Preparation of scalable, inkjet-printable conductive graphene ink from "snowing" graphene

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Abstract

Inkjet printing of graphene is a promising research area for its combination of the attractive features of inkjet printing with the unique optical, electronic and mechanic properties of graphene.[1] Here, we use high-quality graphene sheets which were fabricated by utilizing corona discharge of SiO_2/Si in an ordinary household microwave oven at ambient pressure to blend conductive ink according to Hersam's method.[2] The patterned graphene ink lines demonstrate relatively low sheet resistance (~ 3.2 kΩ sq^{-1} after printing repititions of 200 times) and remarkable mechanical property comparable with previous reports.[1,3] We believe that the conductive graphene ink prepared by this method will have a broad application prospect with the scalable production of this high-quality graphene.

References

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[2] Y. T. Liang, M. C. Hersam, J. Am. Chem. Soc., 132(2010) 17661
[3] F. Torrisi, T. Hasan, W. P. Wu, Z. P. Sun, A. Lombardo, T. S. Kulmala, G. W. Hsieh, S. J. Jung, F. Bonaccorso, P. J. Paul, D. P. Chu, A. C. Ferrari, ACS Nano, 6(2012) 2992

Figures

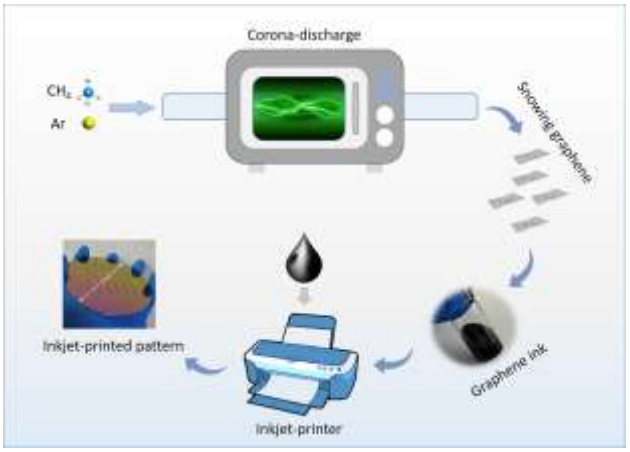

Figure 1: Schematic illustration of preparing conductive graphene ink using snowing graphene method with a conventional microwave oven

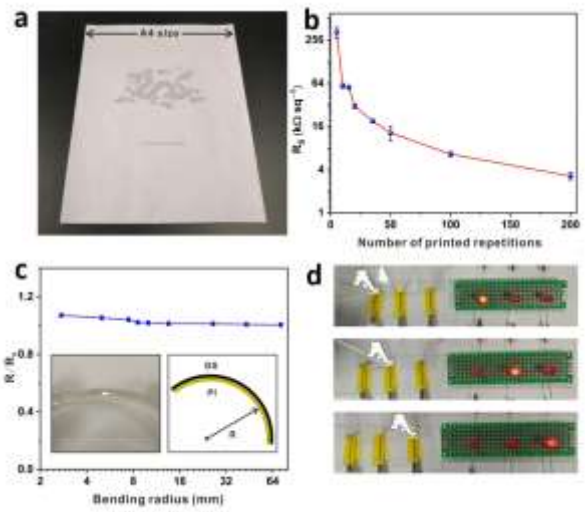

Figure 2: (a) Photograph of inkjet-printed graphene ink on an A4 paper. (b) Sheet resistance of inkjet-printed graphene ink versus printing repetitions. (c) The relative sheet resistance change of graphene ink line as a function of bending radius. (d) Photograph of graphene ink keyboard.