SUPPORTING INFORMATION

Vapor Phase Plotting of Organosilane Chemical Gradients

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Additional data showing the dependence of the WCA on distance between the capillary and substrate for *n*-octyltrichlorosilane are provided (**Figure S1)**, as are data showing the WCA as a function of stepper motor step time for 3-cyanopropyltrichlorosilane (**Figure S2)**. Additional information on the vapor phase plotting of *n*-octyltrichlorosilane and 3-cyanopropyltrichlorosilane gradients is given in **Figure S3 and S4**, which show the stepper motor step delay profile as a function of position along each gradient. A description of how the stepper motor delay times predicted to yield linear WCA gradients were obtained is given.

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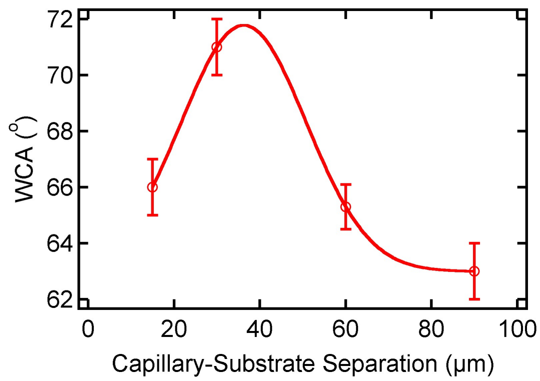

Figure S1. Water contact angle as a function of capillary-substrate separation for gradients plotted from 10 vol % octyltrichlorosilane. The solid line was added to better depict the trend in the data. The error bars depict the 95% confidence interval on each value for n = 3 measurements.

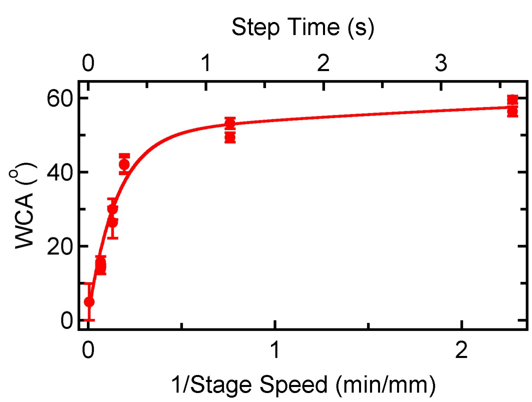

Figure S2. Water contact angle as a function of stepper motor step time (top axis) and 1/stage speed (bottom axis) for 3-cyanopropyltrichlorosilane monolayers prepared from 10 vol % silane in toluene. Both the step delay and stage speed correspond to motion along the fast raster scanning axis. The solid line was added to better depict the trend in the data. The fast rise in WCA at short step times is consistent with a fast kinetic process for the initial reaction with the surface. The error bars depict the 95% confidence interval on each value for n = 5 measurements.

Predicting Stepper Motor Step Time

Vapor phase plotting potentially allows for the gradient profile to be preprogrammed by simply altering the rate at which the capillary is raster scanned above the substrate surface. As an initial demonstration of the process required, the step times needed to achieve a linear WCA gradient were calculated and employed in plotting the gradients shown in Figure 3B,D. In making this determination, the data shown in Figure 2D and in Figure S2 were fit to double exponential functions. The step times expected to produce a linear WCA gradient were then numerically determined from the double exponential fits. The step time profiles are plotted in Figures S3 and S4 for *n*-octyltrichlorosilane and 3-cyanopropyltrichlorosilane, respectively.

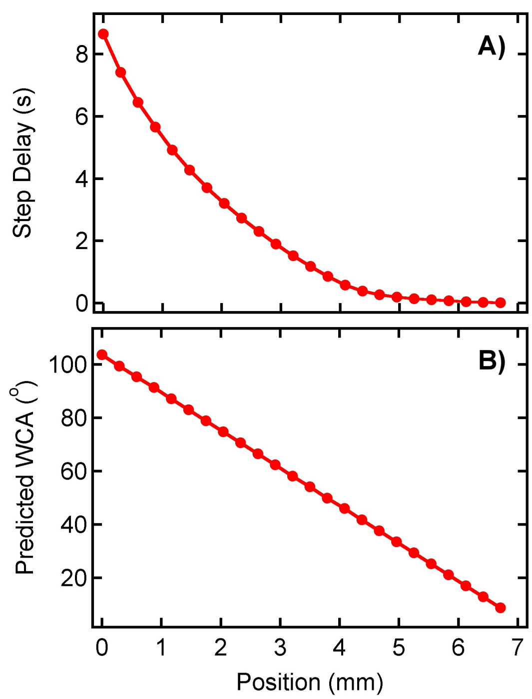

Figure S3. **A)** Stepper motor step time predicted to yield an octylsilane gradient exhibiting a linear decrease in WCA. The step time was predicted from the data shown in Figure 2D in the main body of the paper. **B)** Linear WCA gradient predicted from the step times in A). The actual WCAs obtained from gradients plotted using the step time profile in panel A are shown in Figure 3B.

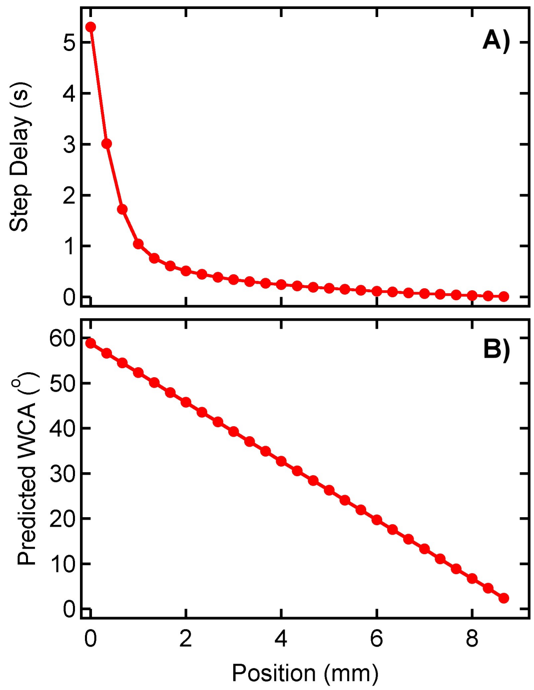

Figure S4. **A)** Stepper motor step time predicted to yield a cyanopropylsilane gradient exhibiting a linear decrease in WCA. The step time was predicted from the data shown in Figure S2. **B)** Linear WCA gradient predicted from the data in A). The actual WCAs obtained from gradients plotted using the step time profile in panel A are shown in Figure 3D.