Supporting Information

A bacterial cellulose-based $LiSrVO_4:Eu^{3+}$ nanosensor platform for smartphone sensing of levodopa and dopamine: point-of-care diagnosis of Parkinson's disease

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FIGURES

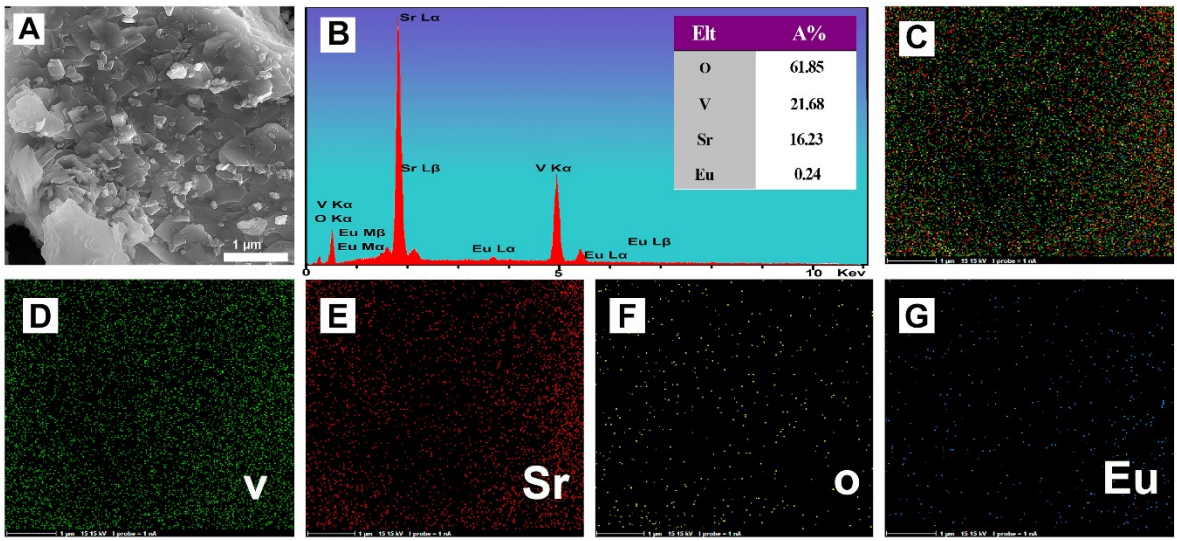

Fig. S1 FESEM images of (A) LSV:0.015Eu^{3+} nanoplates and corresponding (B) Energy-dispersive X-ray (EDX) spectra, (C) mixed elemental mapping, (D) V, (E) Sr, (F) O and (G) Eu.

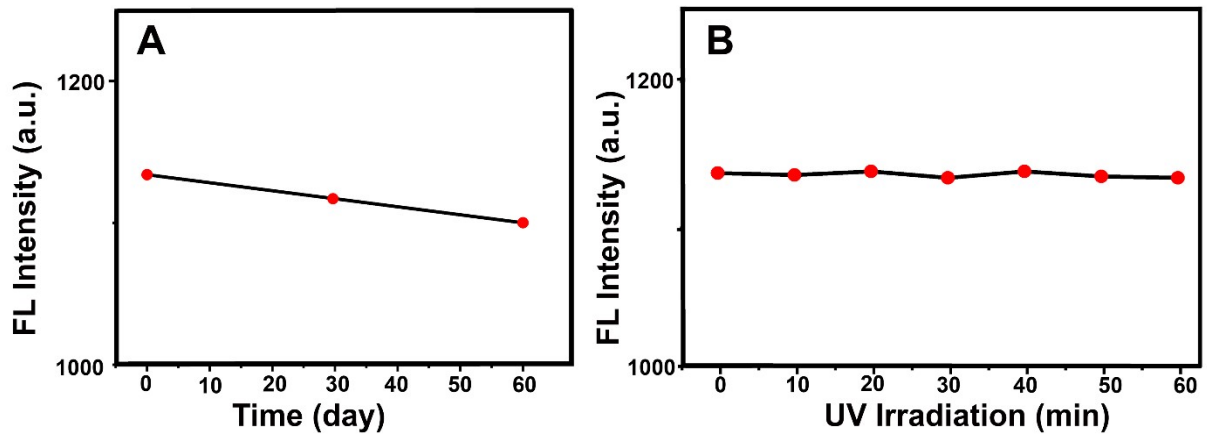

Fig. S2 Stability of LSV:0.015Eu^{3+} at different (A) storage time, (B) UV irradiation time.

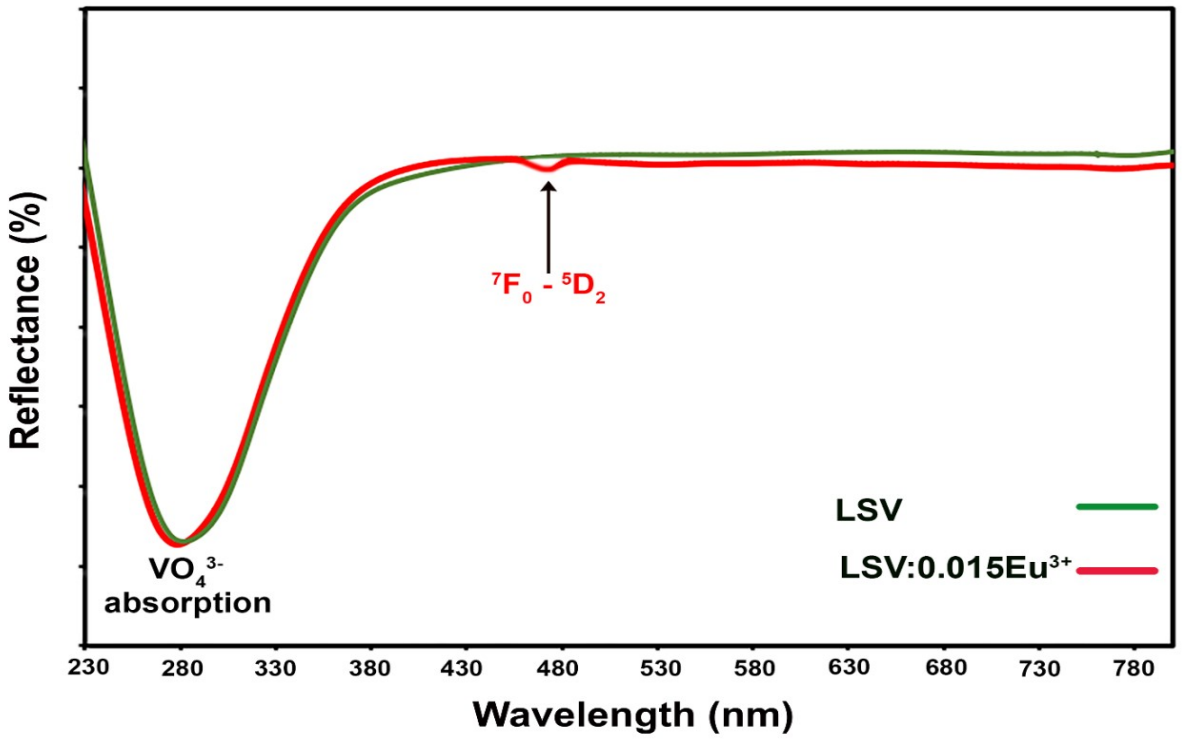

Fig. S3 Diffuse reflectance spectra of LSV and LSV:0.015Eu^{3+} nanoplates.

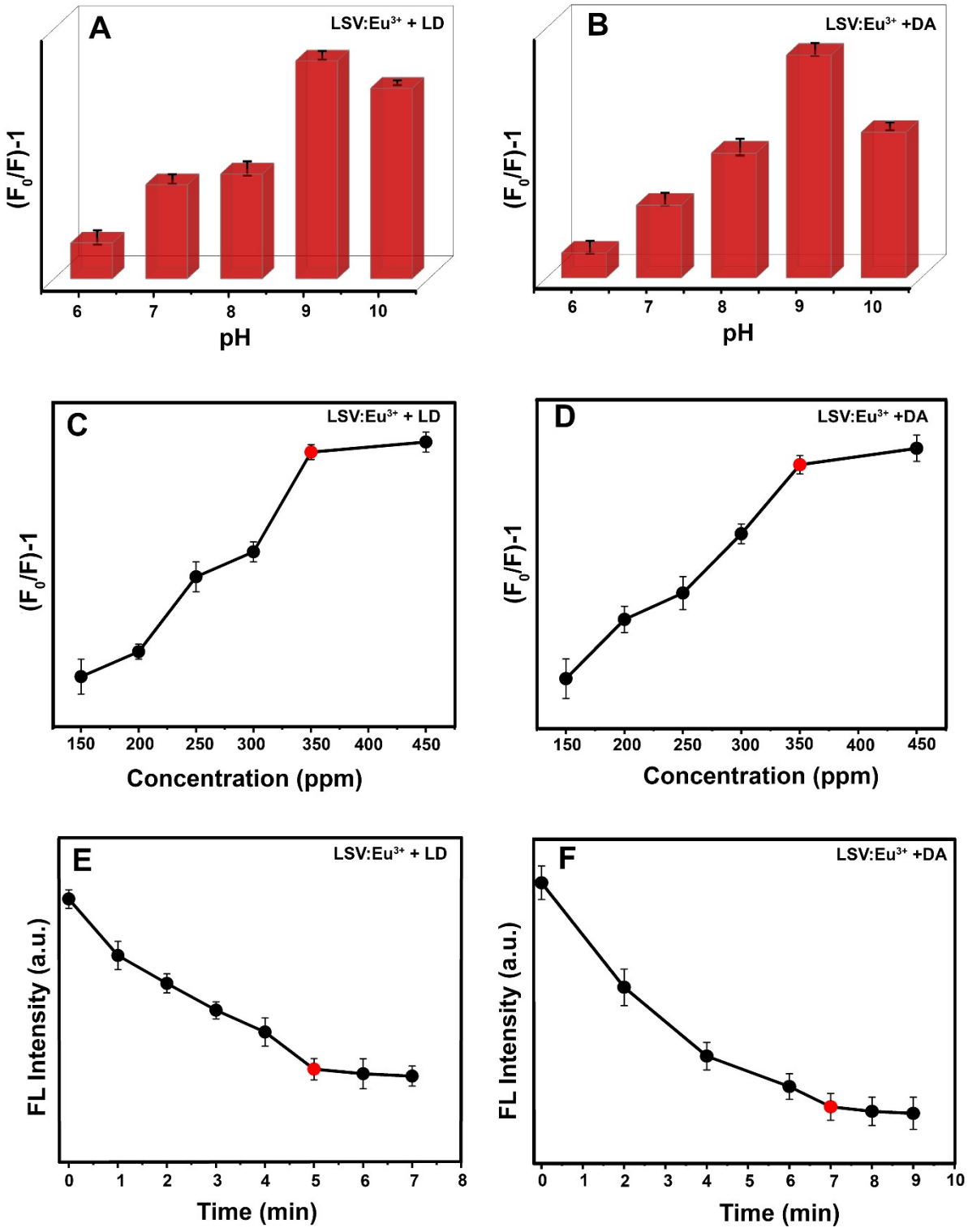

Fig. S4 Fluorescence quenching efficiency of the LSV: $0.015Eu^{3+}$ nanoplates toward the detection of LD and DA depending on (A,B) pH, (C,D) concentration of LSV: $0.015Eu^{3+}$ nanoplates, and (E,F) hold time.

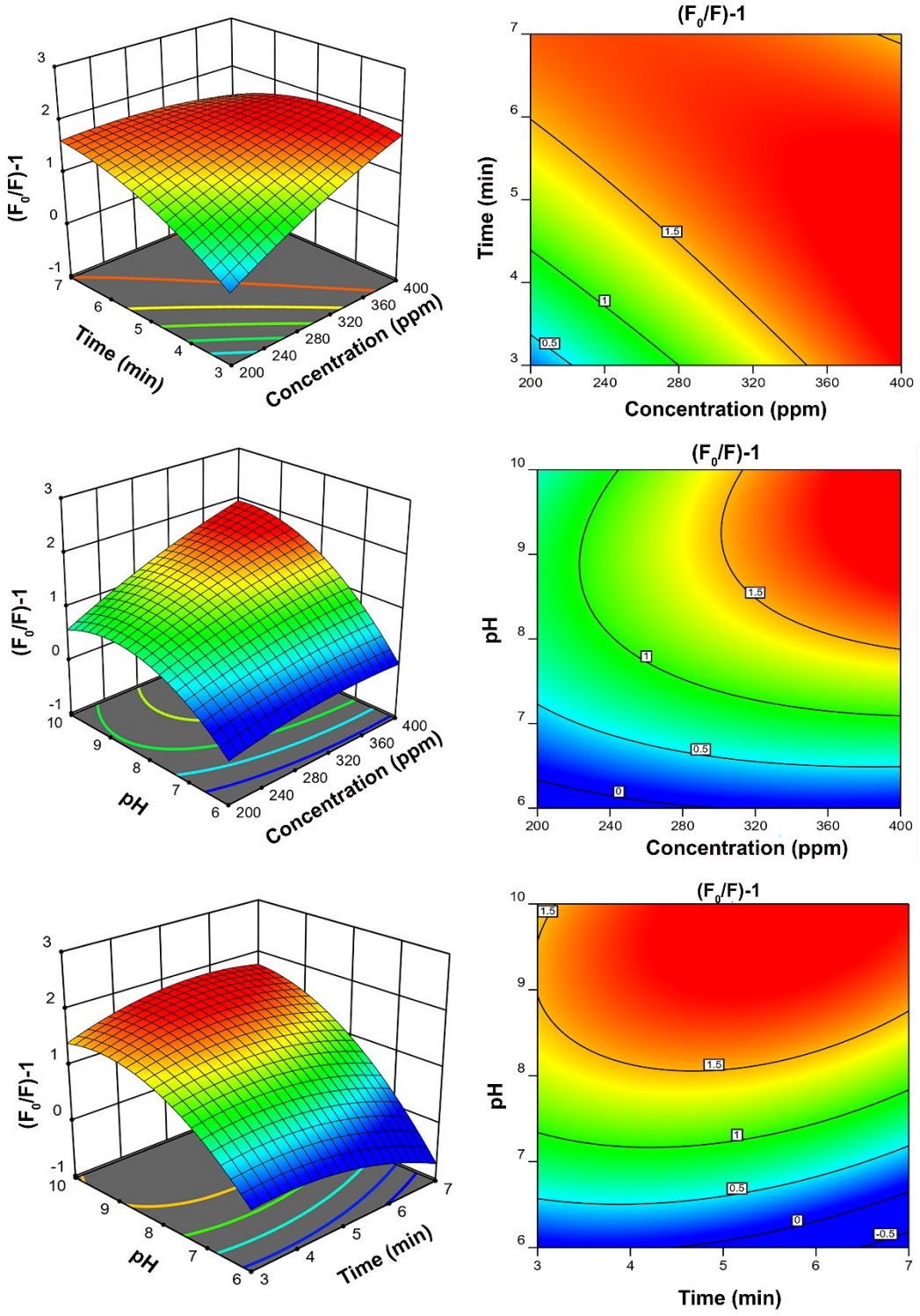

Fig. S5 The results of effective parameters (left) and Contour plot of effective parameters on LSV:0.015Eu^{3+} sensor response for LD detection (considering optimal conditions). The simultaneous effect of Time (3-7 min), pH (6-10), and concentration of LSV: 0.015Eu^{3+} nanoplates (200-400 ppm).

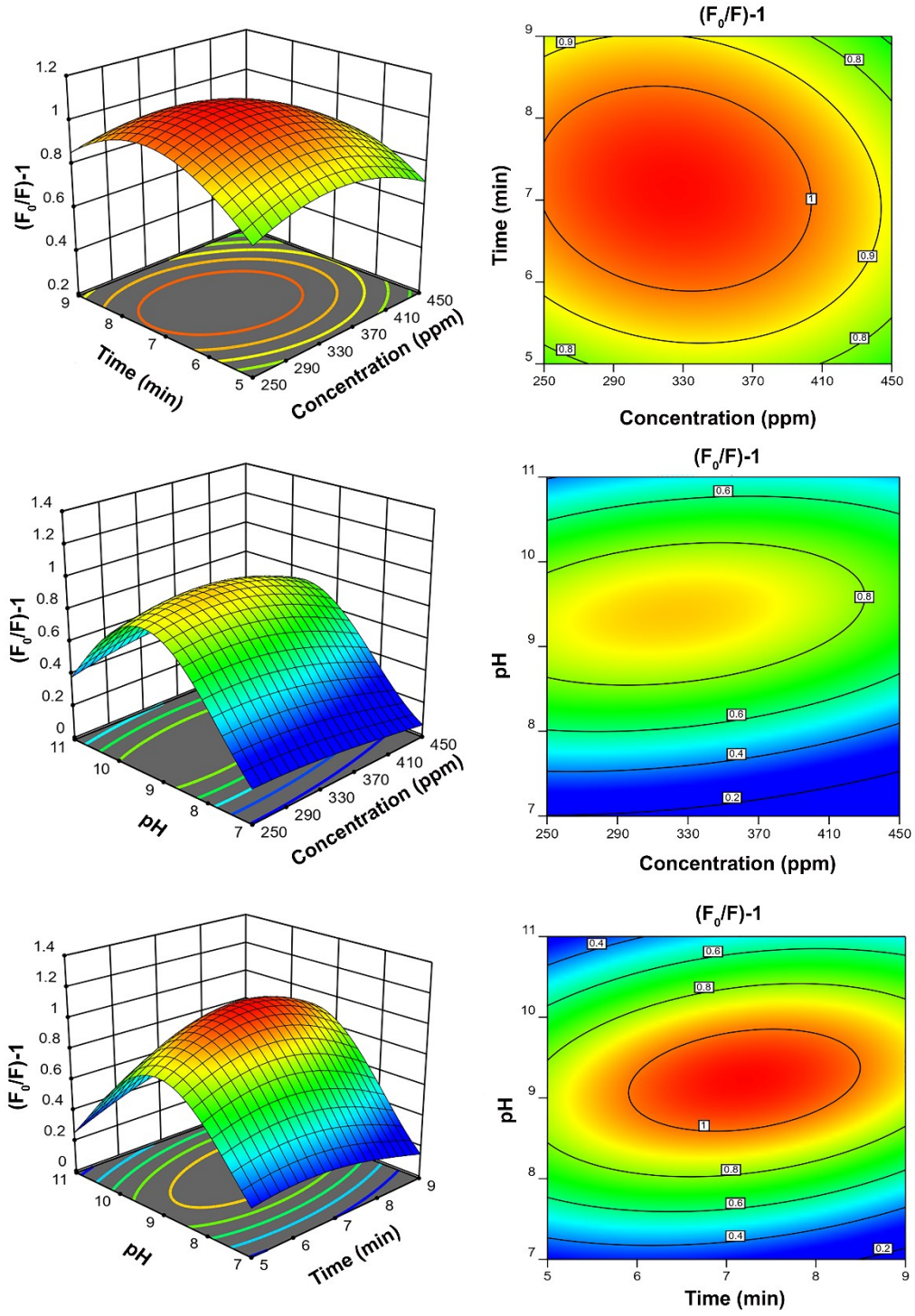

Fig. S6 The results of effective parameters (left) and Contour plot of effective parameters on LSV: 0.015Eu^{3+} sensor response for DA detection (considering optimal conditions). The simultaneous effect of time (5-9 min), pH (6-10), and concentration of LSV: 0.015Eu^{3+} nanoplates(200-400 ppm).

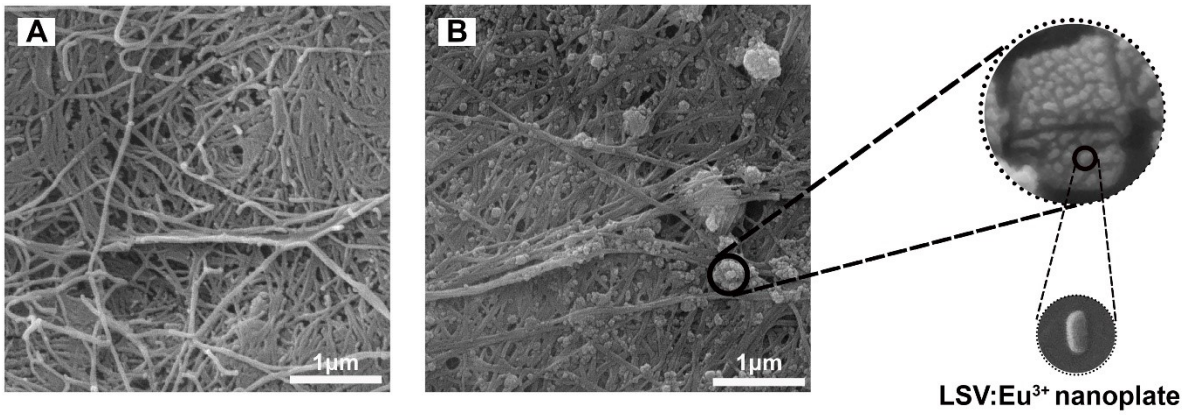

Fig. S7 FESEM images of (A) bacterial cellulose nanopaper and (B) bacterial cellulose nanopaper immersed in LSV:0.015Eu^{3+} solution.

TABLES.

Table S1 Fluorescence lifetimes of LSV:0.015Eu^{3+} nanoplates, LSV:0.015Eu^{3+} + LD, and LSV:0.015Eu^{3+} + DA.

	α_1	τ_1(ns)	α_2	τ_2(ns)	τ_{av}(ns)	χ^2
LSV:0.015Eu^{3+}	**1.0018**	**0.0443**	**0.002**	**1.608**	**0.148**	**1.3**
LSV:0.015Eu^{3+}- LD	**1.53**	**0.0246**	**0.001**	**1.255**	**0.064**	**1.1**
LSV:0.015Eu^{3+}- DA	**0.98**	**0.0462**	**0.001**	**1.401**	**0.08**	**1.4**

Table S2 Comparison of the study method for the detection of dopamine and levodopa in this study with other works.

Method	Limit of detection (µmol L^{-1})		Linear range (µmol L^{-1})		Reference
	Levodopa	Dopamine	Levodopa	Dopamine	
Colorimetry	2.08	–	0 – 500	–	[1]
DPV	0.37	–	1–100	–	[2]
CE-ED[a]	3	–	6–500	–	[3]
CE-CL[b]	0.6	–	5–500	–	[4]
CE-AD[c]	0.38	–	1.25- 50	–	[5]
DPV	0.36	–	0.65–22	–	[6]
Spectrophotometric Detection	–	1.2	–	3.2–20	[7]
Colorimetry	2.5	2.5	5-30	2.5–15	[8]
Fluorescence spectrophotometry	-	5.3934	-	1-100	[9]
Colorimetry	-	6.13	-	1–500	[10]
Fluorescence spectrophotometry	0.27	0.39	1-40	2-50	This work

[a] Capillary electrophoresis-electrochemical detection.
[b] Capillary electrophoresis-chemiluminescence.
[c] capillary electrophoresis with amperometric detection.

Table S3 Determination of LD and DA in urine and tap water samples (n=3)

sample	Add (µM)		Found (µM)		Recovery (%)		RSD (%)	
	LD	DA	LD	DA	LD	DA	LD	DA
Human urine	5	5	5.25	4.86	105	97.2	1.02	0.8
	10	10	10.36	10.21	103.6	102	2.03	1.5
	20	20	20.21	20.32	101	101.6	1.6	1.3
Human serum	5	5	4.93	4.88	98.6	97.6	2.05	1.03
	10	10	10.21	9.88	102.1	98.8	0.9	0.65
	20	20	20.36	19.83	101.8	99.15	1.3	1.6
Tap water	10	10	9.72	9.68	97.2	96.8	1.8	4.07
	15	15	15.95	14.67	106.3	97.8	3.9	5.07
	20	20	20.62	19.3	103.1	96.5	2.09	6.02

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