

# Supporting Information

for

## **Graphene-enhanced plasmonic nanohole arrays for environmental sensing in aqueous samples**

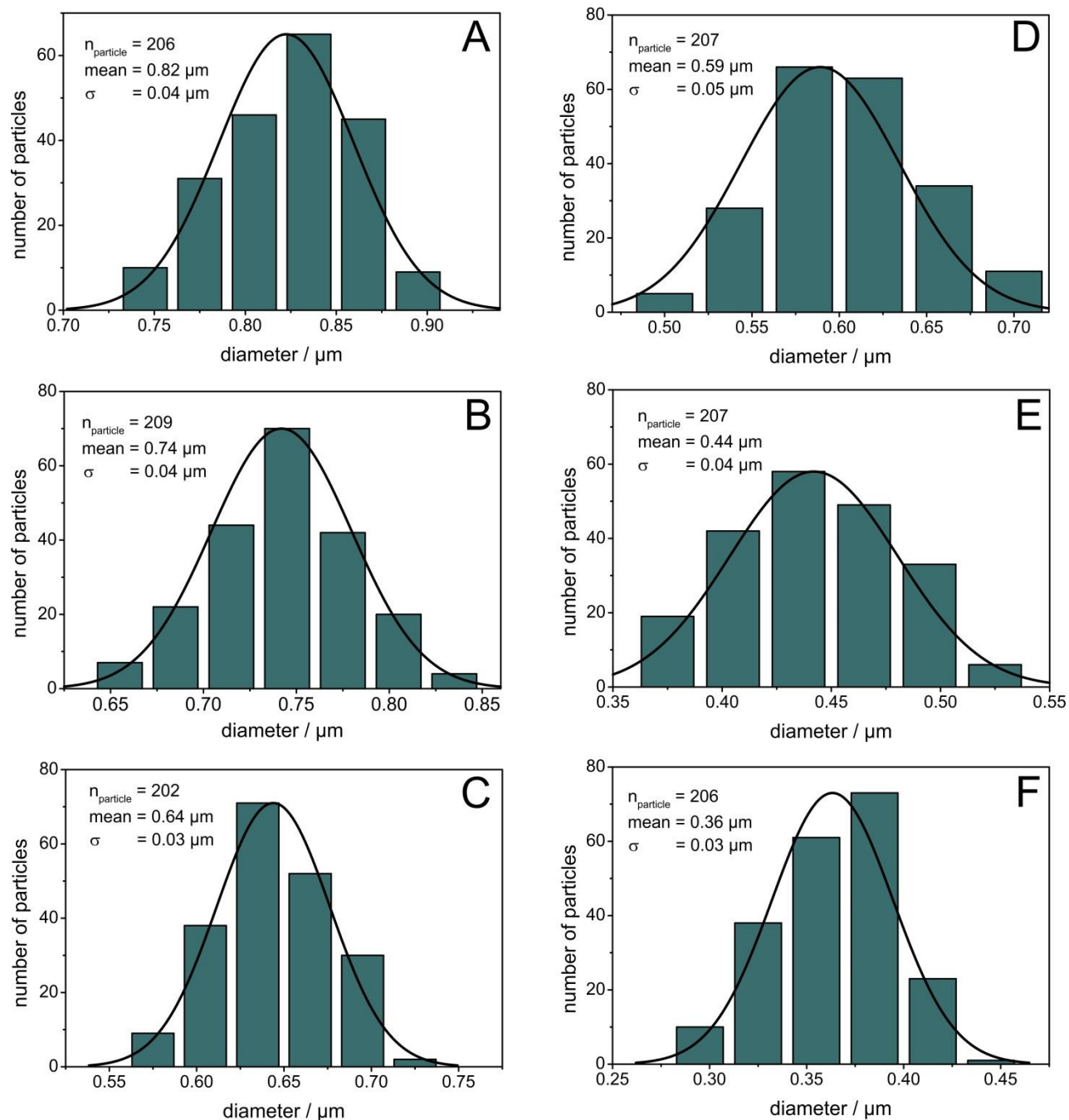
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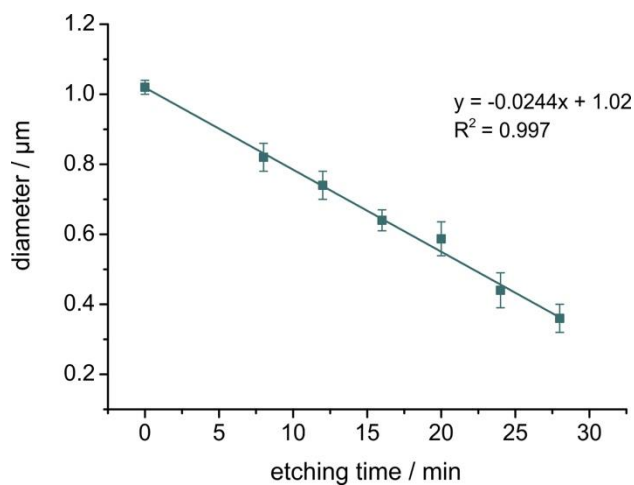
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### **Additional experimental data**



**Figure S1:** The respective size distribution analysis of the particles is from the SEM images (compare Figure 3). A Gaussian function was used for fitting. Substrates were covered by  $\sim 45$  nm Au with a  $\sim 3$  nm Ti adhesion layer. A decrease in the diameter of the polystyrene particles with an increase of the etching time from 8 min (A) to 28 min (F) can be seen.



**Figure S2:** Time dependence of the particle diameter reduction. Particles have a starting diameter of 1.02  $\mu\text{m}$ . Etching is performed using reactive ion etching with oxygen plasma. Standard deviation is taken from the respective size distribution of the SEM image analysis (Figure S1).

**Table S3:** Fitting parameter for the interaction of DEP with rGO on various substrates. The Langmuir model was used.

substrate	$K / \mu\text{M}$	$K_A / \mu\text{M}^{-1}$	$R^2$
continuous film	0.17 $\pm 0.03$	$6 \pm 1$	0.9693
nanohole array with D/P	0.35	$5 \pm 1$	0.9149
	0.43 $\pm 0.02$	$7 \pm 0.9$	0.9847
	0.58 $\pm 0.04$	$5 \pm 1$	0.9585

$$\Delta s = \frac{c}{K + c},$$

where  $\Delta s$  is the signal change,  $c$  is the DEP concentration and  $K$  represents the equilibrium dissociation constant.