Supplementary Material (ESI) for Soft Matter

ELECTRONIC SUPPORTING INFORMATION

Lipid Bilayers on Topochemically Structured Planar Colloidal Crystals: A Versatile Platform for Optical Recording of Membrane-mediated Ion Transport

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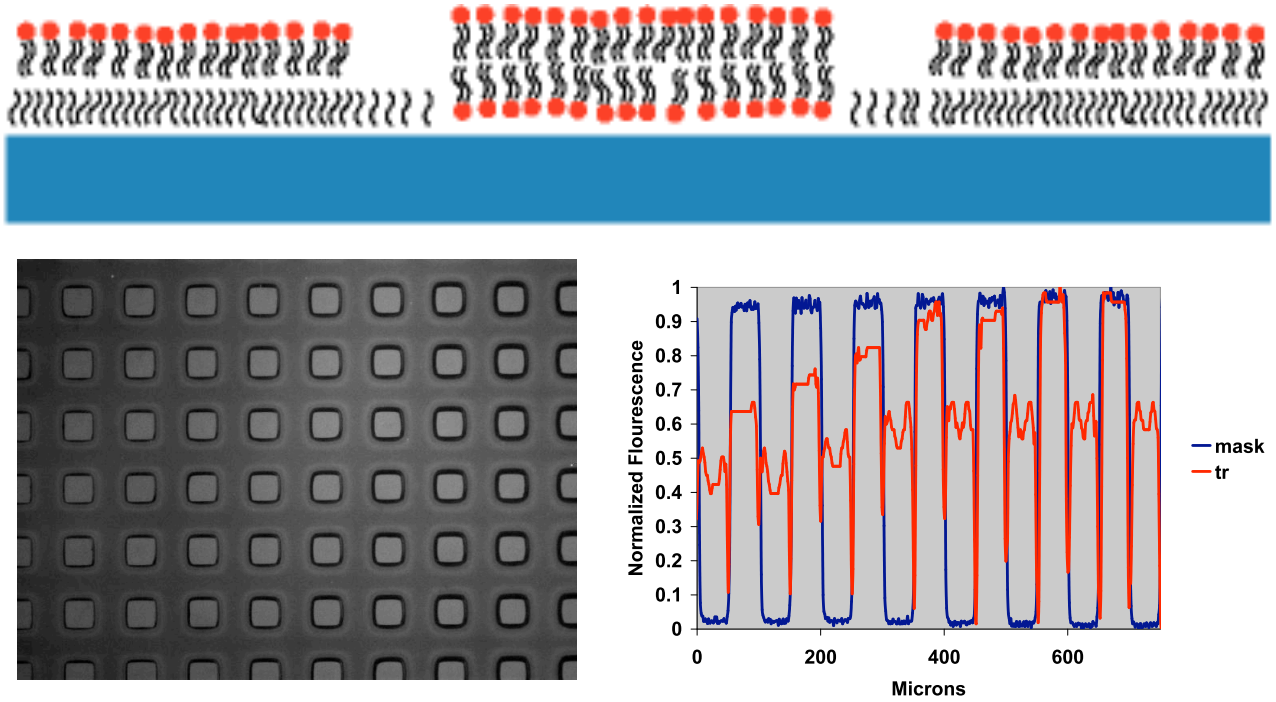
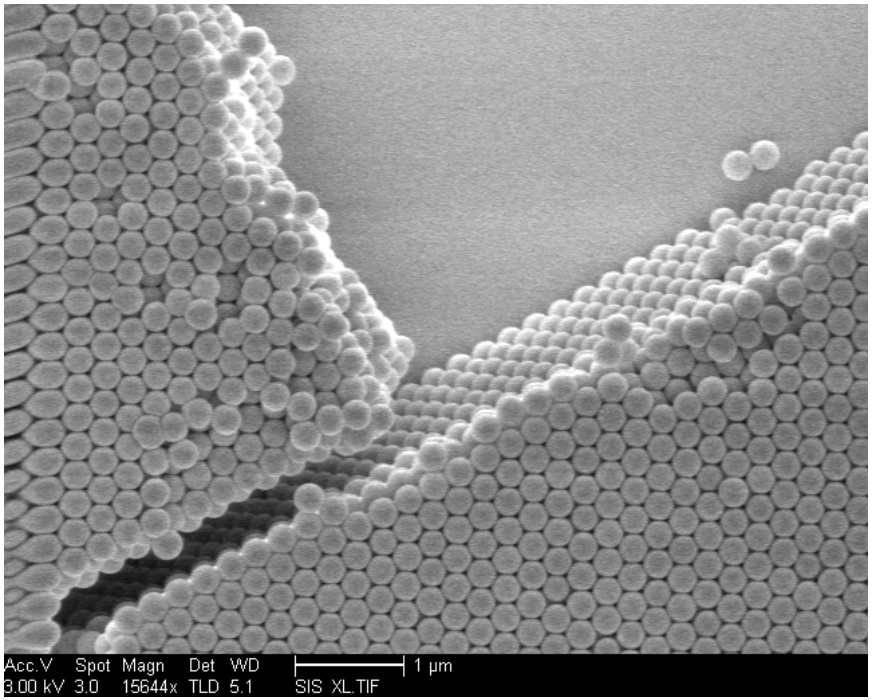
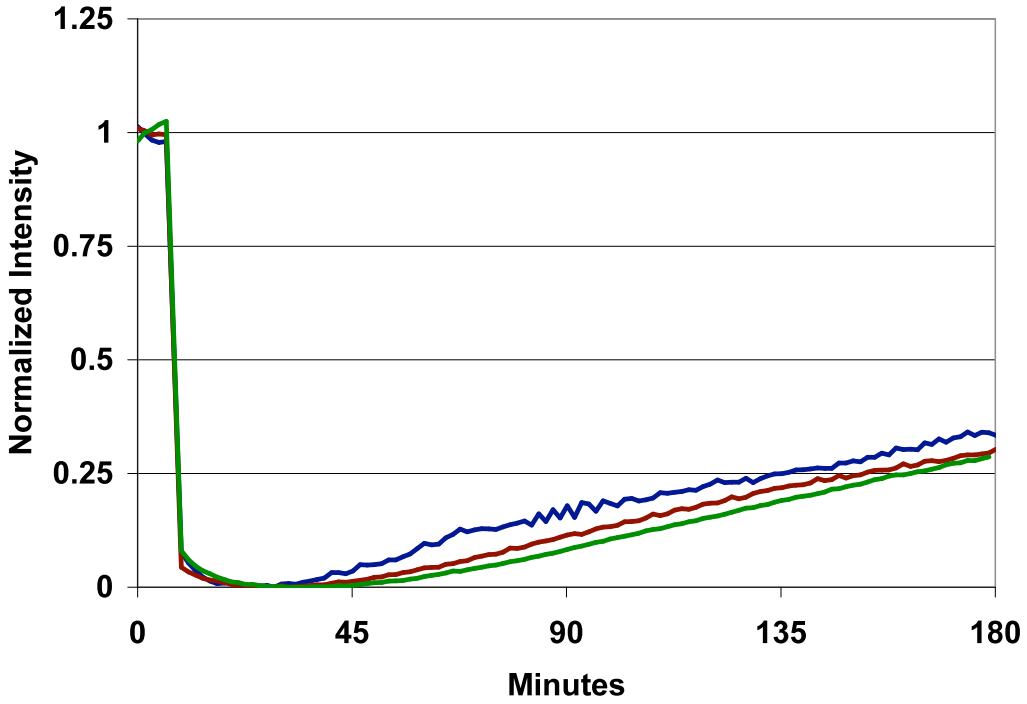


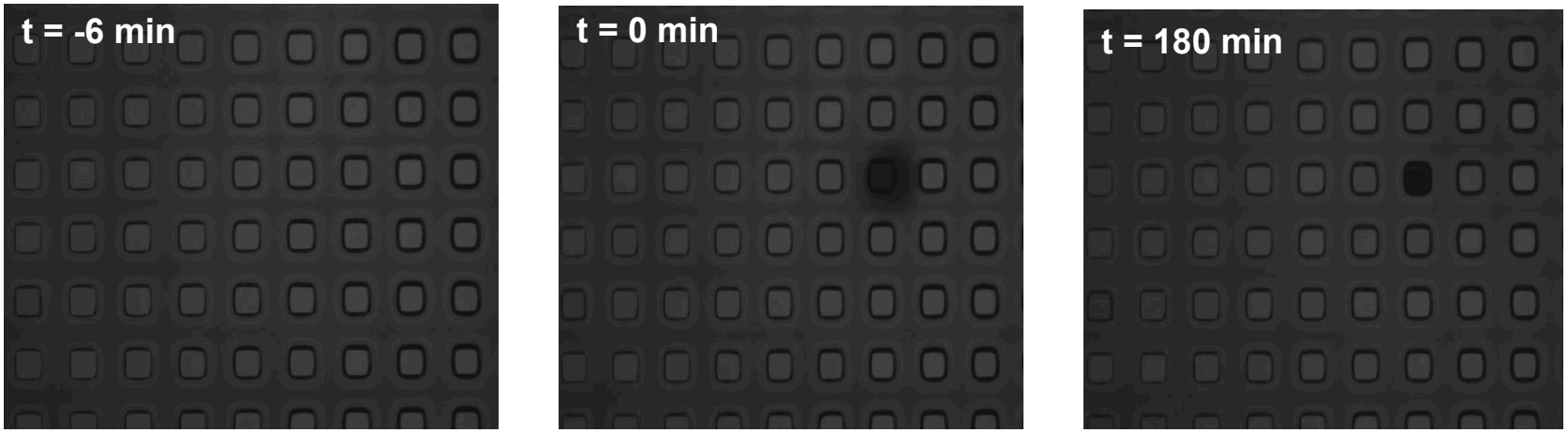
SI FIG 1: (1a) A cartoon illustration of lipid morphologies derived by vesicle fusion onto planar silica substrates. The blue slab is the silica support. The upward facing tails are OTS. The molecules with red heads are lipids. Fig 1b: A fluorescence image of a 1 mol% TR-DHPE and 99 mol% POPC on a planar coverslip. The dark region separating bright and dark features represents a lipid-free moat. The scale bar is 150 microns. A line scan shows the fidelity between the mask pattern and the resulting lipid pattern and a ratio of fluorescence intensity of the square to the grid of 1.84:1, further supports bilayer and monolayer morphologies derived independently in a previous study.



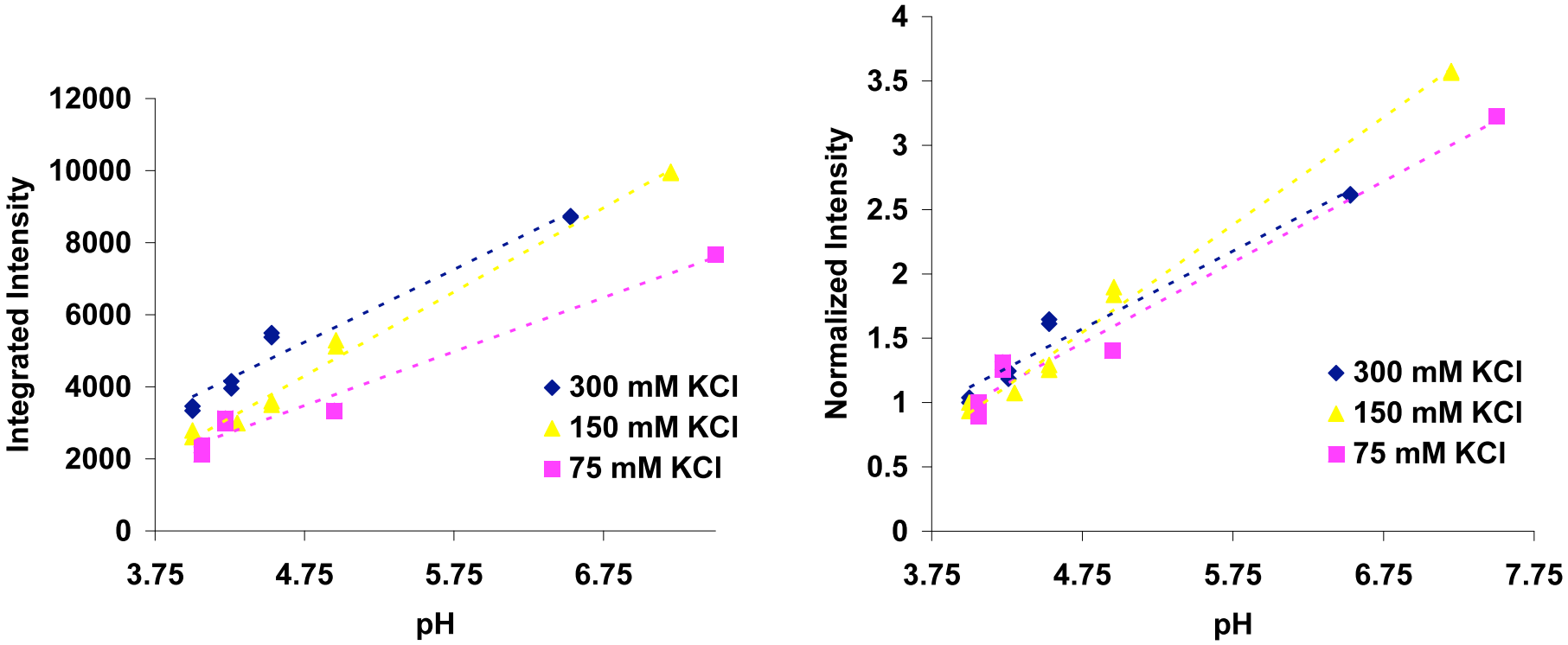
SI FIG 2: Scanning electron microscopy image of a cross section of an 12 layer planar colloidal crystal fabricated using the physical confinement method. The colloids are 260 nm polystyrene spheres.



SI FIG 3: Sample-to-sample variations. Samples were prepared with 1 mol% TR-DHPE and 99 mol% POPC. 3a: Three FRAP curves from different regions of the same sample. 3b: Three FRAP recovery curves from three different samples.



SI FIG 4: Epifluorescence images during a FRAP sequence reveals that the lipid-free moat interrupts the long-range fluidity across the mono- and bilayer regions on a planar silica substrate. In contrast, colloidal crystals do not exhibit such moat regions (see text for details). Samples were prepared using vesicles containing 1 mol% Texas red-DHPE and 99 mol% POPC deposited on a patterned OTS coverglass. The scale bar is 150 microns.



Si FIG. 5: LEFT: a plot of fluorescein response vs pH as a function of KCl concentration. RIGHT: the same plot normalized tothe initial intensity. The dependence of fluorescnece intensity on pH is linear with a slope of 0.62