Electronic Supplementary Information for

Selective fluorination of the surface of polymeric materials after stereolithography 3D printing

Megan A. Catterton, Alyssa N. Montalbine and Rebecca R. Pompano

University of Virginia
Department of Chemistry

Contents:

Supporting Tables:

Table S1: Printing settings used for each resin on the CADworks3D M50 printer with a 405 nm light source. For all resins, the peeling speed was Slow, and gap adjustment was 0.1 mm.

Resin	Curing time (sec)	Base layers	Base curing (sec)	Buffer layers	Light power (%)	Rinsing solvent	Post-curing time
BV-007A	1.15	1	9.0	1	75	MeOH	20 sec
Green master mold	5.00	1	40	2	100	IPA	10 min
Dental	4.50	1	8.5	3	78	IPA	30 min
Plasclear	10.0	1	22	2	78	EtOH	2 min
PEG-DA	2	1	3	1	100	EtOH	30 sec

Table S2: The air/water contact angle for glass, PDMS, and BV-007A upon plasma treatment. N=2

Material	Plasma Treatment time (sec)	Contact angle (degree)
Glass	0	33 ± 2
	5	12 ± 0.3
	30	10 ± 2
PDMS	0	82 ± 5
	5	24 ± 1
	30	32 ± 7
BV-007A	0	59 ± 4
	5	58 ± 7
	30	57 ± 5

Table S3: Power conversion for ambient light exposure. Light intensity was measured with UV-Optometer (SUSS MicroTec).

Light source	Power (J/s) at 405 nm	Equivalent Dosage Time[+]
Ambient light	0.09	32 Days
Light Box	734	360 Seconds

[+]Ambient equivalent exposure time was calculated from the following equation:

$$Time\ (Day) = \frac{Light\ box\ dose\ (J) * 1\ (Day)}{Amibent\ light\ intensity\ \left(\frac{J}{s}\right) * 86400\ (s)}$$

Supporting Figures:

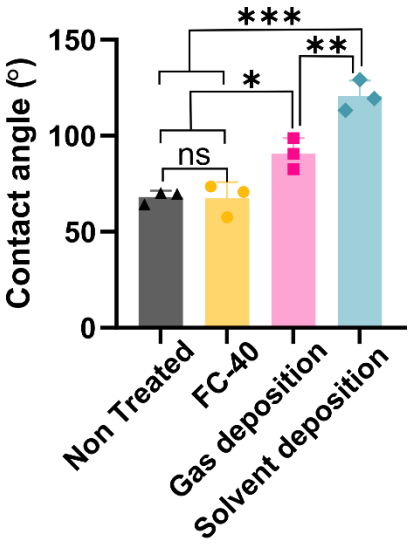

*Figure S1: Air/water contact angles of BV007A after no treatment, immersion in FC-40 oil, or silanization by either gas-phase or solution-phase (FC-40 solvent) deposition (n=3, mean ± std dev). The surfaces were not exposed to air plasma activation. One-way ANOVA with Tukey's multiple comparisons. (*p<0.05, ** p<0.005, and ***p<0.0005)*

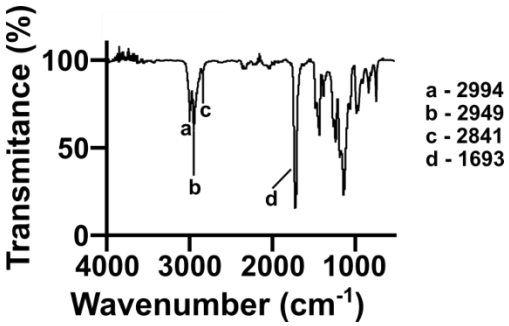

Figure S2: The ATR FT-IR spectra of a 1.5 mm acrylic sheet (McMaster-Carr, Princeton, NJ USA). Peaks a, b, and c were assigned to the sp^3 C-H stretching in the polymer backbone. Peak d was assigned to the carbonyl group.

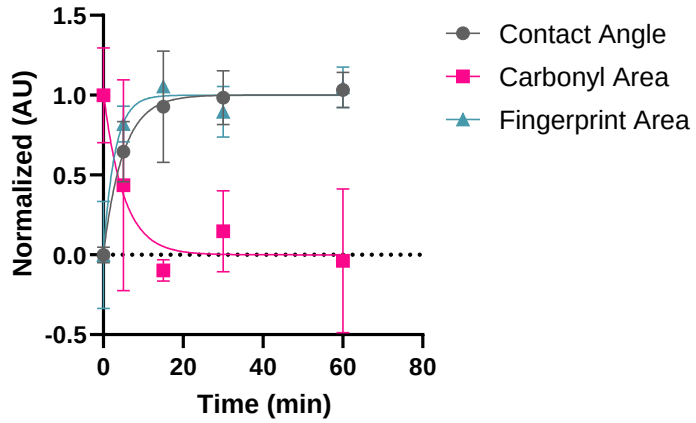

Figure S3: Normalized data of the contact angle, carbonyl peak area, and fingerprint area after various amount of time exposed to the fluoroalkyl silane. Data was normalized using the equation $y_{normalized} = (y - min)/(max - min)$*, where min and max were the min and max y-values of the original data, respectively (i.e. the mean value at t = 0 and the plateau). The data were fit to one-phase exponential curves. Contact angle:* $y = 1 - 0.003e^{-0.2x}$*,* R^2 *=0.8437. Carbonyl area:* $y = 1e^{-0.2x}$*,* R^2 *=0.5109. Fingerprint area:* $y = 1 - 0.0006e^{-0.3x}$*,* R^2 *=0.8545.*

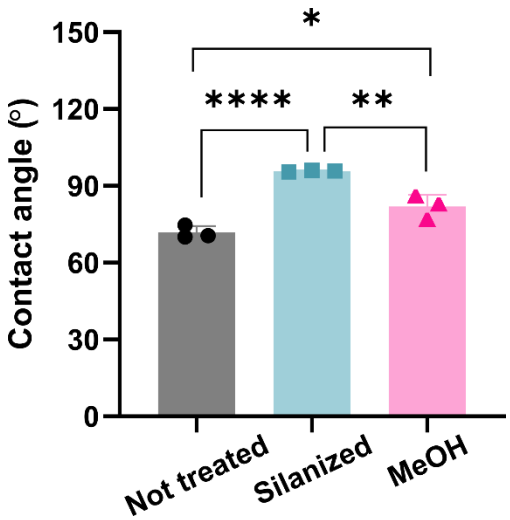

*Figure S4: Air/water contact angles of acrylic (McMaster-Carr, Princeton, NJ USA) after no treatment, silanization by the optimized method, or silanization followed by immersion in methanol for 2 hr (n=3, mean ± std dev). The surfaces were not exposed to air plasma activation. One-way ANOVA with Tukey's multiple comparisons. (*p<0.05, ** p<0.005, and ****p<0.0001)*