ELECTRONIC SUPPLEMENTARY INFORMATION

Clear Castable Polyurethane Elastomer for Fabrication of Microfluidic Devices

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Table 1. Polyurethane bonding evaluation.

Bonding time	PU-PU 2-minute corona treatment		PU-Glass 2-minute corona treatment		Control PU-PU, no corona treatment		PU-PDMS 2-minute corona treatment	
Hours at 60 °C	Bonding	Yellowing	Bonding	Yellowing	Bonding	Yellowing	Bonding	Yellow
1	Fair	None	Good	None	Poor	None	Poor	None
2	Good	None	Good	None	Poor	None	Fair	None
20	Excellent	Moderate	Excellent	Moderate	Poor	None	Fair	Minimal
66	Excellent	Heavy	Excellent	Heavy	N/A	N/A	N/A	N/A
	PU-PU 5-minute corona		PU-PU 1-minute corona		Bonding pressure: 14 kPa psi for all anneal time except 66 hrs 7 kPa for 66 hrs			
	Bonding	Yellowing	Bonding	Yellowing				
1	N/A	N/A	N/A	N/A				
2	N/A	N/A	N/A	N/A				
20	N/A	N/A	N/A	N/A				
66	Excellent	Heavy	Fair	Minimal				

Table 2. Shear bond strength evaluation for polyurethane that was corona-treated for 2 minutes. Bonding was performed at 23.7°C, 40°C, and 60°C.

Time (hours)	Pressure (kPa)	Shear bond strength (kPa)		
		60 °C	40 °C	23.7 °C
8	14	105	92	85
	7	110	100	90
	3.5	112	101	87
4	14	97	93	82
	7	102	99	92
	3.5	104	99	89
2	14	83	93	87
	7	89	85	87
	3.5	101	94	82

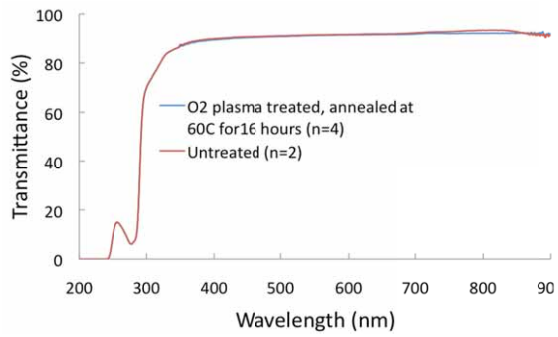

Fig. 1 Comparison of optical transmittance of untreated and treated GS polyurethane over the UV-Visible-NIR spectrum. The plots are average values of four treated and two untreated samples of ~ 2 mm in thickness. Treatment of the samples was mimicking the bonding process with the bonding time doubled.

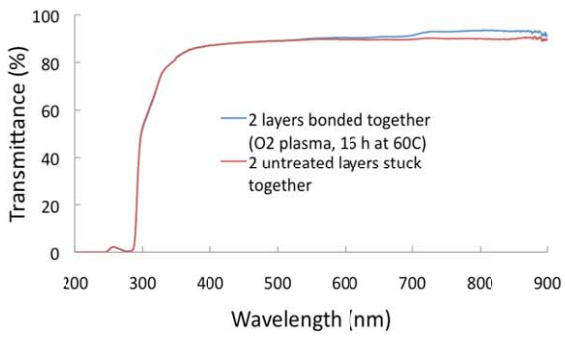

Fig. 2 Comparison of optical transmittance of two treated polyurethane layers bonded together with two untreated layers stuck together over the UV-Visible-NIR spectrum.

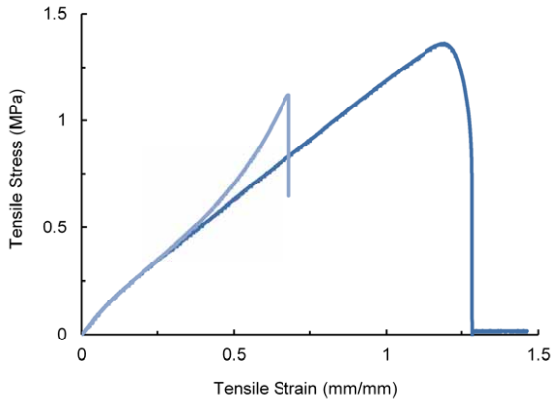

Fig. 3 Stress-strain curves for Sylgard 184 PDMS samples tested to failure under tensile strain. Samples failed at the grips. The 25 mm long samples were tested at a strain rate of 30 mm/min.

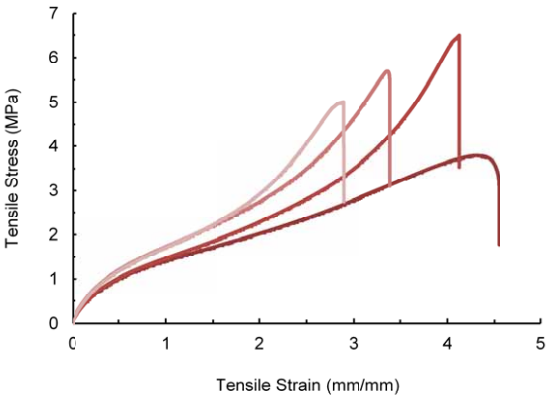

Fig. 4 Stress-strain curves for GS polyurethane samples tested to failure under tensile strain. Samples failed at the grips. The 25 mm long samples were tested at a strain rate of 30 mm/min.

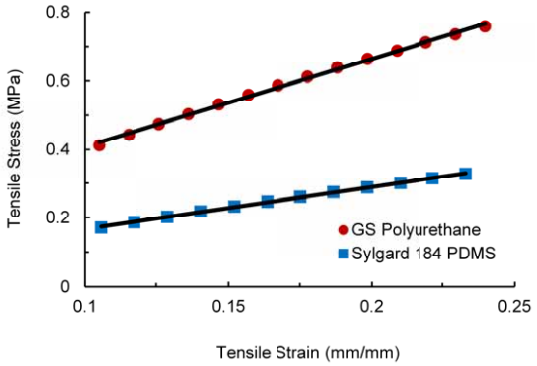

Fig. 5 Linear portion of the stress vs strain curves of two representative Sylgard 184 PDMS and GS polyurethane samples tested to failure under tensile strain. Young's modulus for the two samples was determined via linear regression between 10 and 25% strain, after data binning. In this case, the Young's Moduli were determined to be 1.22 MPa (R^2=0.999) for PDMS and 2.56 MPa (R^2=0.998) for polyurethane. The 25 mm long samples were tested at a strain rate of 30 mm/min.

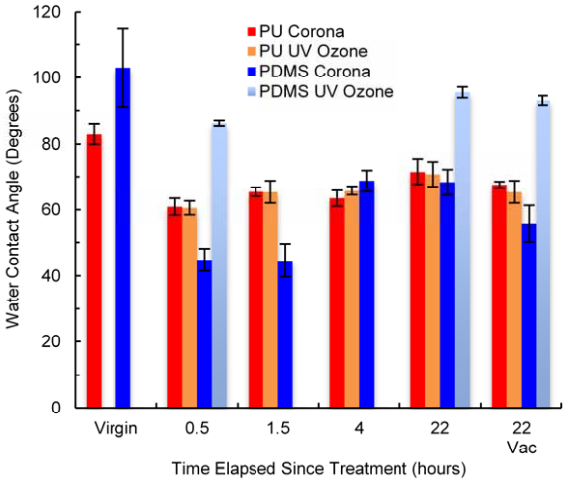

Fig. 6 Comparison of hydrophobic recovery of polyurethane and PDMS. Samples were treated with corona and UV ozone for 2 and 10 minutes, respectively. Error bars are standard deviations. N=3.

Fig. 7 HUVE cells cultured on oxygen plasma treated ClearFlex 50 polyurethane coated with fibronectin.

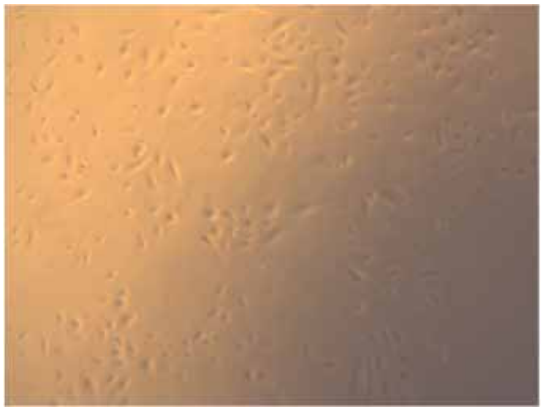

Fig. 8 HUVE cells cultured on tissue culture treated polystyrene.

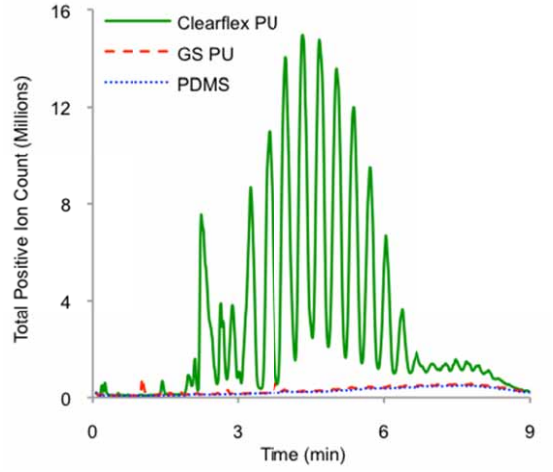

Fig. 9 Liquid chromatography-mass spectrometry of leachable from cured polyurethane elastomers and Sylgard 184 PDMS.

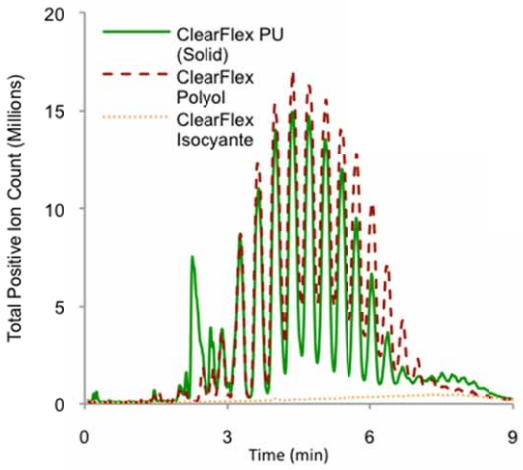

Fig. 10 LC-MS analysis of leachables from ClearFlex 50 polyurethane components.