Supporting Information

Direct patterning of covalent organic monolayers on silicon using nanoimprint lithography

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XPS measurements

A full monolayer of 1-hexadecene on hydrogen-terminated silicon was investigated by X-ray Photoelectron Spectroscopy (XPS). The quality of full monolayers can generally be assessed by absence of a band for SiO_2 around 103 eV in the XPS Si_{2p}-spectrum [12]. Figure S1 shows the Si_{2p}- and C_{1s}-spectra measured on a full hexadecyl monolayer. The maximum of the C_{1s}-spectrum was set at 284.8 eV, the peak for aliphatic carbon. The averaged, fitted C_{1s}-spectrum showed a ratio of C_{1s}-electrons with a low binding energy to aliphatic C_{1s}-electrons of 1:15.6. This is indicative of formation of a Si-C-C bond. It must be

noted however that the relative shift of C_{1s}-electrons with a low binding energy is very small and a visible peak for C_{1s}-electrons with a lower binding energy becomes much more apparent when the samples are prepared using 1-alkynes because of the relatively larger downfield shift [11].

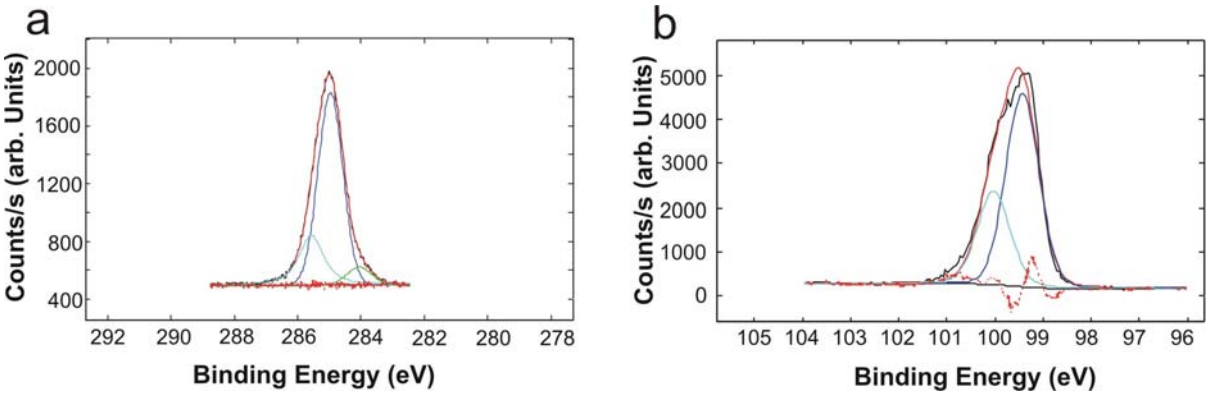

Figure S1. XPS spectra of the C_{1s} region (a) and the Si_{2p} region (b) of a full hexadecyl monolayer on Si(111).

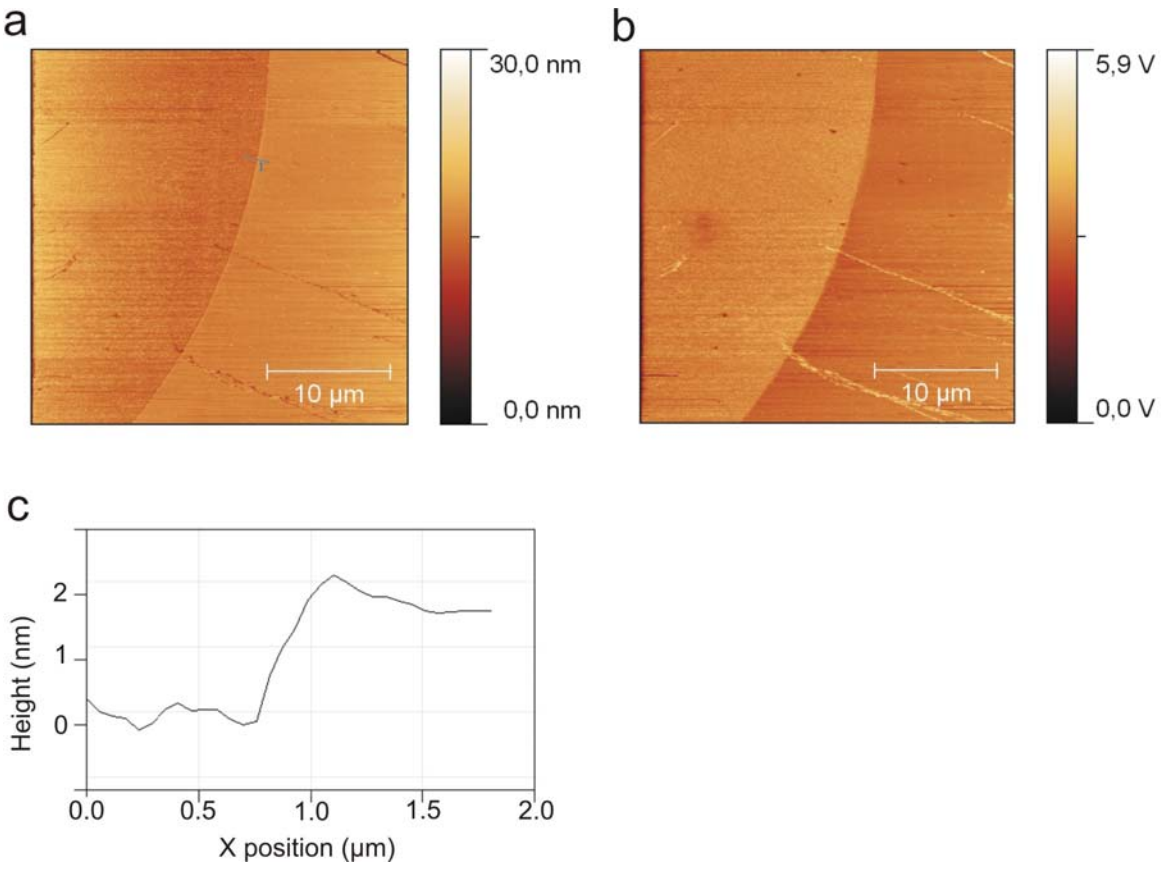

Figure S2. Contact mode AFM height (a; 30 µm x 30 µm) with height profile (c) and corresponding friction image (b) of a 100-µm patterned dot where native SiO_2 surrounding the spacings is still present.

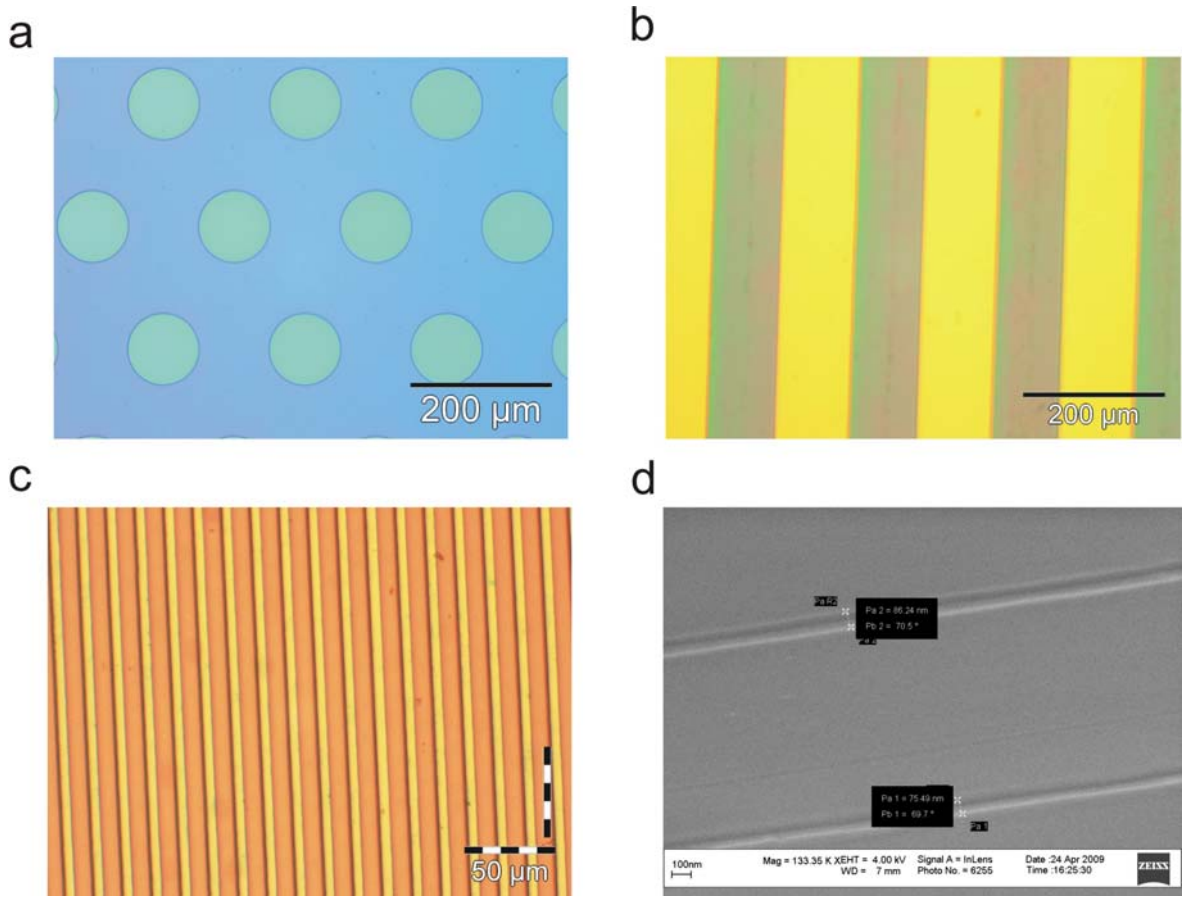

Figure S3. a) Optical microscopy images of 100-µm diameter dots (a), 100-µm lines (b), 3-µm lines (c), and HR-SEM image of 100-nm lines (d), all after NIL.