SUPPORTING INFORMATION

Graphene nanomesh as highly sensitive chemiresistor gas sensor

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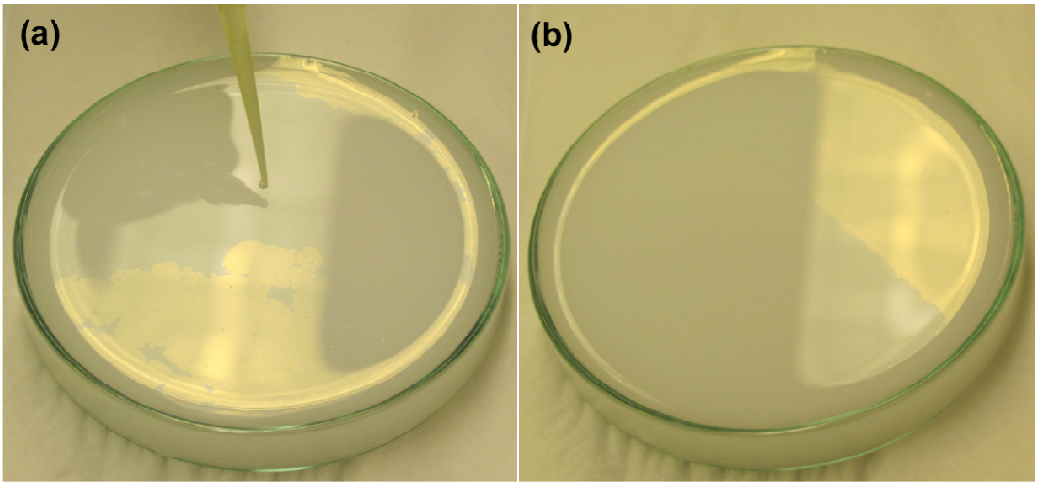

Figure S1. Optical images of PS nanospheres floating on D.I. water surface in a petri dish **a**, before and **b**, after an addition of aqueous SDS (1%) solution.

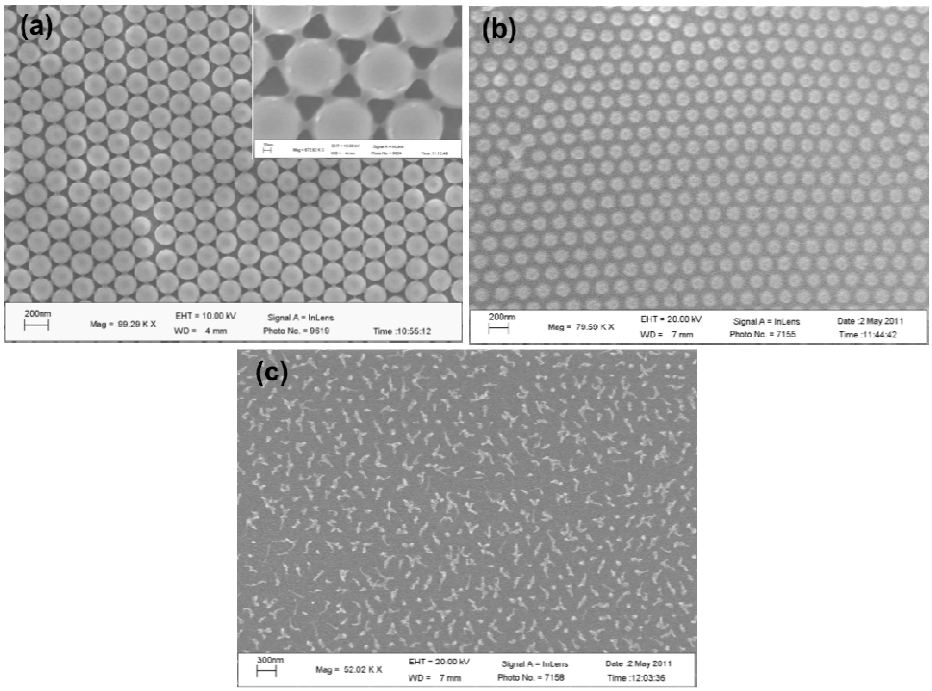

Figure S2. SEM images of self-assembled monolayer of PS spheres over SiO_2/Si substrates after RIE etching at 100W for **a**, 5 s, **b**, 10 s and **c**, 20 sec.

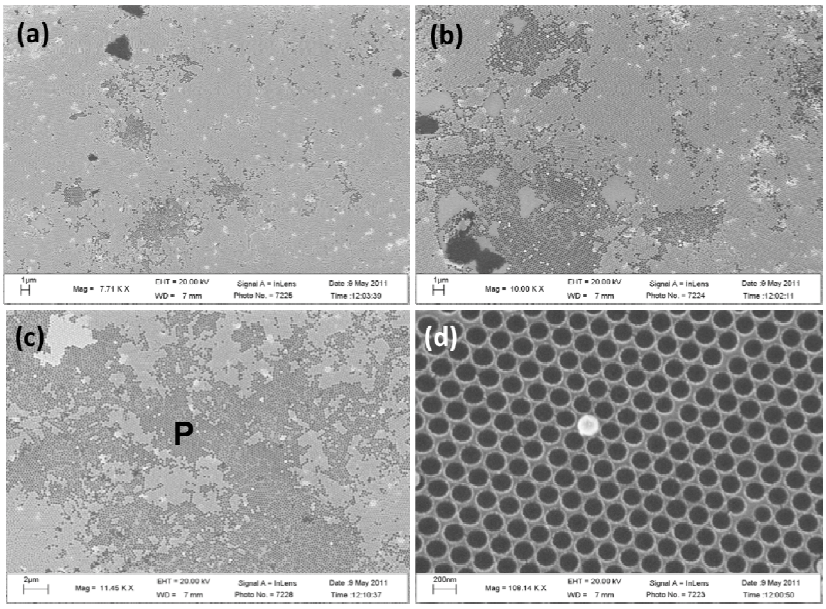

Figure S3. SEM images of Pt nanomesh formation after removal of PS spheres using sonication for **a**, 30 s, **b**, 60 s, **c**, 90 s in deionized water and **d**, magnified image of area P in image **c**.

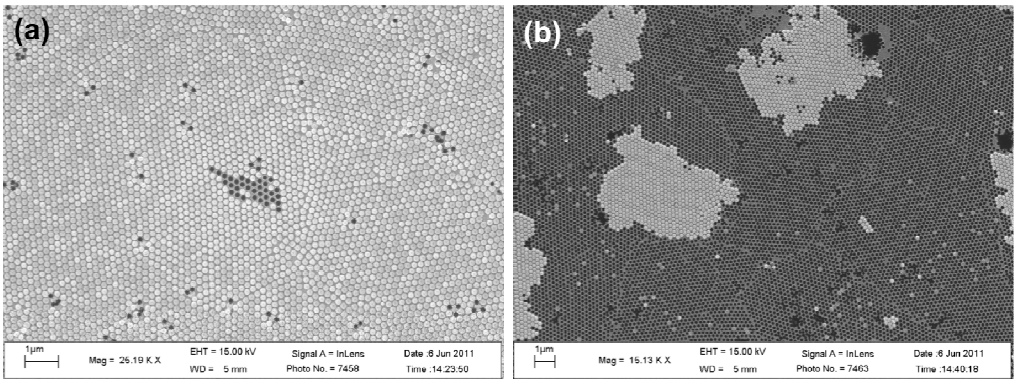

Figure S4. SEM images of Pt nanomesh formation after removal of PS spheres in cyclohexane at 60°C for 2 h. **a**, without sonication and **b**, additional sonication for 90 s in D.I. water.

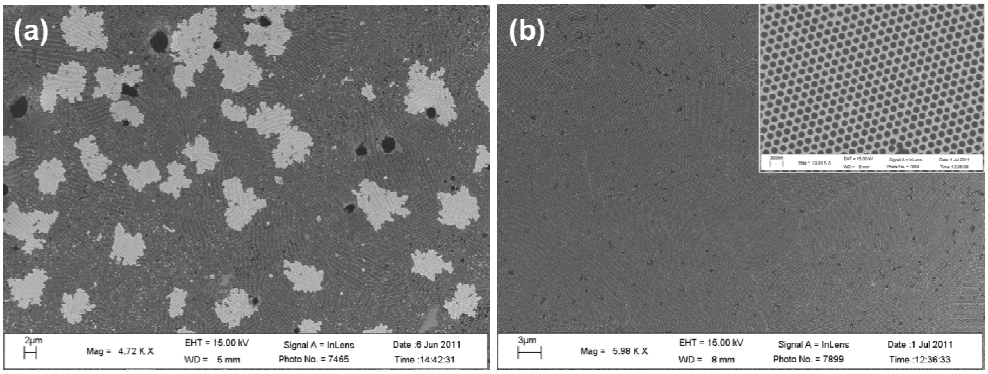

Figure S5. SEM images of Pt nanomesh formation after removal of PS spheres in **a**, cyclohexane with additional 90 s sonication and **b**, 1-chloropentane at 60°C for 2 h.

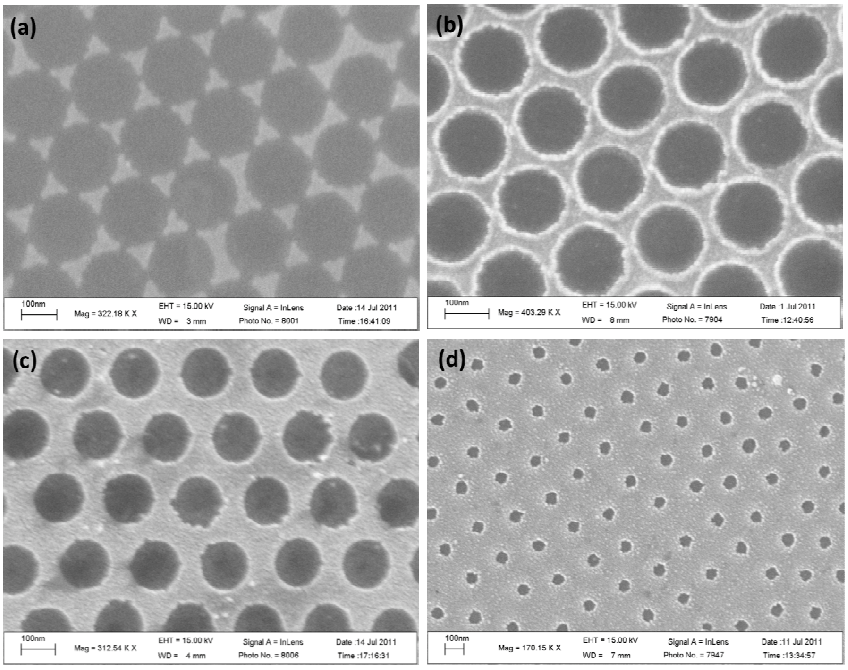

Figure S6. The electronic properties of the resulting GNM can be tuned by changing the size of the graphene neck-width by controlling the neck-width of the nanoporous Pt mask through control of the gap between two nanospheres. With RIE for **a**, 5 s, the gaps were not still formed and produced hexagonal nanodot arrays of Pt after e-beam evaporation of 15 nm Pt. As the duration of RIE was increased to **b**, 10 s, the resulting neck-width of the Pt nanomesh was about 20 nm. The neck-width of Pt nanomeshes was about 60 nm

and 110 nm for **c**, 12 s and **d**, 15 s RIE, respectively. Process parameters such as RIE time, RF power and flow rate of O_2, can be varied to control the neck-width and the periodicity of the GNM.