Supplementary Information

pH-driven assembly of various supported lipid platforms: a comparative study on silicon oxide and titanium oxide

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Fig. S1 Effects of pH on intact vesicle adsorption on titanium oxide.

Vesicle adsorption kinetics as a function of pH on titanium oxide. The frequency changes correspond to a layer of vesicles adsorbed on titanium oxide (top panel) and the simultaneous measurement of the adlayer’s viscoelastic properties is represented by the energy dissipation response (bottom panel). The results indicate that as the pH increases, frequency changes due to the adsorption of intact vesicles decrease (less mass due to vesicle flattening) and there is a corresponding energy dissipation increase.
Figure 2D demonstrates the adsorption kinetics of lipid vesicles on titanium oxide at pH 4.0, which result in the coexistence of bilayer patches and intact vesicles. The adsorption behavior at first displays typical two-step bilayer formation kinetics upon addition of vesicles at five minutes (top panel). However, instead of continuous vesicle rupture and bilayer propagation that would result in a complete, planar bilayer, more vesicles then adsorb and remain intact (bottom panel).
On silicon oxide, we observed instability of lipid vesicle interactions at pH 9.0. Using the same experimental conditions (Tris 10 mM, NaCl 150 mM, and pH 9.0), the vesicle adsorption kinetics indicated either the formation of a planar bilayer or an intact vesicle adlayer depending on the run. The top panel is the frequency response as a function of time and the bottom panel is the corresponding energy dissipation response for a series of three experiments performed under identical conditions.
Fig. S4 Magnified view of Figure 4B.

Frequency and dissipation changes as a function of pH titration from pH 10.0 to pH 7.5. After forming an intact vesicle layer on silicon oxide at pH 10.0, the Tris buffer was exchanged in 0.5 pH unit increments. Note there are no abrupt signal changes due to vesicle rupturing. The stepwise frequency increase and corresponding dissipation decrease is more likely due to intact vesicle flattening as attractive forces increase.