Supporting Information

Unlabeled Multi Tumor Marker Detection System Based on Bioinitiated Light Addressable Potentiometric Sensor

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1. Structure of L-dopa bio-initiated LAPS

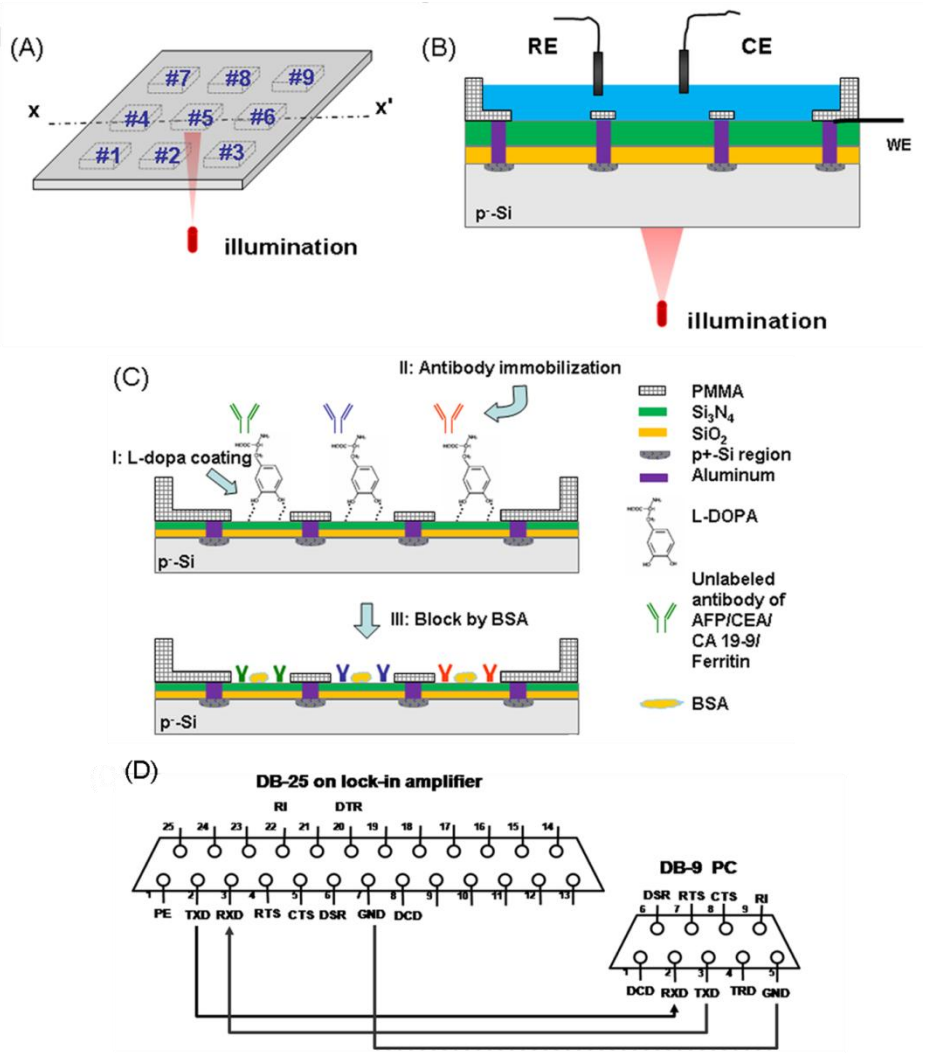


Fig. S1. Arrayed LAPS' chips (A) , the cross section along xx' direction (B), the biofunctionalization of LAPS (C) and Diagram for the serial connection between PC and the lock-in amplifier (D).

2. MXPS measurement of Si_3N_4 surface treated by L-dopa

Table S1. XPS determination of the relative atomic composition

	C1s(%)	N1s(%)	O1s(%)	Si2p(%)
Untreated	62.35	6.96	19.91	10.6
L-dopa coated	28.18	18.84	30.63	22.07

3. Molecular Models and Molecular Dynamics Simulations

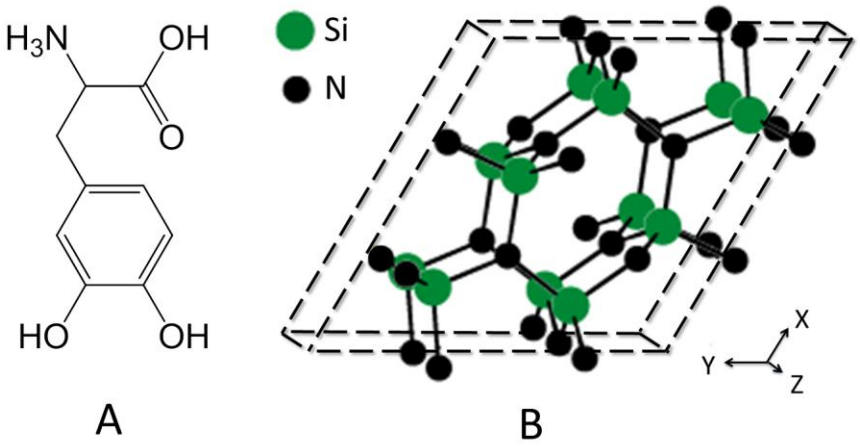


Figure S2 Structures of (A) protonated *L*-Dopa and (B) hexagonal β-Si_3N_4

Table S2. The time-averaged SASA change of the phenyl and amino groups in *L*-Dopa and contact area between substrate and *L*-Dopa molecules for each orientation over the 10-ns trajectories.

Orientation	$\Delta SASA_{phenyl}$ [Å^2]	$\Delta SASA_{amino}$ [Å^2]	ΔContact Area [Å^2]
I	-31.0	25.2	31.28
II	-6.9	5.4	19.16
III	-29.6	24.4	19.98
IV	-34.2	4.4	57.43

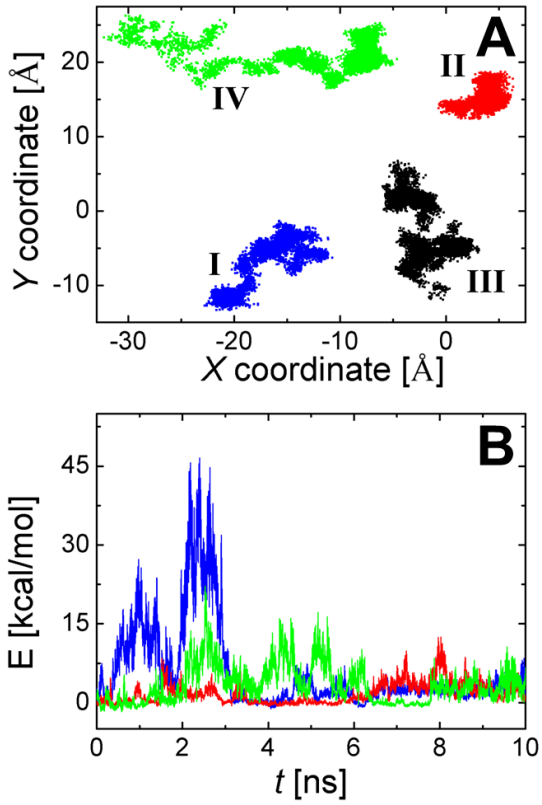


Figure S3. (A) The projection of centers of *L*-Dopa molecules onto the *XY* plane in the trajectory for each orientation in the small system. (B) Energy characterizing the interaction between *L*-Dopa in orientation III and the other three *L*-Dopa molecules in the small system. The color style is consistent with (A).

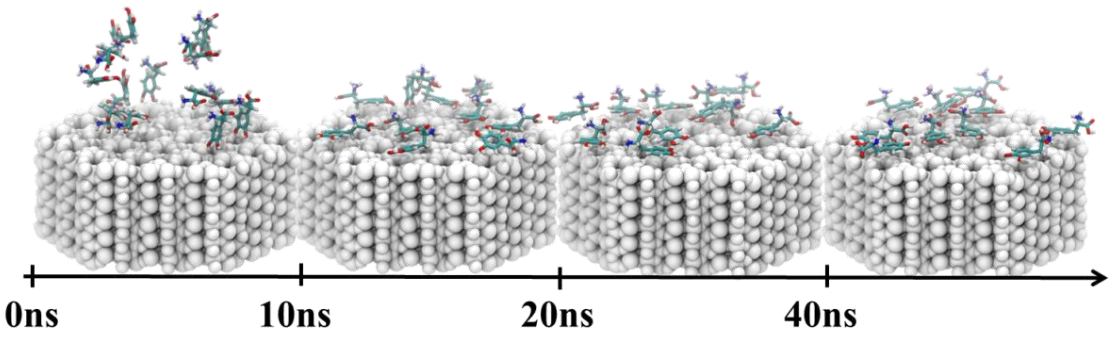


Figure S4. Time evolution of conformation in the large system containing 16 *L*-Dopa monomers. The water and ions are removed for clarity.

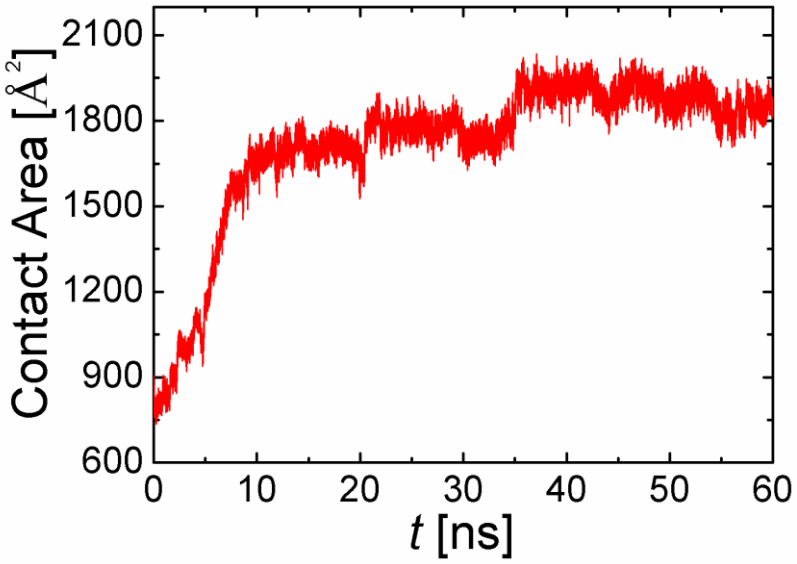
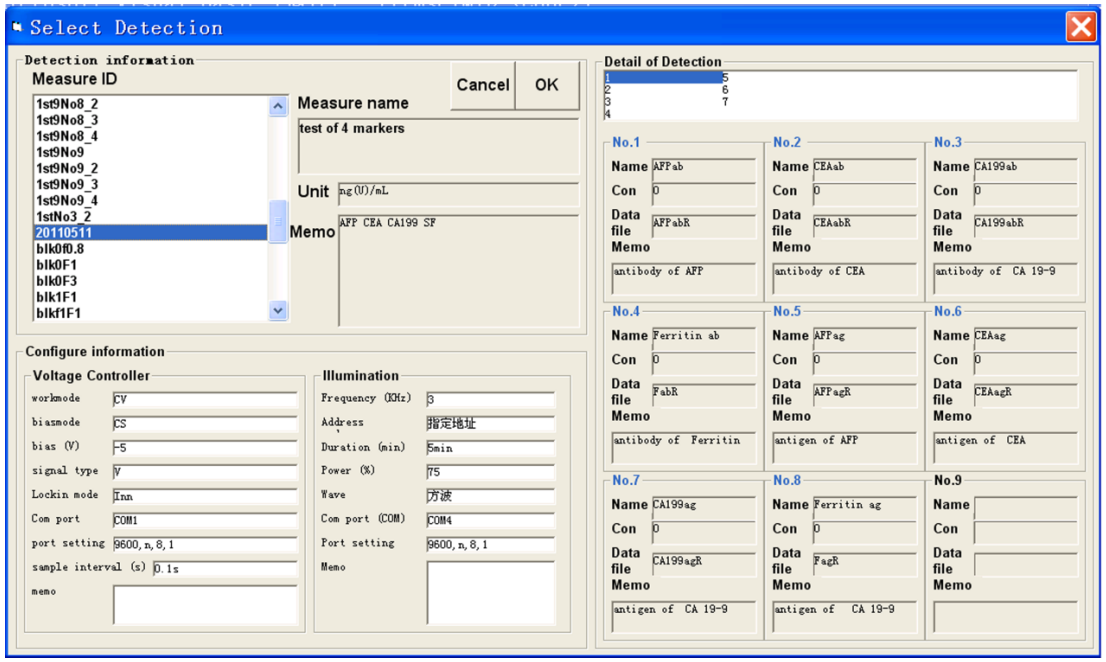
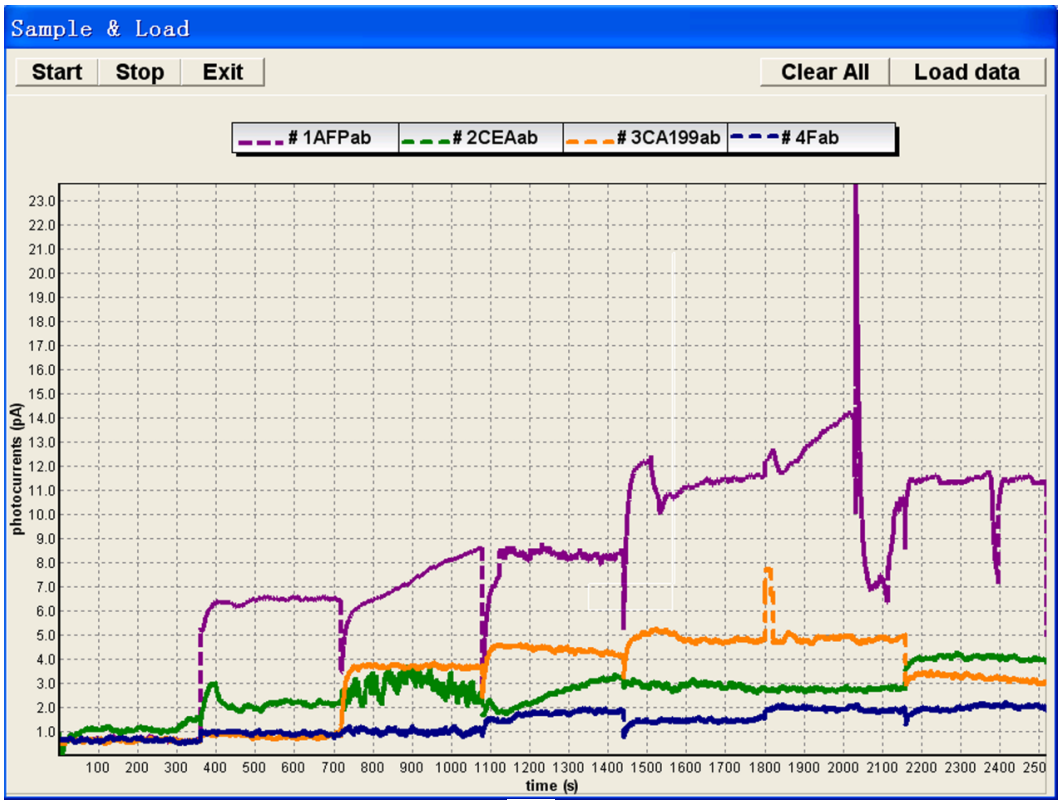


Figure S5. Time evolution of the contact area between substrate and *L*-Dopa molecules in the large system containing 16 *L*-Dopa monomers.

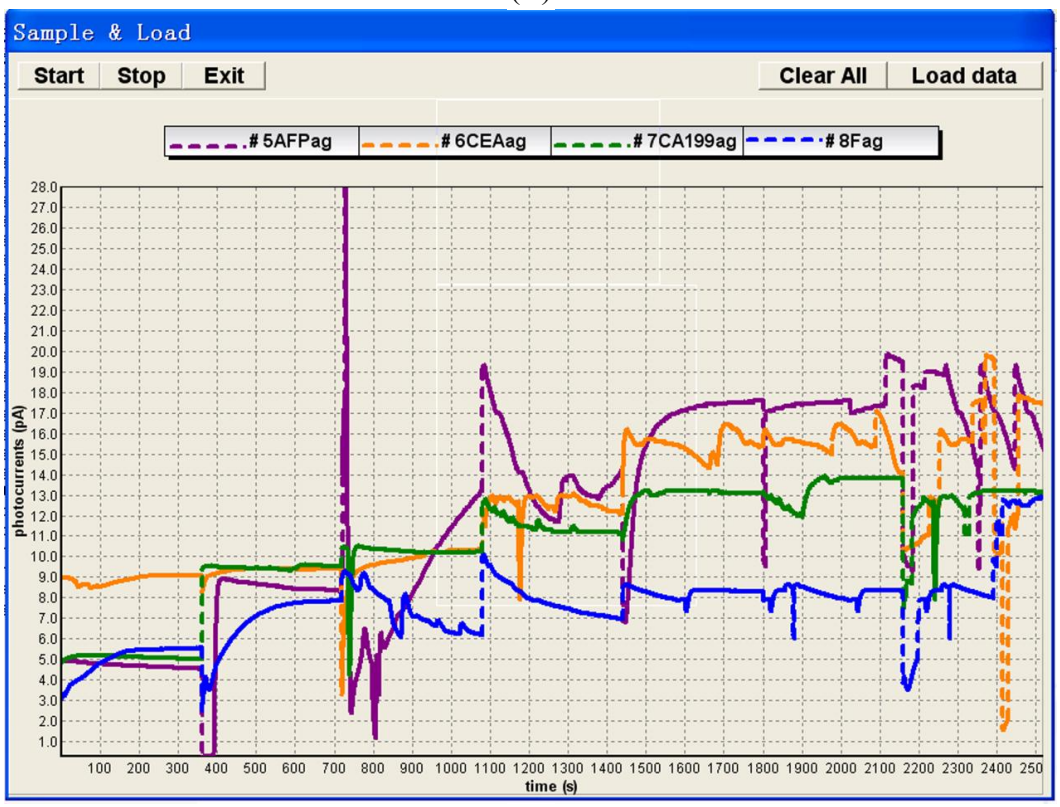
4. User interfaces of the systems' controlling platform



(A)



(B)



(C)

Figure S6 System working platform for user. (A) central controlling interface, data displaying interface for four tumor markers' antibodies (B) and antigens (C).