Supporting Information

3D Printable Acrylate Polydimethylsiloxane Resins for Cell Culture and Drug Testing

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Printing Parameters

Table S1. printing parameters for each TEGORad formulation

Dye Concentration wt.%	Range	Exposure Time s	Separation Velocity mm/s	Light Intensity mW/cm^2	Wait Time (After Approach) s
0.075	Burn-in	7.0	2.7		
	1	6.0	2.7		
	2	5.0	2.0	48	0.5
	3	4.0	2.0		
	4	3.0	1.5		
0.05	Burn-in	5.0	2.0		
	1	4.5	2.0		
	2	3.5	1.5	48	0.5
	3	3.0	1.0		
	4	2.7	1.0		
0.01	Burn-in	3.5	1.5		
	1	3.0	1.5		
	2	2.5	1.0	48	0.5
	3	2.0	1.0		
	4	1.5	1.0		

DMTA analysis

The modulus has been evaluated only on the PDMS and Acrylate PDMS samples at 0.075 wt.% dye as this Acrylate PDMS formulation is the most different from the reference material (Sylgard 184). It is well known that PDMS, being a linear siloxane molecule characterized by

Si-O groups, shows a single glass transition temperature, that is, a single mobility changes at -120 ° C.[1] In Figure S1 it is possible to see the modulus curve from -80°C and while in PDMS the modulus shows a continuous and smooth reduction, in Acrylate PDMS it is possible to notice a sharp transition at indicatively -50°C.

Anyway, approaching room temperature, the modulus of Acrylate PDMS is very similar to the one of PDMS, resulting in similar flexibility of the two materials.

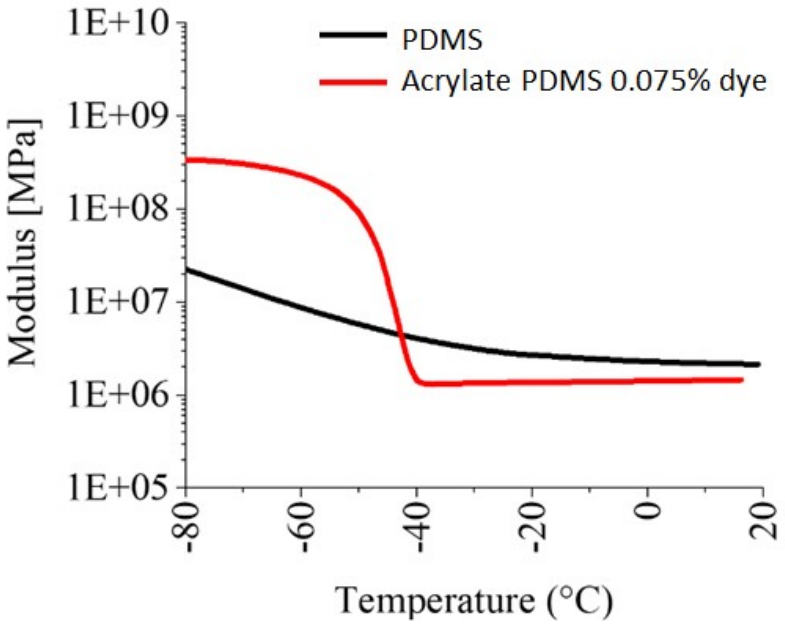

Figure S1. PDMS and Acrylate PDMS 0.075% dye modulus resulting from DMTA analysis.

Surface Characterization after plasma O_2

The materials were subjected to O_2 plasma treatment and the surface properties were analyzed by means of contact angle analysis (OCA) and Attenuated Total Reflection FT-IR and surface profiler. OCA measurements (Table S2) show that as-prepared materials have very hydrophobic surfaces ($\Theta_{H2O} > 100°$ for all the tested specimens), while, as expected, surface energies increase after plasma treatment. This is related to an increase of the polar component, which results in low contact angle with water drop (i.e. hydrophilic surfaces).

Table S2. OCA output on the tested surfaces

Samples	Contact Angle value (Θ)		Surface Energy (SE)		
	H_2O	CH_2I_2	Dispersive	Polar	Total
PDMS	104.1	87.9	3.63	23.16	26.79
PDMS PLO_2	49.1	58.4	20.35	24.59	44.94
Acrylate PDMS 0.01% dye	105.2	94.8	9.97	0.67	10.65
Acrylate PDMS 0.01% dye PLO_2	38.8	55.5	19	38.66	57.66
Acrylate PDMS 0.05% dye	123.4	101.5	8.41	0.3	8.71
Acrylate PDMS 0.05% dye PLO_2	29.1	48	23.88	40.41	64.29
Acrylate PDMS 0.075% dye	142.5	119.3	2.97	0.05	3.03
Acrylate PDMS 0.075% dye PLO_2	17.7	44	26.81	42.6	69.41

Also ATR measurements are in good agreement with these results. In Figure S2, pristine surfaces are compared. As it is possible to observe, all the spectra are very similar, evidencing typical main absorption peaks of PDMS 785 cm^{-1} ($-CH_3$ rocking and Si-C stretching in Si-CH_3), 1006 cm^{-1} (Si-O-Si stretching), 1260 cm^{-1} (CH_3 deformation in Si-CH_3), and 2960 cm^{-1} (asymmetric CH_3 stretching in Si-CH_3). After plasma O_2 (Figure S2b) an additional large hydroxyl band around 3400 cm^{-1} appears (grey rectangle in the graphs), indicating the presence of polar groups and oxidation of the surface. The presence of such polar groups is consequently reflected in an increase of hydrophilicity, as evidenced by OCA.

Interestingly, as also observed in OCA, increasing the amount of dye, larger oxidation and, in turns, higher hydrophilicity is achieved. This result is quite surprising considering the low amount of dye present in the tested formulations and needs further investigations in the future, aiming at using this ingredient to better tailor the surface properties.

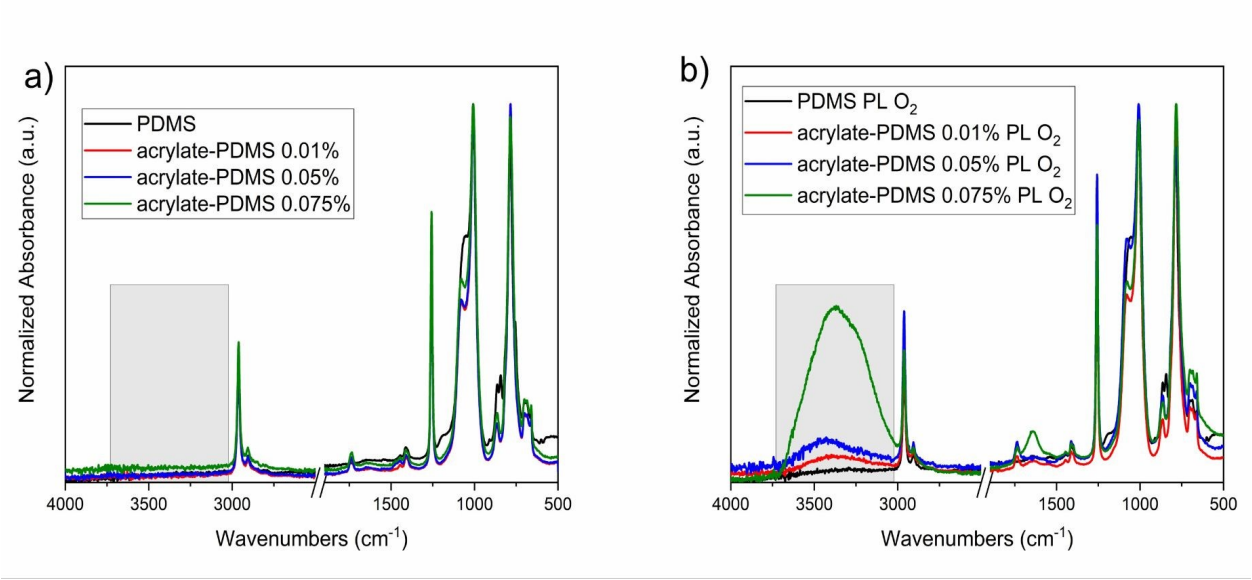

Figure S2. ATR spectra of a) as-prepared materials and b) of the materials' surfaces after plasma O_2 treatment.

Surface roughness measurements showed a decrease of Ra value, i.e. the average surface roughness for the length of the measurement performed, in O_2 plasma treated samples (Table S3). A smoother surface after the treatment is surely due to the etch process occurring during the plasma process.

Table S3. Surface Roughness output on the tested surfaces

Samples	Ra (micron)
PDMS	1.8
PDMS PLO_2	0.6
Acrylate PDMS 0.01% dye	1.4
Acrylate PDMS 0.01% dye PLO_2	0.4
Acrylate PDMS 0.05% dye	1.5
Acrylate PDMS 0.05% dye PLO_2	0.7
Acrylate PDMS 0.075% dye	1.3
Acrylate PDMS 0.075% dye PLO_2	0.8

[1] A. P. Munaro, G. P. da Cunha, J. G. Filgueiras, J. M. Pinto, M. Munaro, E. R. de Azevedo, L. C. Akcelrud, *Polymer Degradation and Stability* **2019**, *166*, 300.