Critical point drying of graphene field-effect transistors improves their electric transport characteristics

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Abstract

We present a critical point drying (CPD) technique with supercritical CO_2 as a cleaning step for graphene field-effect transistors (GFETs) microfabricated on oxidized Si wafers (see *e.g.* [1]), which results in an increase of the field-effect mobility and a decrease of the unwanted doping. We show that the polymeric residues remaining on graphene after the transfer process and device microfabrication are significantly reduced after the CPD treatment. Moreover, the CPD effectively removes ambient adsorbates such as water therewith reducing the undesirable *p*-type doping of the GFETs. We propose that CPD of electronic, optoelectronic, and photonic devices based of 2D materials is a promising technique to recover their intrinsic properties after the microfabrication in a cleanroom and after storage at ambient conditions.

References

[1] Kaiser, D.; Tang, Z.; Küllmer, M.; Neumann, C.; Winter, A.; Kahle, R.; Georgi, L.; Weimann, T.; Turchanin, A.; *Appl. Phys. Rev.*, 8 (2021) 031410.

Figures

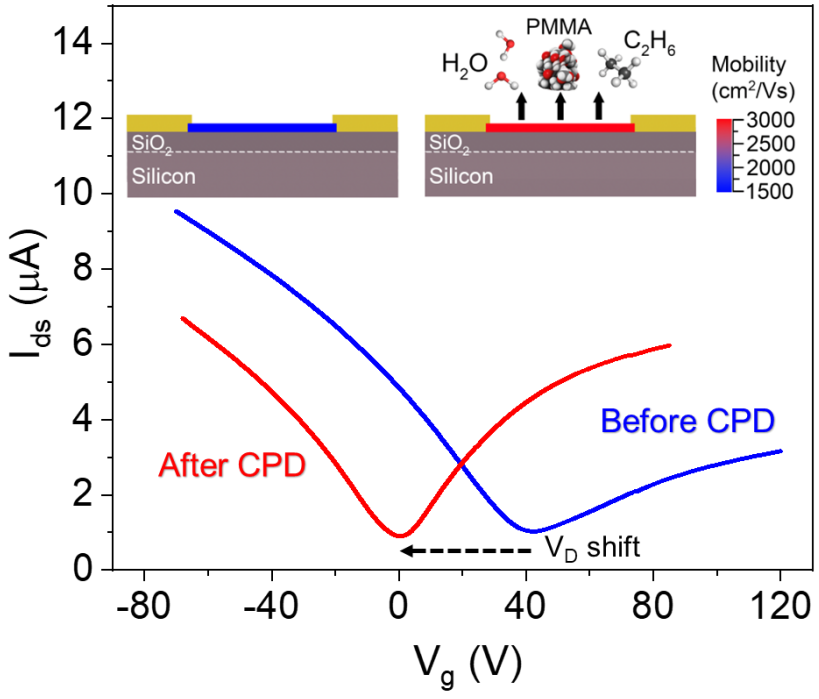

Figure 1: Effect of the CPD treatment on charge transfer characteristics of the GFET devices