

Supplementary Information for

Selective functionalization of PDMS-based photonic lab on a chip for biosensing

Bergoi Ibarlucea^a, César Fernández-Sánchez^{a,*}, Stefanie Demming^b, Stephanus Büttgenbach^b and Andreu Llobera^{a,*}

^a Instituto de Microelectrónica de Barcelona, IMB-CNM (CSIC), Campus UAB, 08193, Bellaterra, Spain

^b Institut für Mikrotechnik, Technische Universität Braunschweig, 38124-Braunschweig, Germany.

* To whom correspondence should be addressed: andreu.llobera@imb-cnm.csic.es, cesar.fernandez@imb-cnm.csic.es

Contents:

Figures S1-S8

Table S1

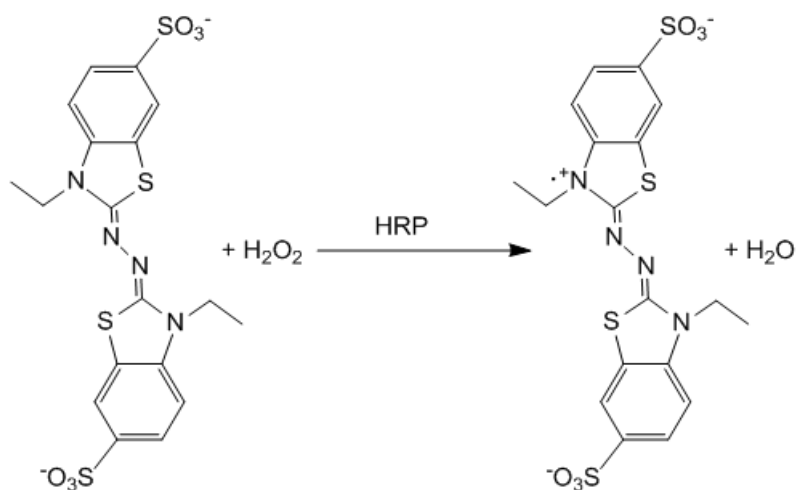


Figure S1. HRP-catalyzed reduction of hydrogen peroxide mediated by colourless ABTS, which generates water and green-colour ABTS radical cation counterpart.

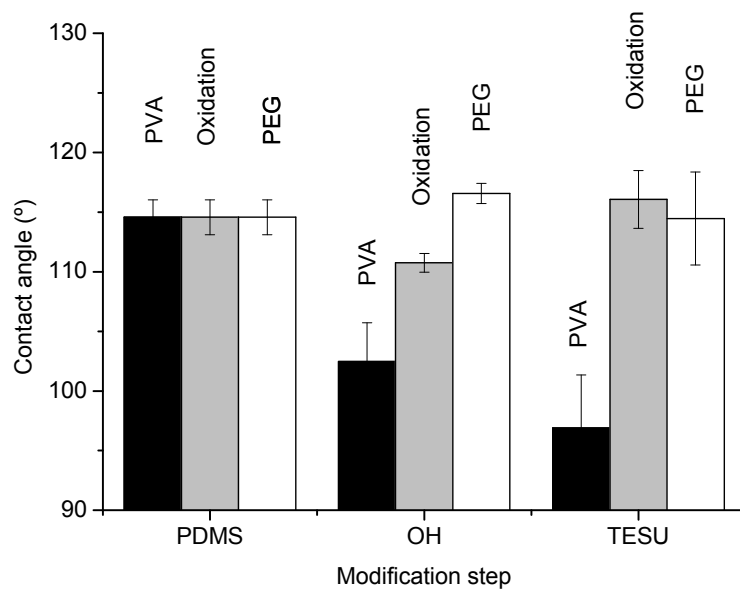


Figure S2. Contact angle values measured following every step of each modification procedure. Error bars correspond to the standard deviation of three replicates.

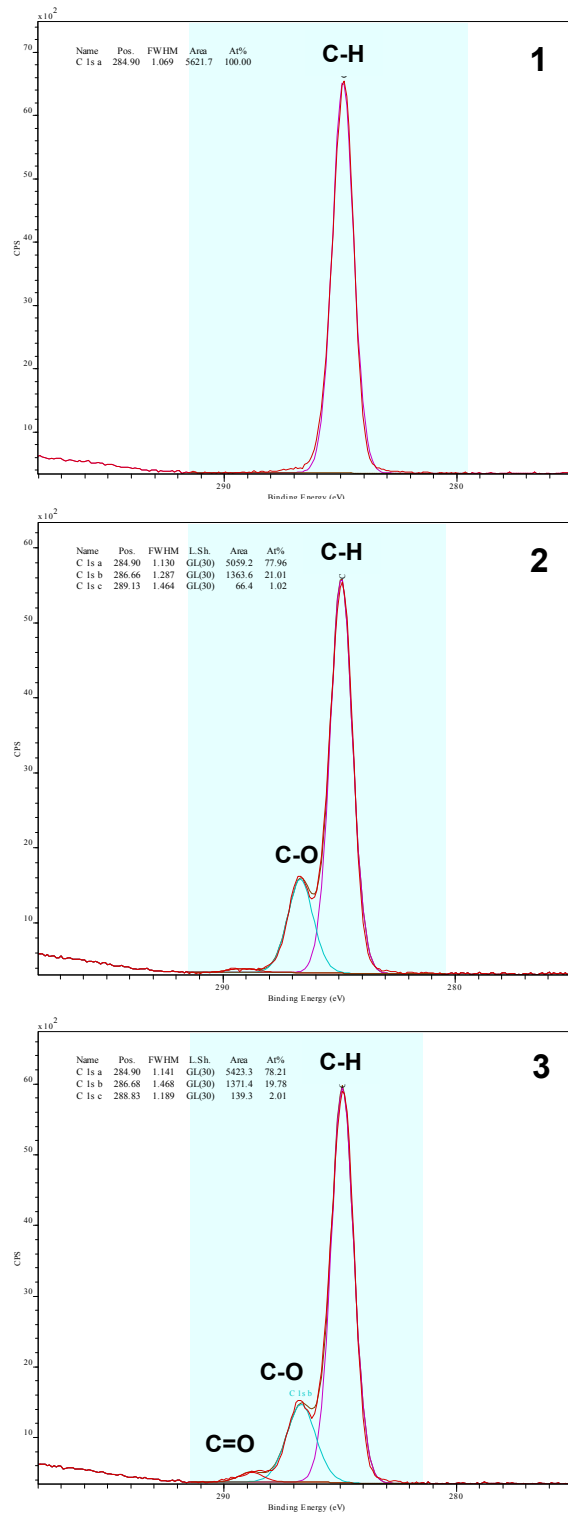


Figure S3. High resolution XPS spectra of the C (1s) region corresponding to intact PDMS (1), after the adsorption of PVA (2) and after the silanisation process with TESU (3).

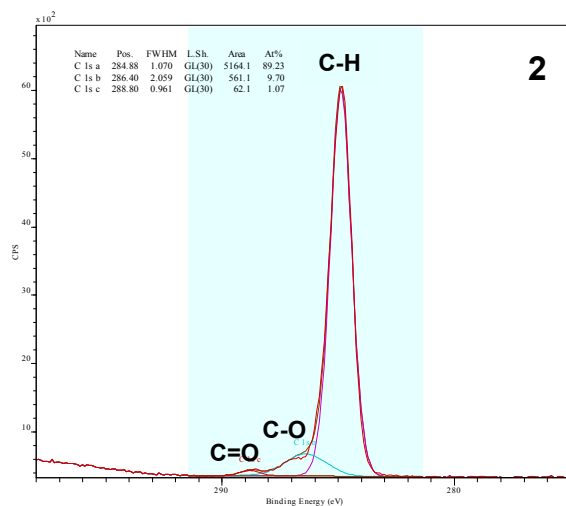
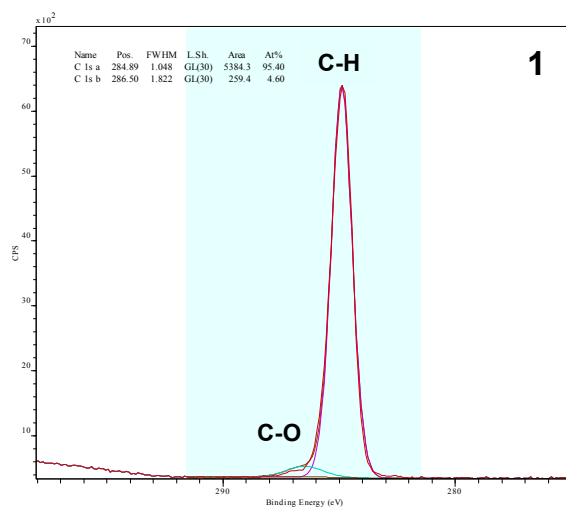


Figure S4. High resolution XPS spectra of the C (1s) region corresponding to PEG-modified PDMS before (1) and after (2) the silanization process with TESU.

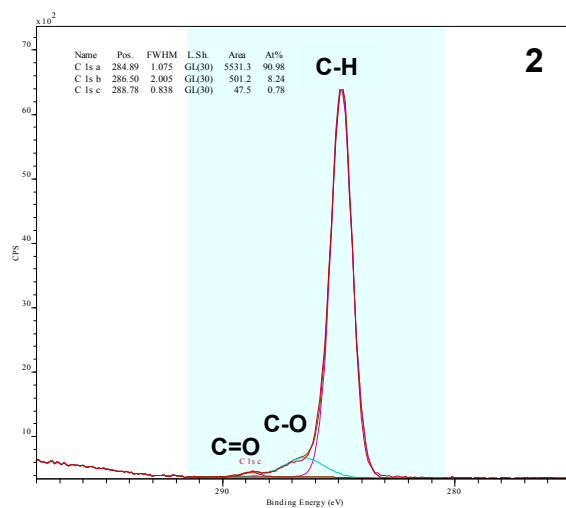
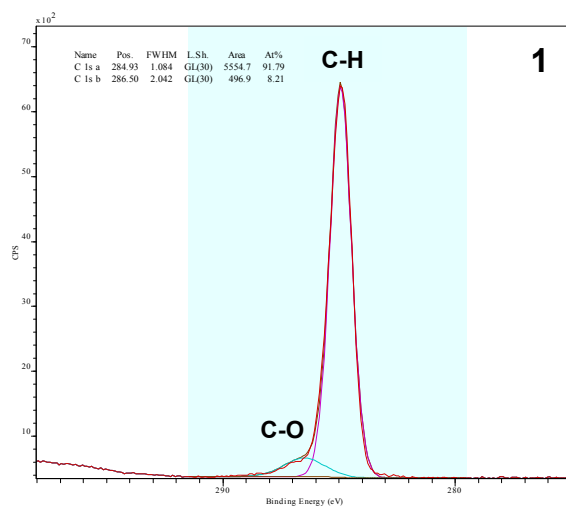


Figure S5. High resolution XPS spectra of the C(1s) region corresponding to PDMS after the chemical oxidation (1) and after the silanisation process (2).

Sample	Bond	Position / eV	Atomic percentage
PDMS	C-H	284.90	100
PDMS+ PVA	C-H	284.90	77.96
	C-O	286.68	22.06
PDMS +PVA+ TESU	C-H	284.90	78.21
	C-O	286.68	19.78
	C=O	288.83	2.01
PDMS+ PEG	C-H	284.89	95.40
	C-O	286.50	4.60
PDMS + PEG + TESU	C-H	284.89	89.23
	C-O	286.50	9.70
	C=O	288.80	1.07
Oxidation	C-H	284.93	91.79
	C-O	286.50	8.21
Oxidation + TESU	C-H	284.93	90.98
	C-O	286.50	8.24
	C=O	288.78	0.78

Table S1. C percentages corresponding to the different chemical groups introduced on the PDMS surface alter each modification step.

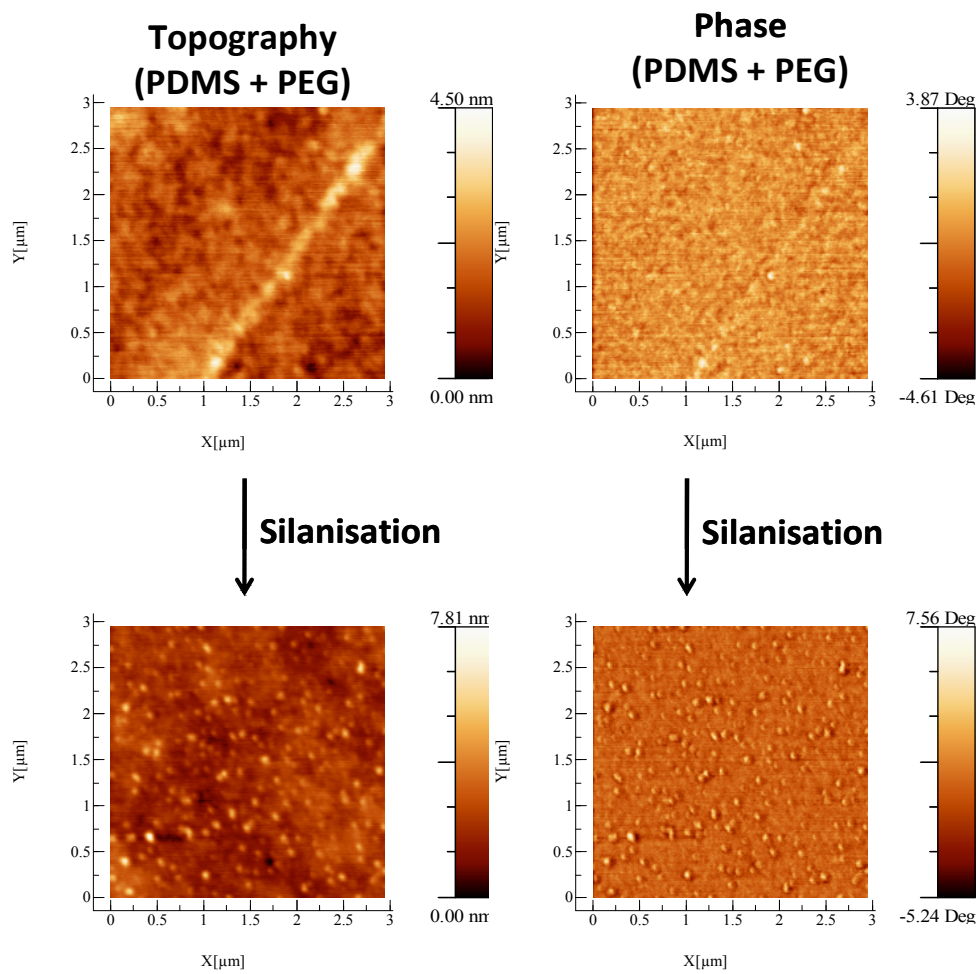


Figure S6. Topographic and phase AFM pictures of the PDMS surface after the modification with PEG and further silanisation with TESU.

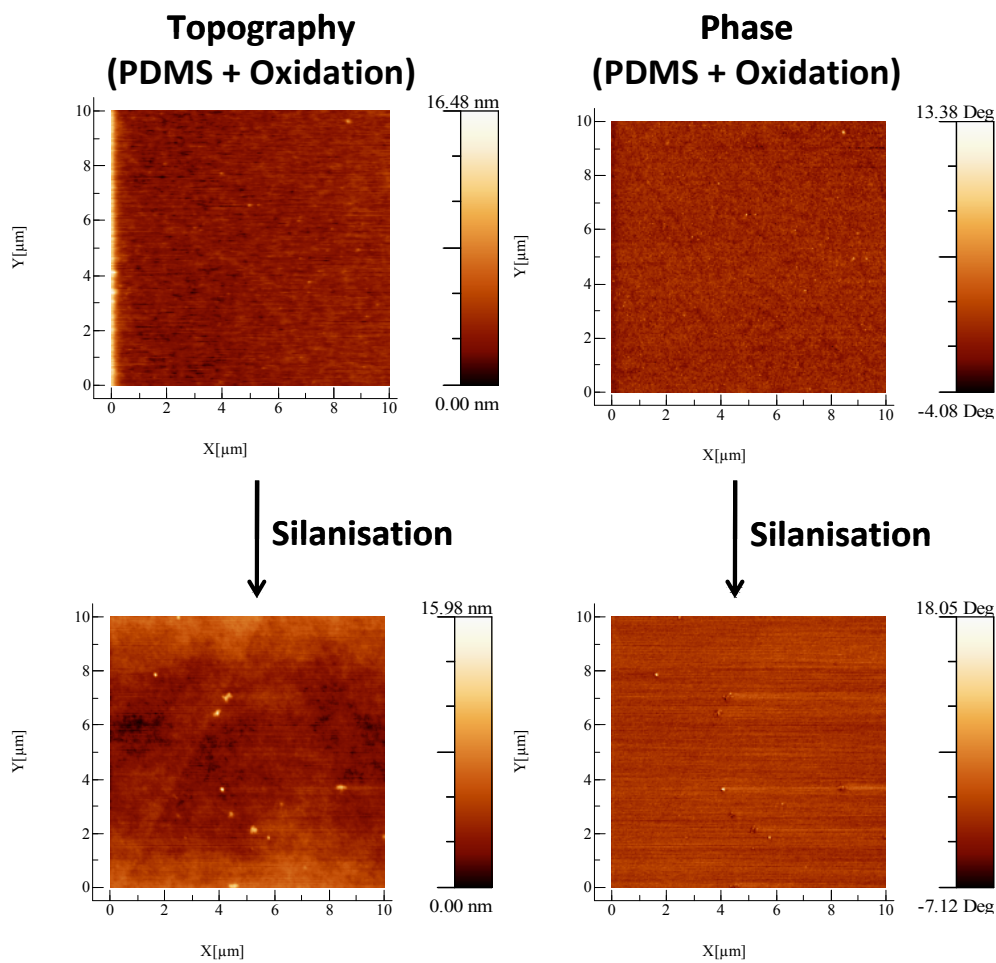


Figure S7. Topographic and phase AFM images of the PDMS surface after the chemical oxidation and further silanisation with TESU.

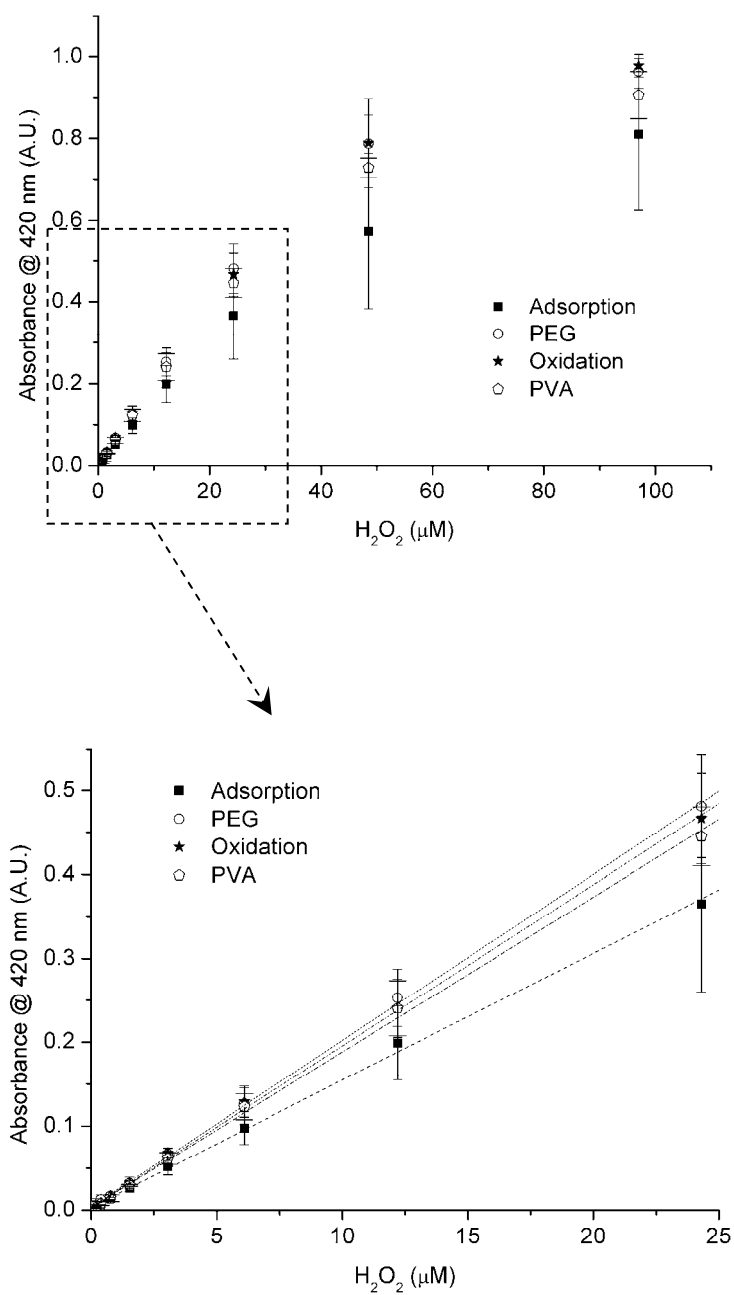


Figure S8. Calibration plots recorded with the different biosensor approaches. Each point is the mean value obtained for each hydrogen peroxide concentration in three different experiments, the error bars being the corresponding standard deviation. A linear range from 0 to 24.3 μM H₂O₂ was obtained in all cases.