Supporting Online Material

Materials and Methods

Surfaces with patterned chemistry were prepared using UV lithography (Fig S1). Silicon wafers were cleaned in oxygen plasma and reacted with dimethyldichlorosilane (DMDCS) (Gelest, Inc.) in the vapor phase for 3 days at 60°C. The samples were thoroughly rinsed with toluene, ethanol, and water after the reaction. A commercially available positive photoresist, Megaposit SPR220-7 (Shipley), was spin-coated onto the modified wafers. The samples were exposed to 365nm radiation through various mask patterns. The exposed regions were developed using Microposit MF-319 (Rohm and Haas). The developed samples were briefly put in an oxygen plasma to re-expose the silica surface not covered by the resist. A second silane, (tridecafluoro-1,1,2,2-tetrahydrooctyl)dimethylchlorosilane (FDCS), was then reacted with the exposed silica in the vapor phase for 3 days at 60°C to form barriers. The resist was then rinsed off using Microposit EC-11 solvent (Shipley).
**Figure S1.** Diagram of the lithographic process used to prepare silane surfaces with patterned wettability.

**Figure S2.** (a) Photograph of water droplets on a silicon wafer modified with dimethyldichlorosilane (left) and tridecafluoro-1,1,2,2-tetrahydrooctyldimethylchlorosilane (right). Dynamic contact angle values are listed below each drop. (b) Same surface as (a) tipped 90°. A 2μL water drop pins at the DMDCS/FDCS interface.
Figure S3. (a) Photograph of a dimethyldichlorosilane/FDCS binary patterned silicon wafer showing no distinction between the regions. (b,c) Ethanol wets the dimethyldichlorosilane regions, but not the FDCS lines.