

Supporting Information

Versatile Bottom-up Synthesis of Tethered Bilayer Lipid Membranes on Nanoelectronic Biosensor Devices

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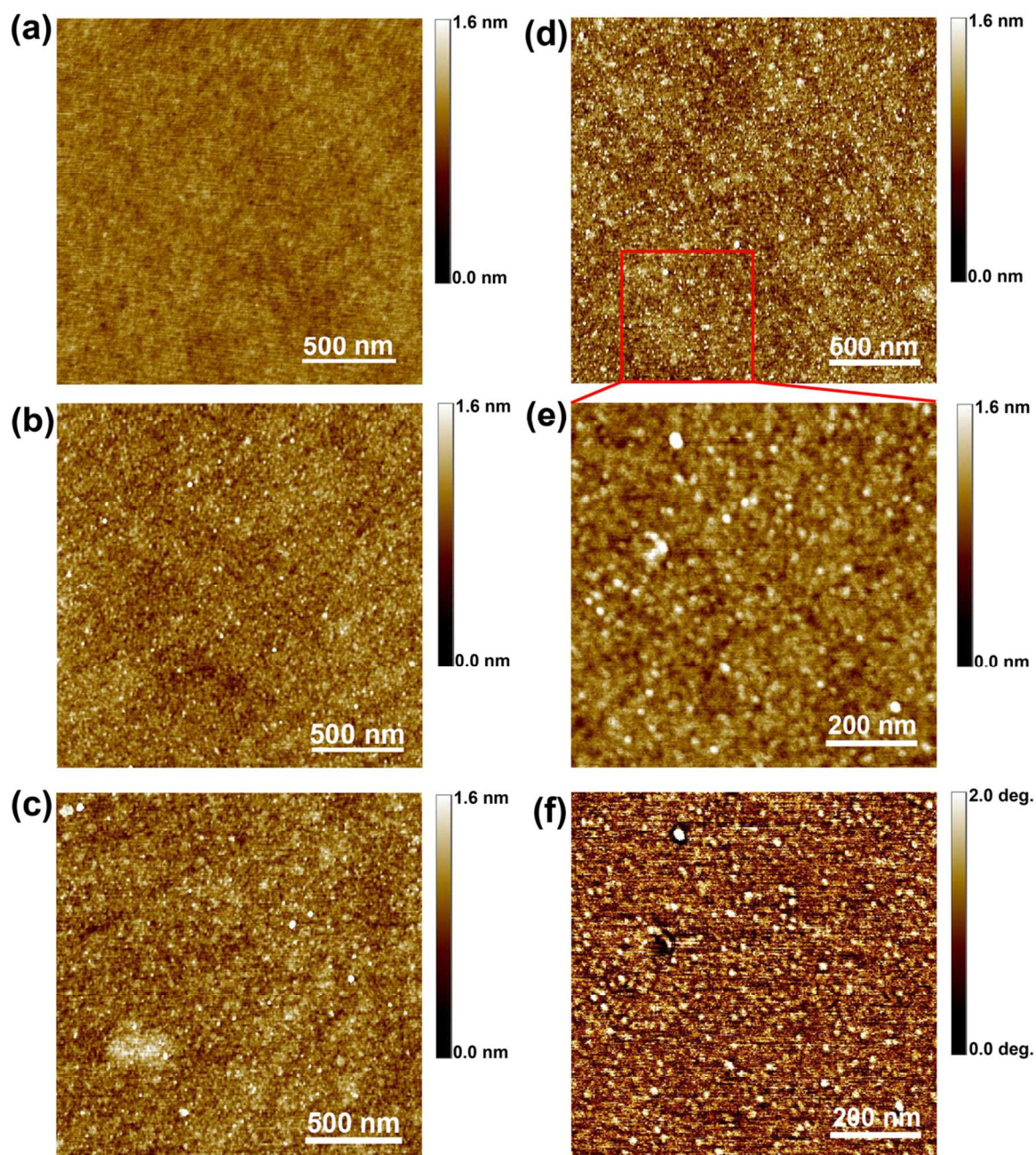


Figure S1. AFM images of bare silicon wafer (a), GOPS (b), GOPS-CA(PEG)₈ (c) and GOPS-CA(PEG)₈-DOPE (d, e and f) functionalized silicon wafers. (a ~ e) are the AFM topography images, and (f) is AFM phase image corresponding to (e). (e, f) are the higher-magnification images corresponding to the area in the red rectangle box shown in (d).

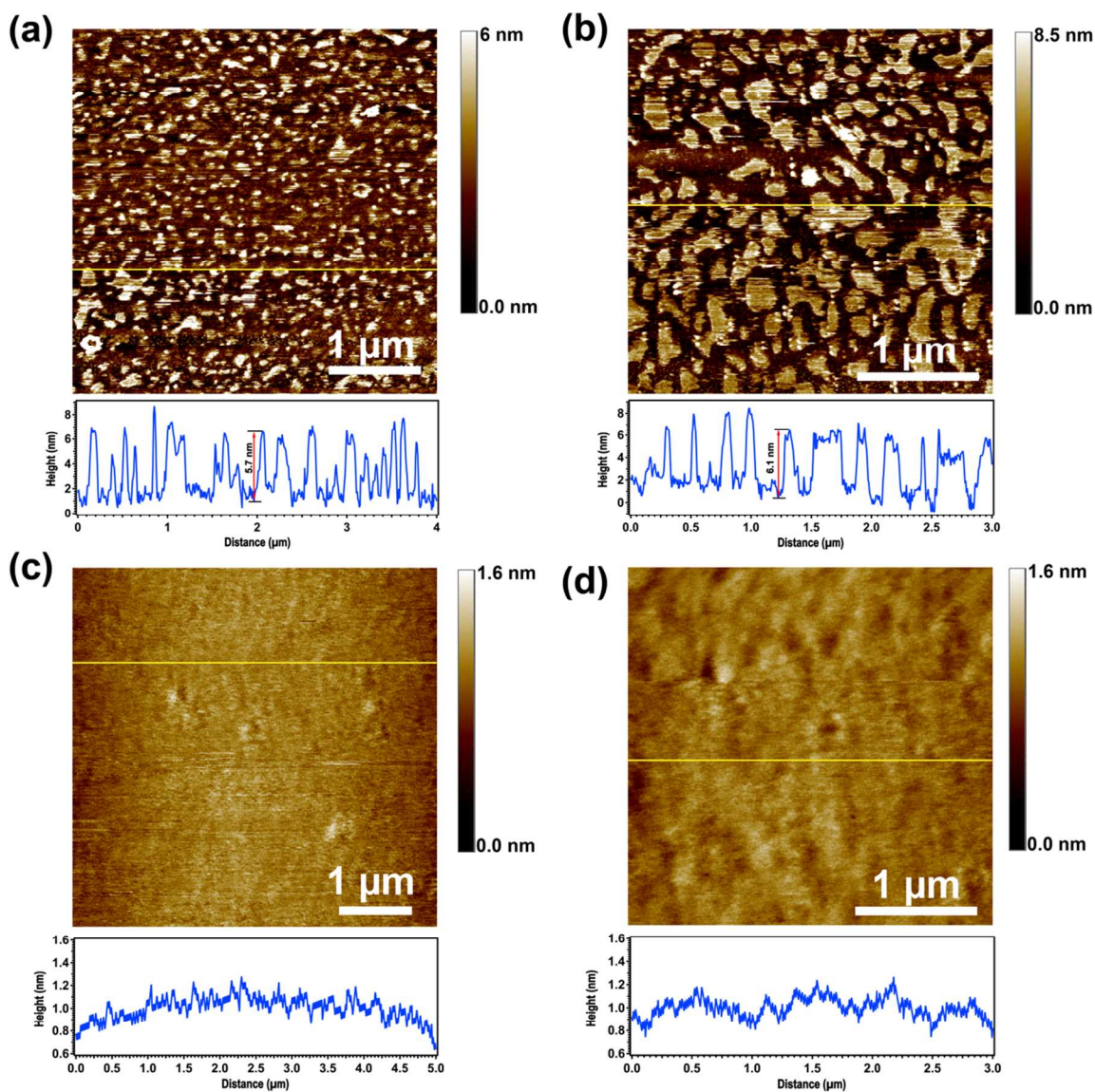


Figure S2. AFM topography images of GOPS-CA(PEG)₈-DOPE monolayer functionalized silicon wafer (a, b) and tBLM formed on the same substrate after a vesicle fusion process (c, d). The chart below each AFM image is the height profile of the horizontal line shown in the corresponding image. AFM characterizations were performed in 1x PBS buffer.

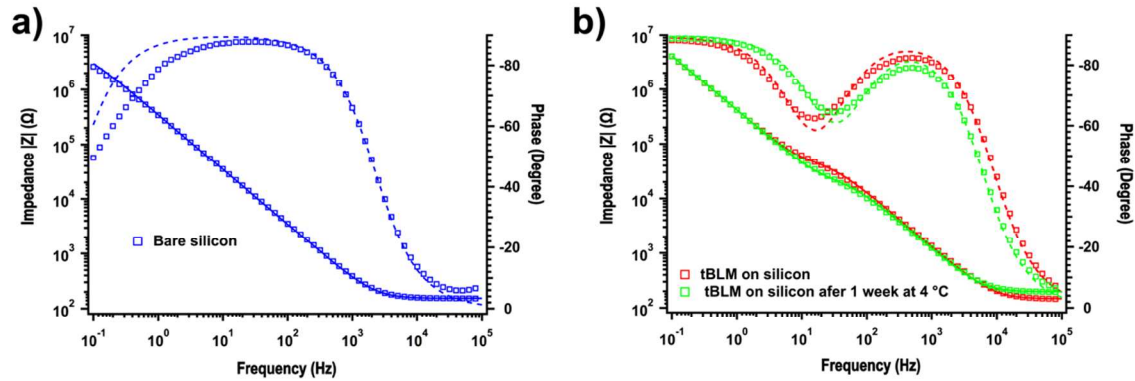


Figure S3. Bode plots of EIS spectra of bare silicon wafer (a) and tBLMs (b) just completed with DPhPC by vesicle fusion on silicon wafer (red rectangles) and after one week stored at 4 °C (green rectangles). The solid lines and dash lines represent the fitted impedance and phase curves, respectively. The size of the homemade PDMS chamber used in Figure S3 is $\sim 0.2 \text{ cm}^2$.

Formation of Tethered Bilayer Lipid Membranes on ITO Glass

Similar to the fluorescence results on SiO₂ surface, a uniform tBLM can be obtained on monolayer functionalized ITO glass surface (Figure S4a) via the same functionalization strategy. However, the Bode plot of EIS spectrum of tBLM on ITO (Figure S4b) has a smaller phase peak in the middle frequency compared to the spectrum on silicon wafer. The two-RC mesh circuit model cannot fit the data well, which needs further investigation.

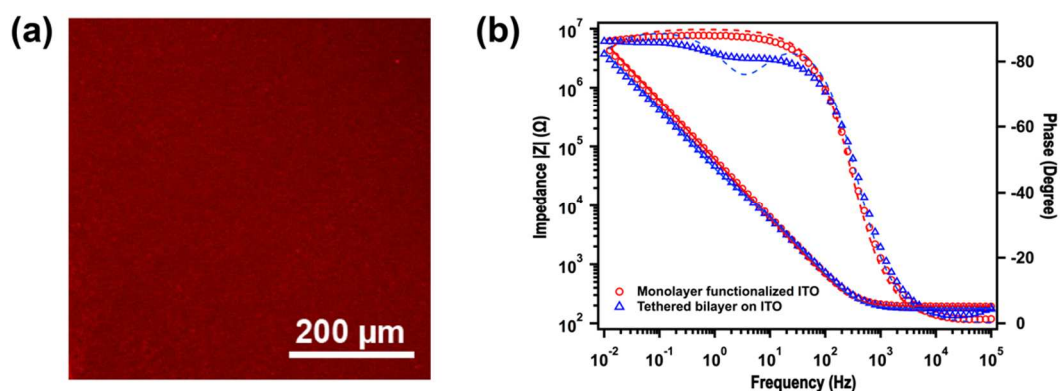


Figure S4. a) Fluorescence image of tBLM formed on GOPS-CA(PEG)₈-DOPE monolayer functionalized ITO slide. b) Bode plots of EIS spectra of monolayer functionalized ITO (red circle) and tBLM on ITO (blue triangle). The dash lines are the fitted curves using two-RC mesh circuit model.