Electronic Supplementary Information (ESI)

Self-limiting Multiplexed Assembly of Lipid Membranes on Large-area Graphene Sensor Arrays

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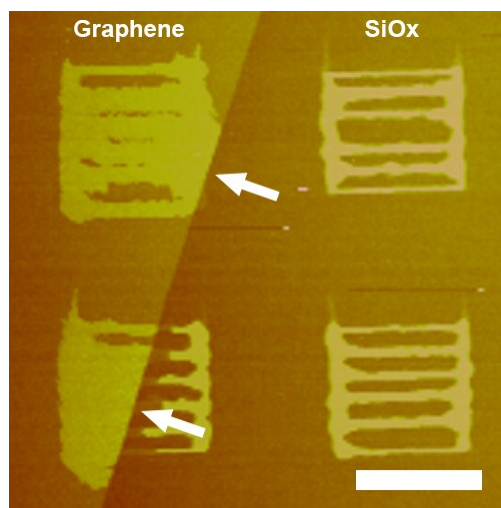
Fig. S1 AFM image of self-limiting spreading on an exfoliated graphene flake. The exfoliated graphene flake spans the left area; the right area is bare silicon oxide. Several parallel lines of 5 µm length were written by L-DPN. The arrows indicate the edge of the exfoliated graphene flake, were the spreading of the lipid membrane abruptly stops. The scale bar equals 5 µm.
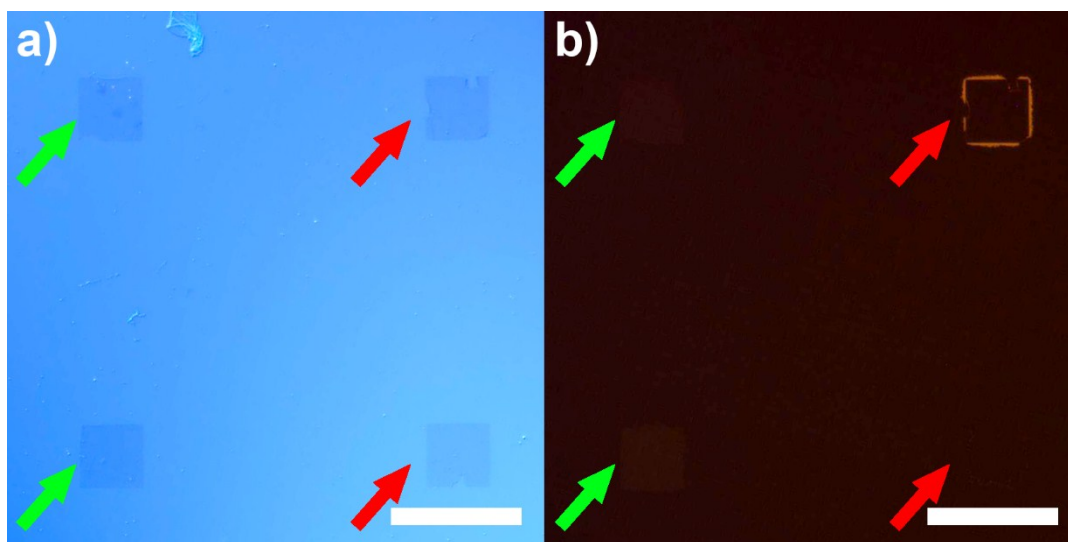
Fig. S2 Bright field and corresponding fluorescence image of four graphene squares functionalized with Biotin-PE containing ink (green arrows) and Rho-PE containing ink (red arrows) after immersion in liquid and incubation with streptavidin-cy3. Note that only the Biotin-PE functionalized squares light up in fluorescence, while the Rho-PE functionalized remain dark. A small spoilage of lipid with Rho-PE around the upper right square (caused by defects at the edge that allowed the lipid to transfer to the silicon oxide substrate) is brightly visible, as it is not quenched by the graphene any more. Scale bars equal 40 μm.
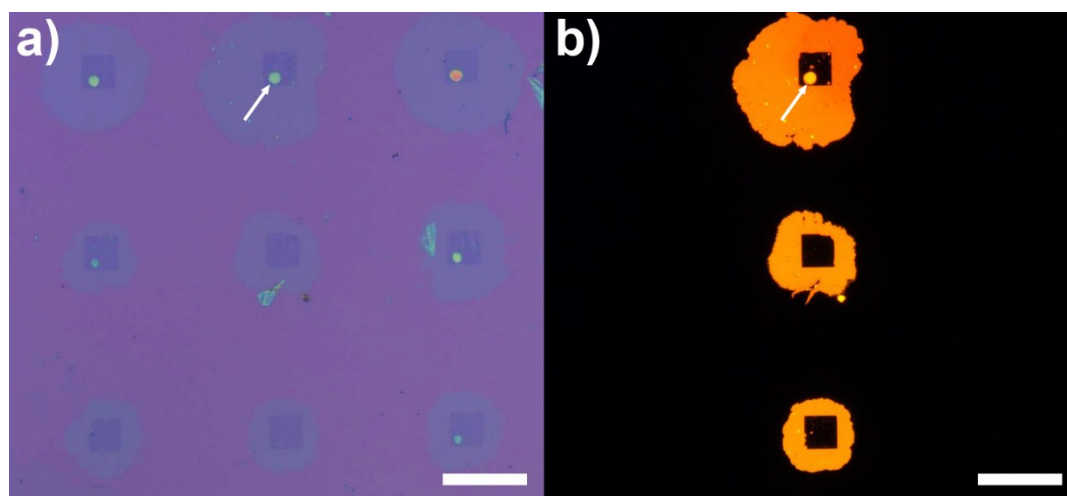
Fig. S3 Bright field and corresponding fluorescence image of graphene squares intentionally overloaded by Biotin-PE containing lipid ink (left and right columns) and Rho-PE containing ink (middle column). The quenching effect of the graphene becomes very obvious, as the graphene squares appear totally dark even though carrying lipid membranes. The white arrow denotes a thick droplet of lipid ink that has not spread out yet. As these droplets can easily reach heights in the hundreds of nm, the material in it also escapes quenching and lights up even on the graphene. Scale bars equal 50 μm.