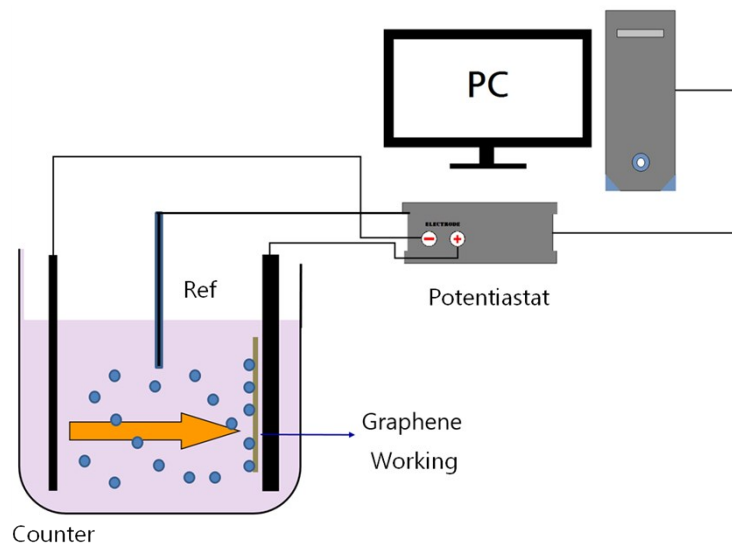
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Graphene synthesis:

The graphene film was grown by chemical vapor deposition (CVD). The 25 μm thickness of Cu film was used to grow graphene and it was inserted on the middle of CVD chamber. It took 40 minutes to ramp up from room temperature to 1000 °C, and kept for 30 minutes at 1000 °C with flows of H₂ (20 sccm) and Ar (1,000 sccm). After that, H₂ (20 sccm), Ar (1,000 sccm) and CH₄ (3 sccm) were supplied for 10 minutes to grow a graphene layer on the Cu film at 1000 °C and then it took 30 minutes to cool down from 1000 °C to 50 °C by using an electric fan. The graphene grown on the Cu film placed on the Al₂O₃ plate was taken out of the CVD chamber. After growing graphene on a Cu substrate, PMMA was coated on graphene by spin coating method at 5,000 rpm for 30 sec. Cu was dissolved by Cu etchant for 30 minutes. Graphene on the PMMA film was washed in de-ionized water, and then it was transferred on a p-type doped silicon substrate coated with a 300 nm SiO₂. Thereafter, it was dried at 80 °C in an oven for 20 minutes. Pristine graphene on silicon was used as a working electrode for electrochemical doping.



S1. Schematic picture of electrochemical doping procedure.