Article

Sterically Stabilized Multilayer Graphene Nanoshells for Inkjet Printed Resistors

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Figure S1 shows a typical particle size distribution of MGNS particles dispersed in DI water. The breadth of the distribution and average size compared with the size of individual particles measured from TEM images suggests the presence of particle agglomerates. In regard to the geometric adsorption model, the presence of agglomerates reduces the actual particle surface area available for surfactant adsorption. The model assumed individual particles, which amounts to an overestimation of the available surface area and would lead to an overestimation of surfactant dosage.

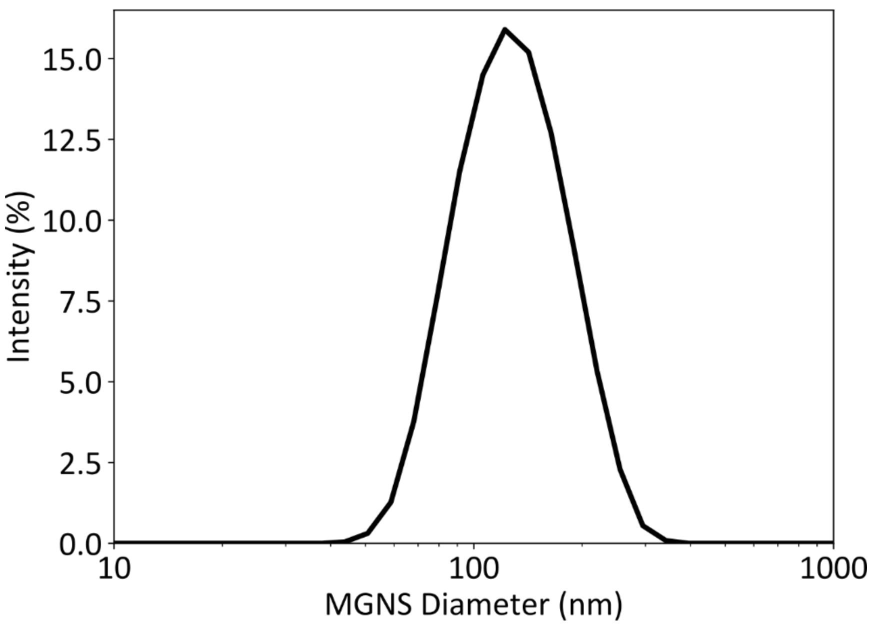

Figure S1. Typical particle size distribution for MGNS measured via dynamic light scattering.

Inks with electrostatically stabilized MGNS particles should form dry particle-particle contacts once deposited and dried. For sterically stabilized MGNS inks, the particle-particle contact may be accompanied by residual surfactant material, which could explain the lower resistivity of the sterically stabilized ink compared to the electrostatically stabilized ink, for few printed layers. The resistivity reduction could be due to the residual surfactant material constituting an additional conduction path (depicted in Figure S2) or by drawing nearby particles together as the surfactant molecules constrict while drying.

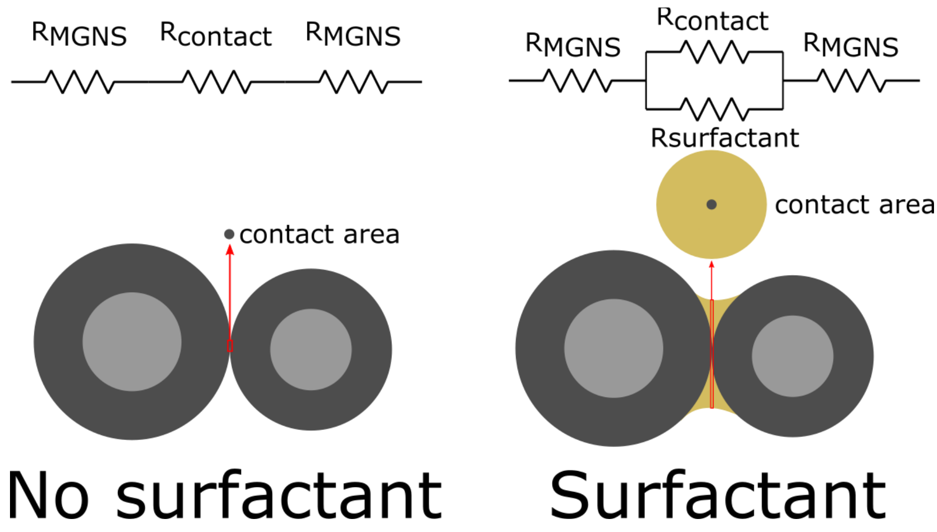

Figure S2. Depiction of contact area between bare (left) and surfactant coated (right) MGNS particles and the resulting resistance network.