Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Electronic Supplementary Information

A Novel, Facile, Layer-by-Layer Substrate Surface Modification for the Fabrication of All-Inkjet-Printed Flexible Electronic Devices on Kapton

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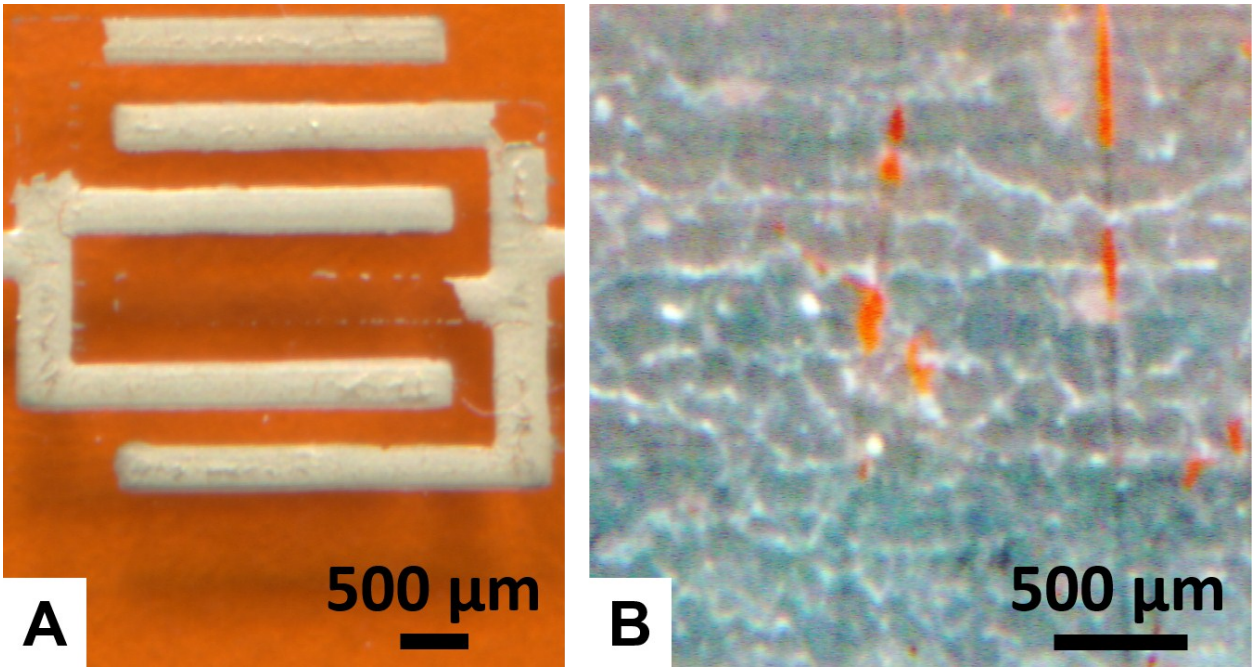

Fig. S1. Scanned images of a silver IDE pattern (A) and a graphene patch (B) inkjet-printed on surface unmodified Kapton HN films with the silver or graphene traces intentionally damaged (to show the strong color contrast between the inkjet-printed traces and the Kapton HN substrate). The silver IDE pattern was fabricated by inkjet-printing for 5 passes an ethanol-based silver nanoparticle ink on surface-unmodified Kapton substrate followed by drying at 120 °C for 3 h. The graphene pattern was fabricated by inkjet-printing for 5 passes a cyclohexanone/terpineol-based graphene ink on surface-unmodified Kapton substrates followed by drying at 100 °C for 1 h.

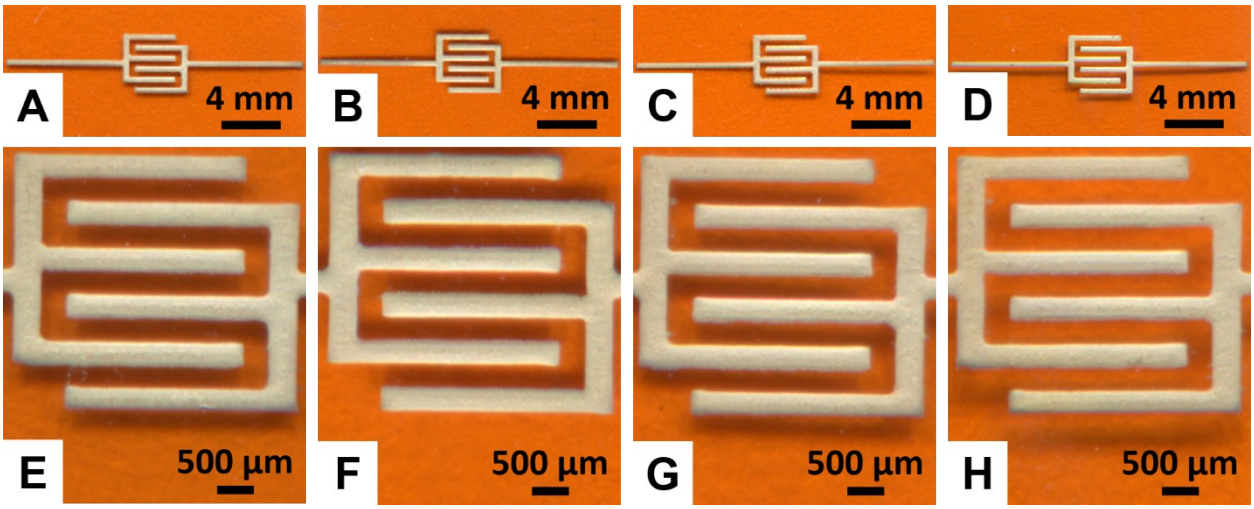

Fig. S2. Scanned low and high magnification images of silver IDE patterns printed on unmodified and PEM-modified Kapton substrates. A), B), C) and D) are low magnification images of silver IDE patterns inkjet-printed on surface unmodified, 1-PEM-layer-modified, 3-PEM-layer-modified and 4-PEM-layer-modified Kapton HN films, respectively. E), F), G) and H) are the high magnification counterparts of A), B), C) and D), respectively. All these silver IDE patterns were fabricated by inkjet-printing for 5 passes an ethanol-based silver nanoparticle ink on the appropriate Kapton substrates followed by drying at 120 °C for 3 h.

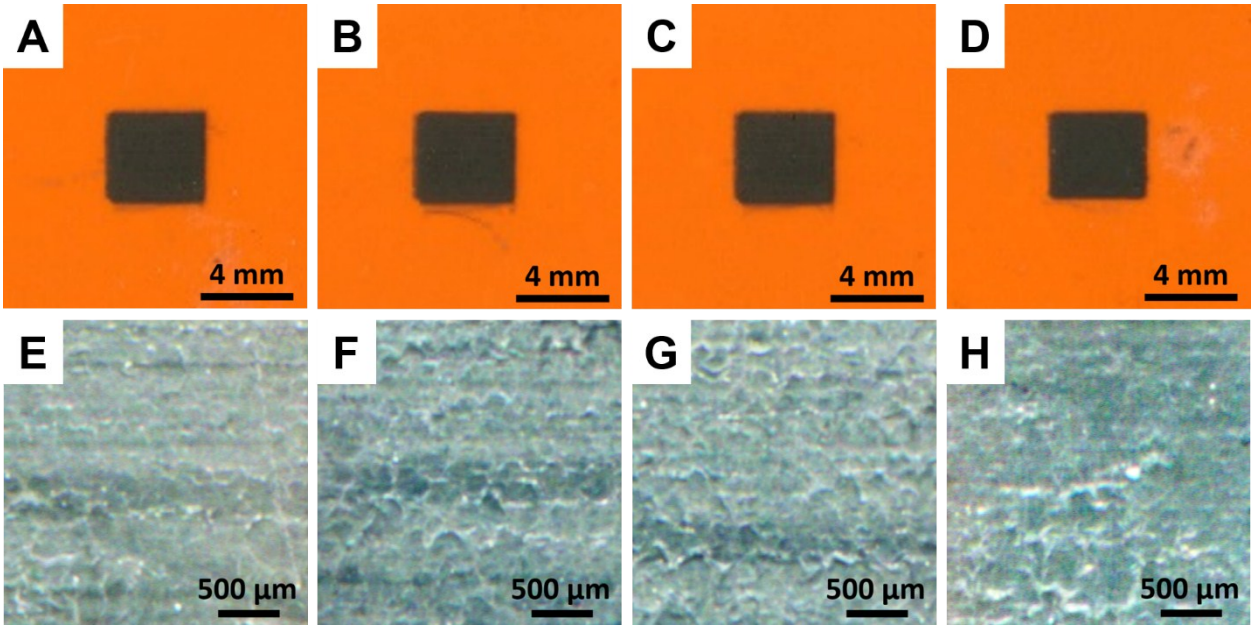

Fig. S3. Scanned low and high magnification images of graphene patches printed on unmodified and PEM-modified Kapton substrates. A), B), C) and D) are low magnification images of graphene patches inkjet-printed on surface unmodified, 1-PEM-layer-modified, 3-PEM-layer-modified and 4-PEM-layer-modified Kapton HN films, respectively. E), F), G) and H) are the high magnification counterparts of A), B), C) and D), respectively. All these graphene patches were fabricated by inkjet-printing for 5 passes a cyclohexanone/terpineol-based graphene ink on the appropriate Kapton substrates followed by drying at 100 °C for 1 h.

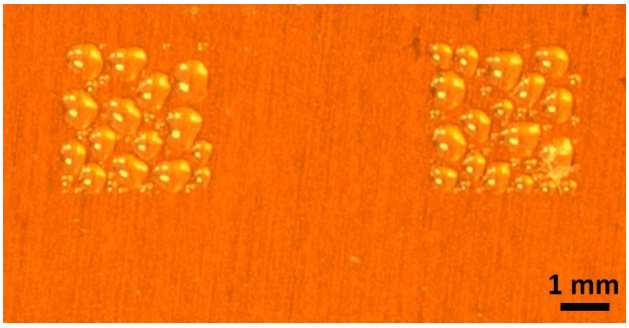

Fig. S4. Optical image of GO patterns printed (5 passes) with a water-based GO ink on a Kapton HN substrate which has been deposited with 4 PEM layers with a modified LbL PAA/PEI process (i.e., the PAA solution contained a higher NaCl concentration (1 M NaCl instead of the regular 0.5 M)).

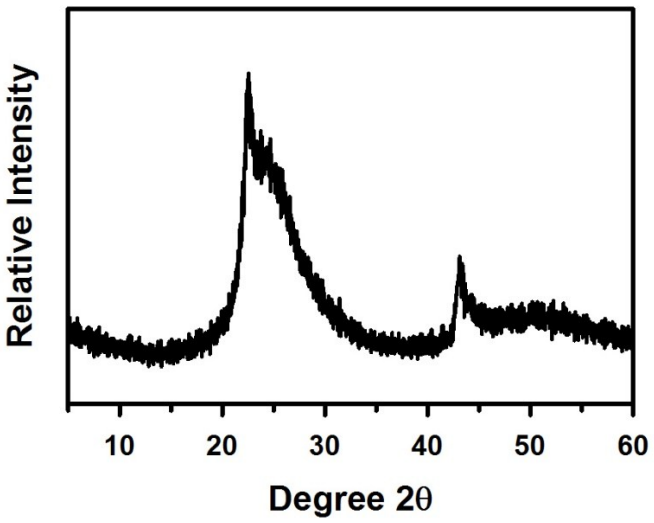

Fig. S5. XRD analysis of rGO powder after drying and pyrrole reduction of GO ink.