

## Supporting Information

### Carbon electrode obtained via pyrolysis of plasma-deposited parylene-C for electrochemical immunoassays

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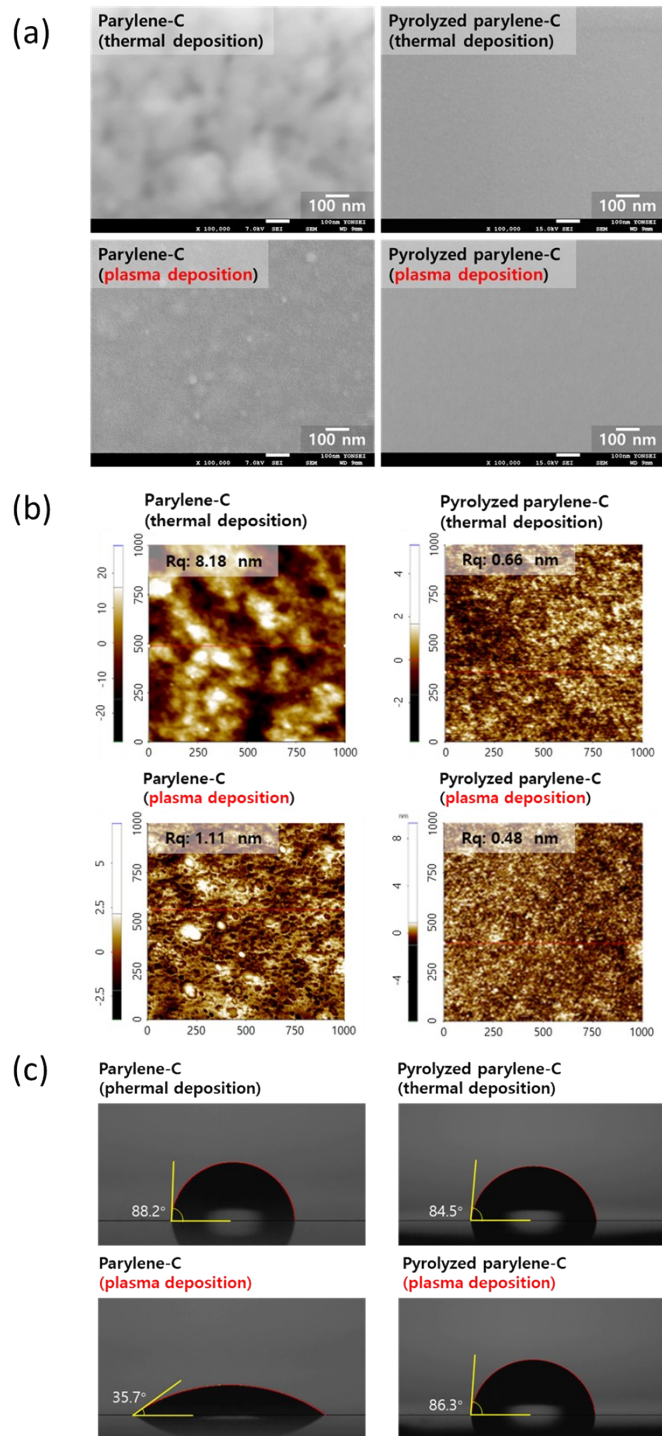


Fig. S1. Surface analysis of parylene-C obtained via thermal and plasma deposition. (a) Scanning electron microscopy images, (b) atomic force microscopy analyses, and (c) contact angle measurements

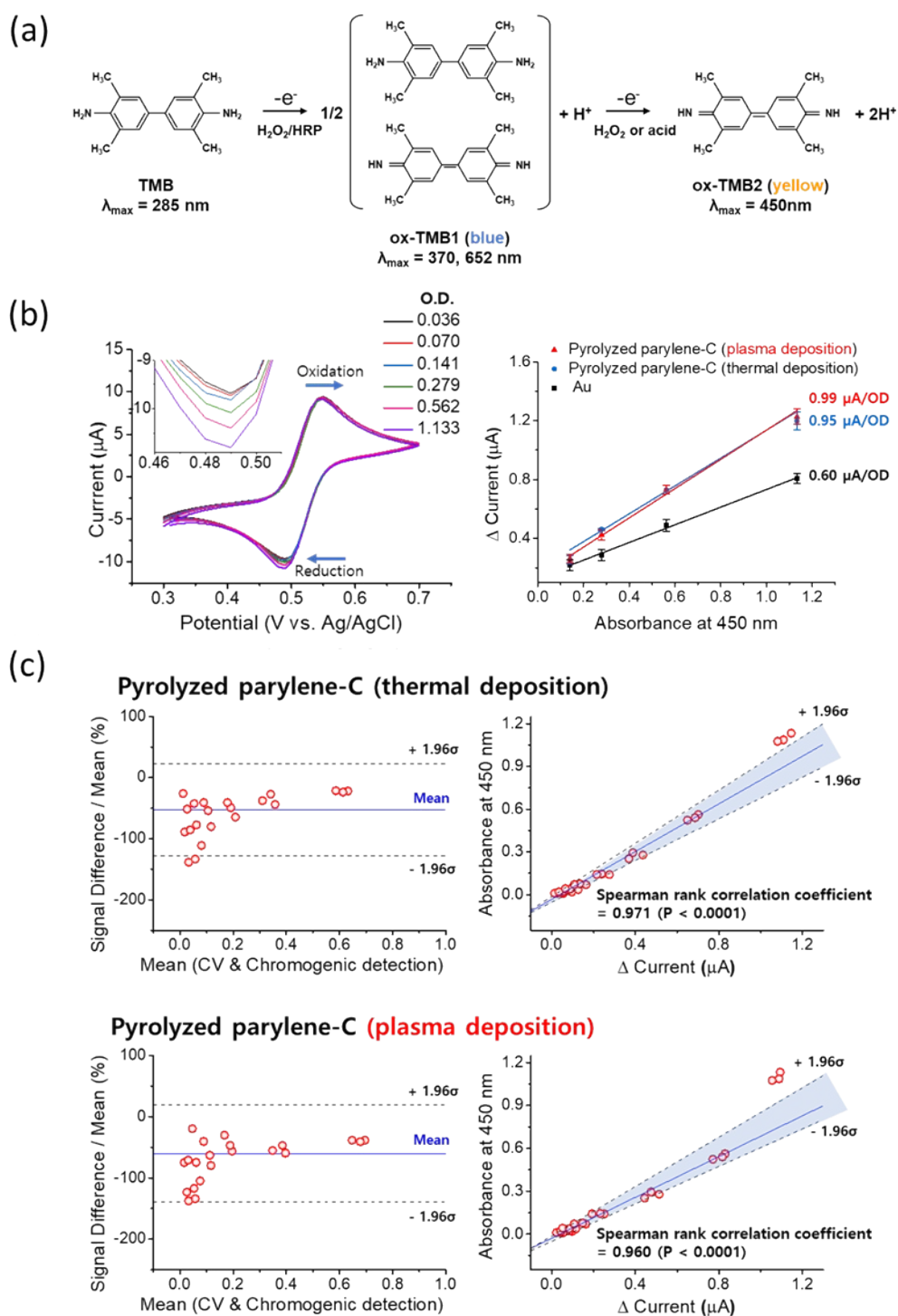


Fig. S2. TMB analysis using pyrolyzed parylene-C in electrochemical and conventional chromogenic measurements. (a) Redox reaction of TMB. (b) Cyclic voltammetry (CV) of TMB with absorbance at 450 nm (OD) values using pyrolyzed parylene-C obtained via thermal and plasma deposition. (c) Statistical comparison of TMB analysis using the Bland-Altman test and Passing-Bablok regression.

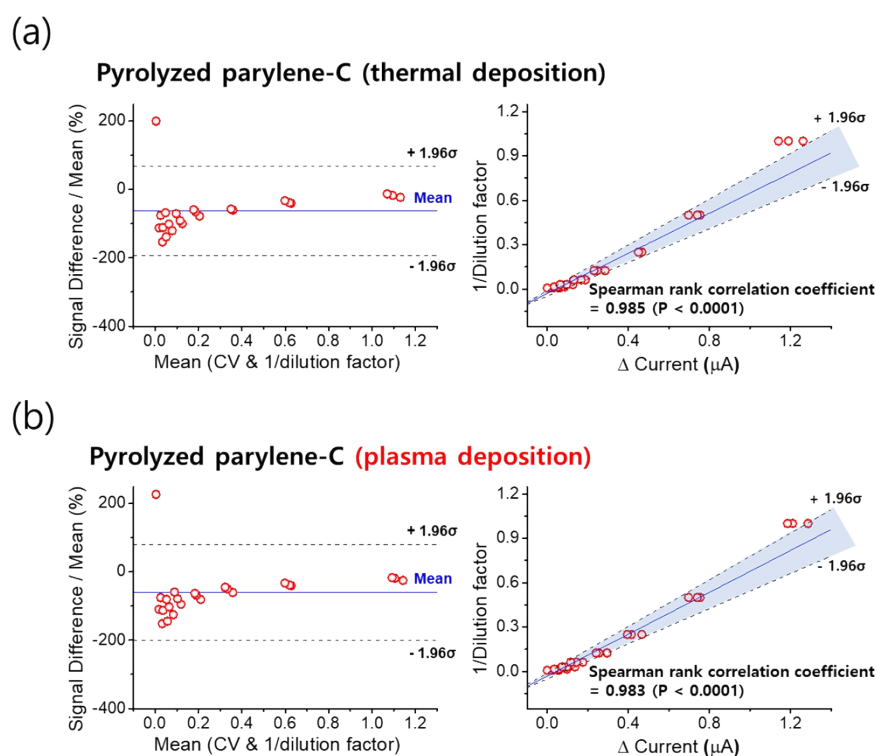


Fig. S3. Statistical comparison of ELISA for the diagnosis of human hepatitis-C and electrochemical analysis with pyrolyzed parylene-C obtained via (a) thermal and (b) plasma deposition using Bland-Altman test and Passing-Bablok regression.

Table S1. Peaks in the Fourier transform infrared spectra of parylene-C films obtained via thermal and plasma deposition before and after pyrolysis.

Wave number (cm <sup>-1</sup> )	Assignment	Before pyrolysis		After pyrolysis		Type
		Thermal	Plasma	Thermal	Plasma	
3018	Aromatic C–H stretching	O	O	X	X	3
2924	Aliphatic CH <sub>2</sub> , CH <sub>3</sub> stretching	O	O	O	O	1
2850	Aliphatic CH <sub>2</sub> , CH <sub>3</sub> stretching	O	O	O	O	1
1705	C=O stretching	X	O	O	O	2
1669	C=C stretching	X	X	O	O	4
1608	C=C stretching	O	O	X	X	3
1555	C=C stretching	O	O	X	X	3
1491	Bending of sp <sup>2</sup> C–H bonds in aromatic rings	O	O	X	X	3
1450	C–H bending	O	O	X	X	3
1397	C–H bending	O	O	X	X	3
1200	C–O stretching	O	O	X	X	3
1155	C–O stretching	O	O	X	X	3
1101	C–O stretching	O	O	X	X	3
1045	Vibrational stretches of C–Cl attached to aromatic ring	O	O	X	X	3
875	C–H bending	O	O	X	X	3
823	C–H bending	O	O	X	X	3
687	C=C bending	O	O	X	X	3

- 1: Peaks observed for parylene-C films obtained via both deposition methods before and after pyrolysis.
- 2: Peaks observed only for the plasma-deposited parylene-C film (before pyrolysis).
- 3: Peaks observed for parylene-C films obtained via both deposition methods but not observed after pyrolysis.
- 4: Peaks only observed after pyrolysis

Table S2. Atomic compositions of the parylene-C films prepared via thermal and plasma deposition (at. % : atomic composition in percentage) according to X-ray photoelectron spectroscopy.

Deposition method	Pyrolysis	C (at. %)	N (at. %)	O (at. %)	Cl (at. %)	C 1S chemical state (at. %)						sp <sup>2</sup> C/sp <sup>3</sup> C
						sp <sup>2</sup> C	sp <sup>3</sup> C	sp <sup>3</sup> C-OH	sp <sup>2</sup> C=O	sp <sup>3</sup> C-N	sp <sup>2</sup> C-Cl	
Thermal deposition	before	89.2	0	0.5	10.3	73.3	20.8	-	-	-	5.9	3.5
	after	96.5	0	3.5	0	70.8	18.2	7.0	4.0	-	-	3.9
Plasma deposition	before	71.0	10.7	14.6	3.7	33.9	17.1	14.3	18.4	12.7	3.6	2.0
	after	97.0	1.4	1.6	0	72.5	18.6	6.0	2.9	-	-	3.9

Table S3. Raman peaks of the thermally or plasma-deposited parylene-C films before and after pyrolysis.

Wave number (cm <sup>-1</sup> )	Assignment	Before pyrolysis		After pyrolysis		Type
		Thermal	Plasma	Thermal	Plasma	
630.8	C-Cl stretching	O	O	X	X	3
691.8		O	O	X	X	3
952.3	C-O-C stretching	O	O	X	X	3
1008	symmetric ring breathing	O	O	X	X	3
1211	C-H in-plane deformations	O	X	X	X	2
1340	CH <sub>2</sub> wagging And twisting vibrations	O	X	X	X	2
1443.2	CH scissoring in CH <sub>2</sub> , C=C in-plane vibrations of the aromatic ring	O	X	X	X	2
1610.7		O	O	X	X	3
2710.3	C-H stretching vibrations of the aromatic ring	X	O	X	X	1
2859.2		O	X	X	X	2
2930.9		O	X	X	X	2
3050.5		O	X	X	X	2
1361.1~1366.4	D peak	X	X	O	O	4
1595.9~1597.1	G peak	X	X	O	O	4

1: Peaks observed only for the plasma-deposited parylene-C film (before pyrolysis).

2: Peaks observed only for the thermally deposited parylene-C film (before pyrolysis).

3: Peaks observed in the parylene-C films obtained via both deposition methods (before pyrolysis).

4: Peaks observed only after pyrolysis.

Table S4. Electrochemical parameters of pyrolyzed parylene-C obtained via thermal and plasma deposition.

	$C_{dl}$ ( $\mu\text{F}/\text{cm}^2$ )	$k_{app}$ ( $\text{cm}/\text{s}$ )	Electrochemical Window vs. (Ag/AgCl)
Pyrolyzed parylene-C (thermal)	2.20	$1.2 \times 10^{-3}$	-1.0~2.1 V
Pyrolyzed parylene-C (plasma)	2.10	$1.1 \times 10^{-3}$	-1.0~2.1 V