Electronic Supplementary Information (ESI)

Nanopatterns of polymer brushes for understanding protein adsorption on the nanoscale

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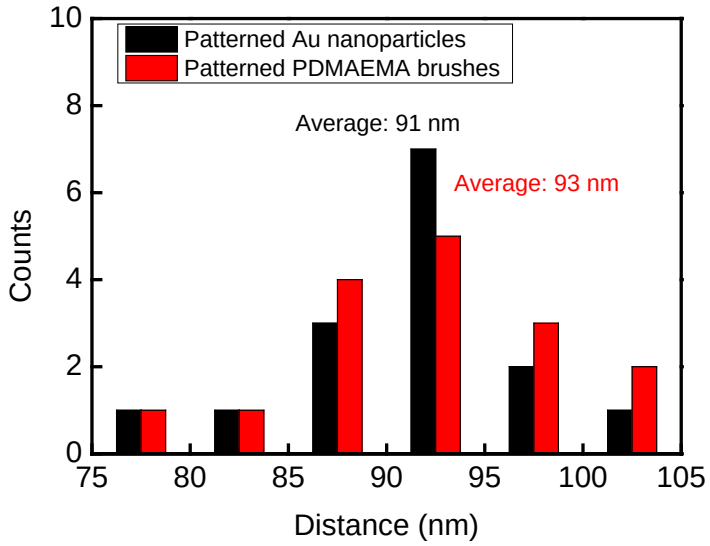

Figure S1. Statistical analysis of distance between neighboring Au nanoparticles and patterned PDMAEMA brushes. The AFM height images of the two samples are shown in Figure 1 in the main text.

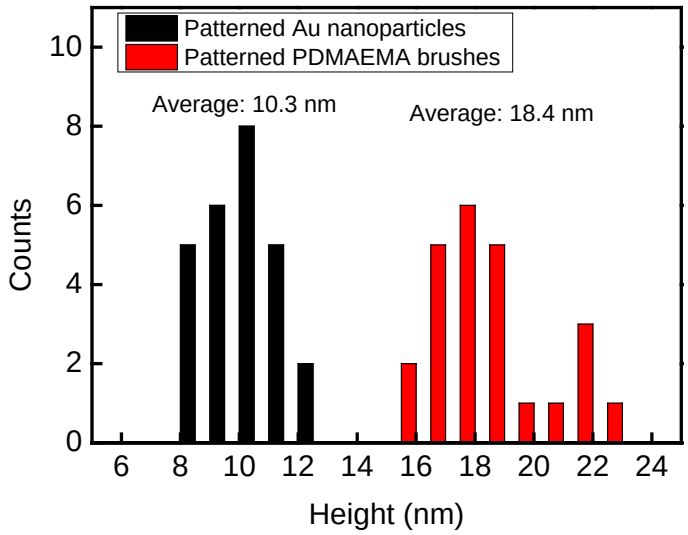

Figure S2. Statistical analysis of height of patterned Au nanoparticles and patterned PDMAEMA brushes. The AFM height images of the two samples are shown in Figure 1 in the main text.

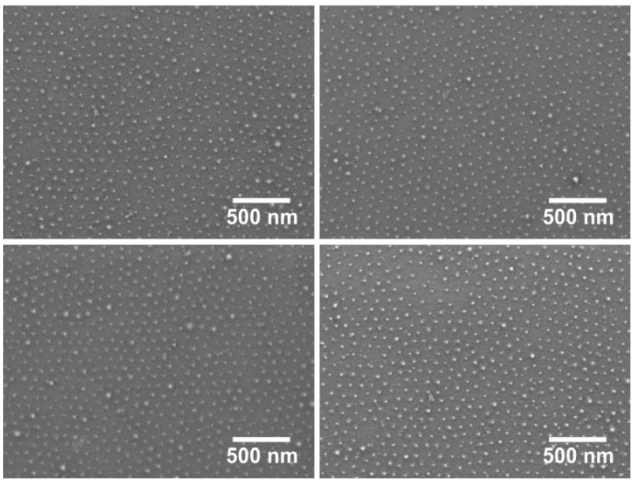

Figure S3. SEM images of patterned PDMAEMA brushes at randomly selected positions on the same substrate.

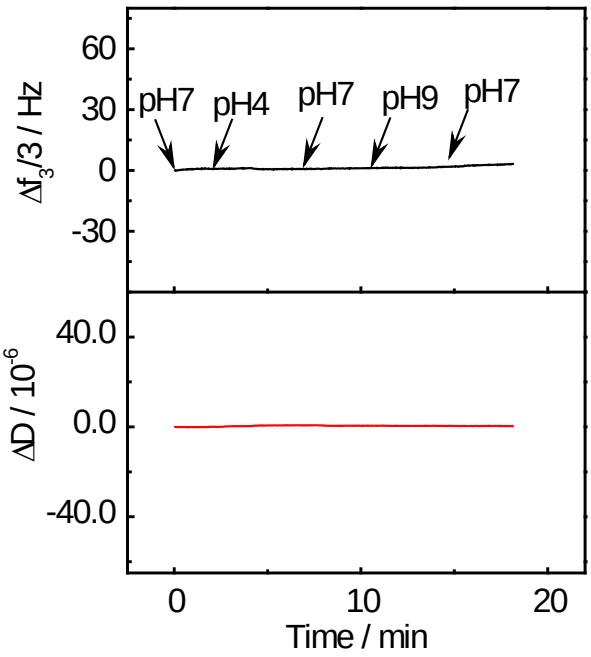

Figure S4. Frequency shift (Δf) and dissipation shift (ΔD) of QCM-D for patterned Au nanoparticles without PDMAEMA at different pH as a function of time. This control experiment confirms that the pH response shown in Figure 3 is due to PEMAEMA brushes.

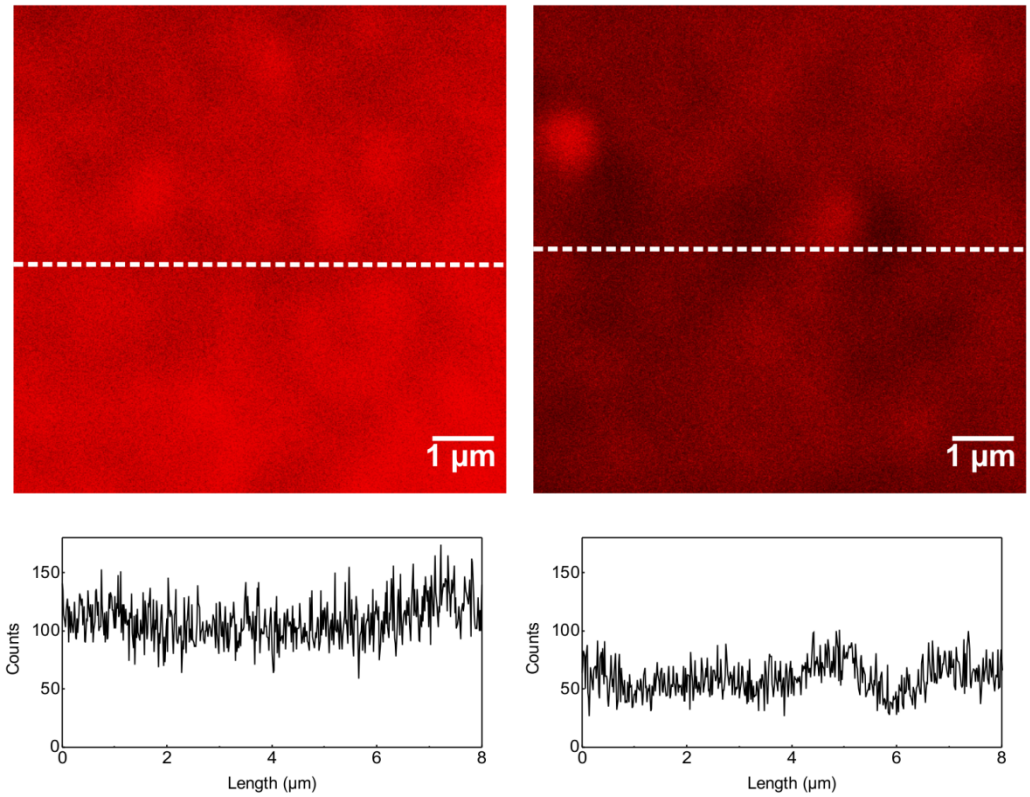

Figure S5. Laser scanning confocal microscopy images and fluorescence counts of patterned PDMAEMA brushes after protein adsorption (left) and after protein desorption (right). The average fluorescence counts decrease to ~47% of the original counts, indicating that ~53% BSA is released from the polymer brushes.

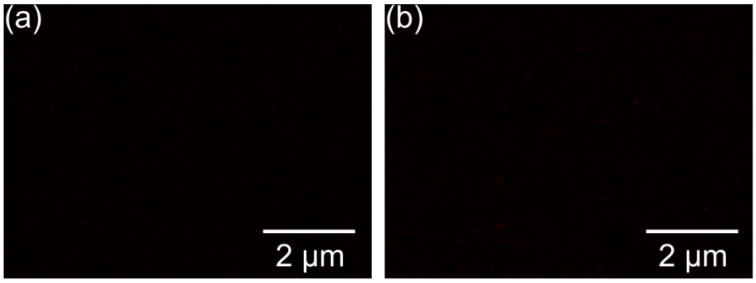

Figure S6. Laser scanning confocal microscopy images of a quartz substrate (a) and a PEG-modified quartz substrate (b) after rinsed in fluorescence-labeled BSA solution (0.1 mg/mL, pH 5.8) for 1 hour, washed with NaCl solution (1 mM, pH 5.8), and dried with N_2. No fluorescence species could be detected. This control experiment shows that both quartz and PEG-modified quartz do not adsorb BSA.

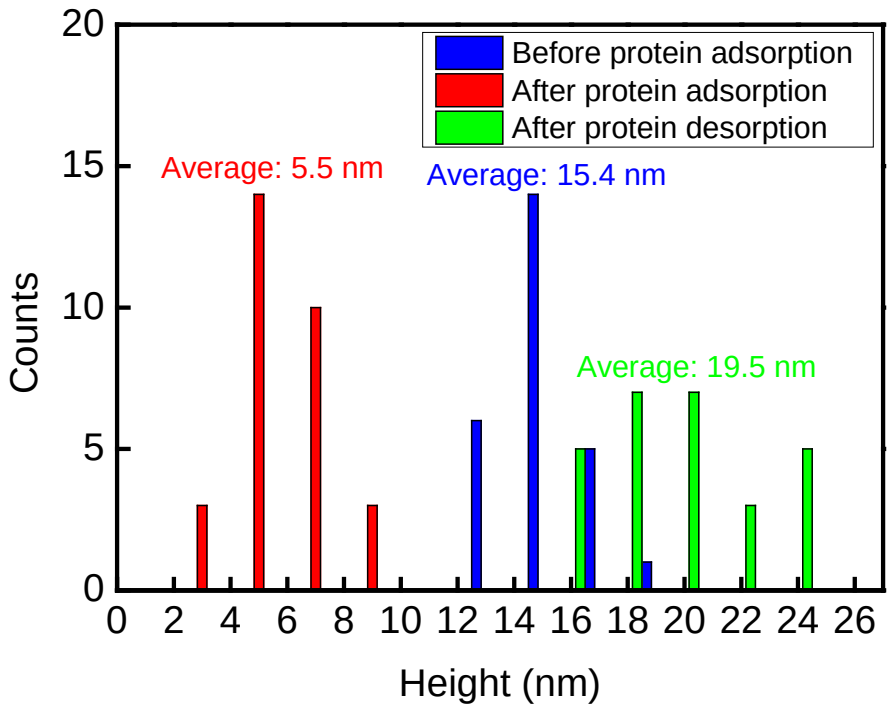

Figure S7. Statistical analysis of height of patterned PDMAEMA brushes before protein adsorption (blue), after protein adsorption (red), and after protein desorption (green). The AFM topography of the samples is shown in Figure 4c in the main text.

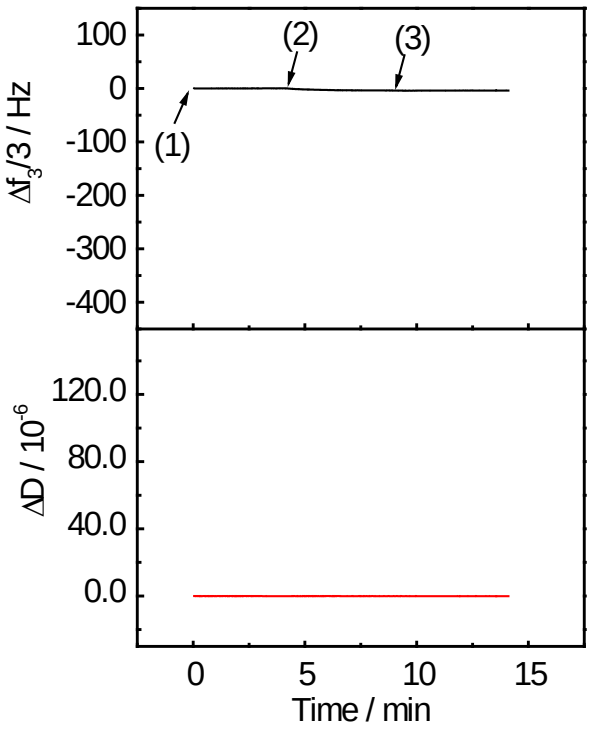

Figure S8. Frequency shift (Δf) and dissipation shift (ΔD) of QCM-D for patterned Au nanoparticles without PDMAEMA brushes in: (1) NaCl solution (1 mM, pH 5.8, baseline), (2) BSA solution (0.1 mg/mL, pH 5.8), and (3) NaCl solution, (1 mM, pH 5.8). This control experiment shows that negligible BSA is adsorbed on patterned Au nanoparticles. This control experiment also indicates that protein adsorption shown in Figure 5 is caused by the interactions between PDMAEMA brushes and BSA.