

Precision on Cancer Diagnostics: An Ultra-Sensitive Detection of MCF-7 Breast Cancer Cells by Gold Nanostructure-Enhanced Electrochemical Biosensing

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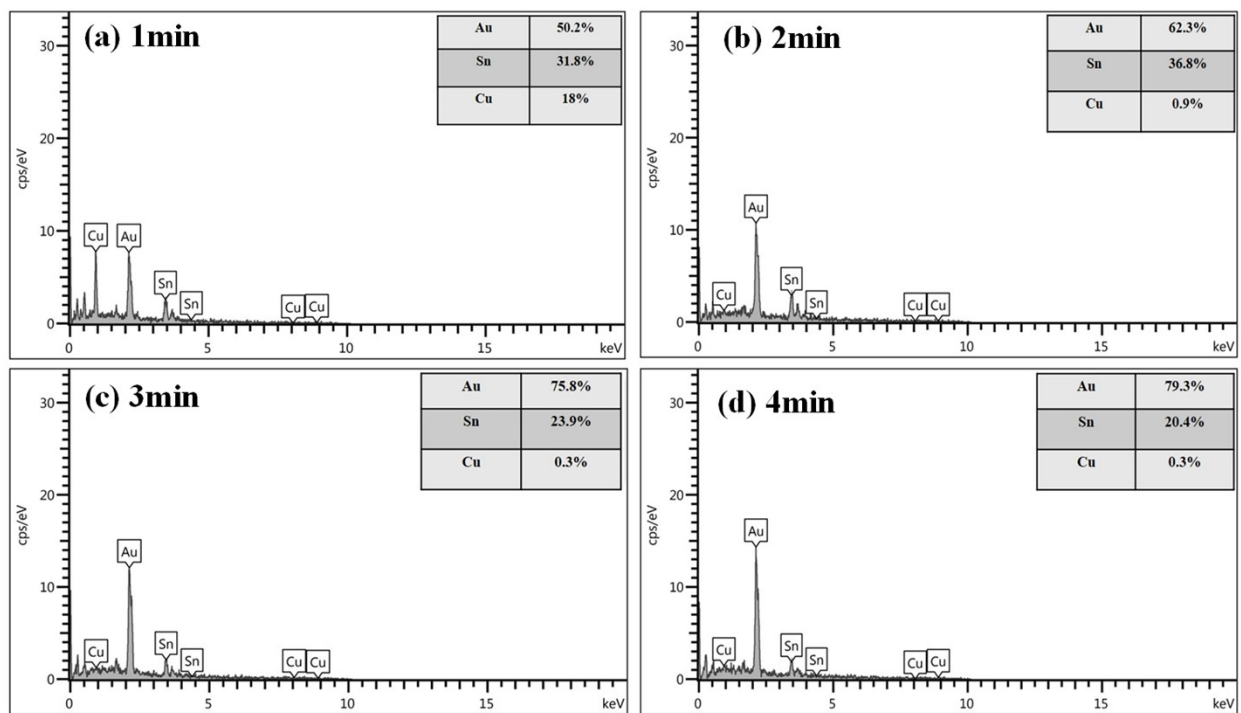


Figure. S1 EDX mapping spectra and elemental composition of Au electrode with different galvanic reaction times.

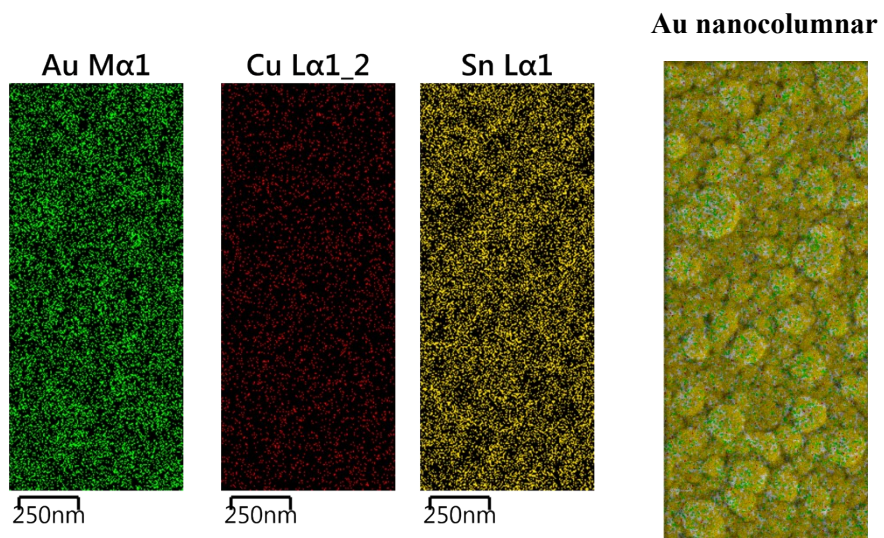


Figure. S2 The elemental mapping of optimal gold nanocolumnar structure.

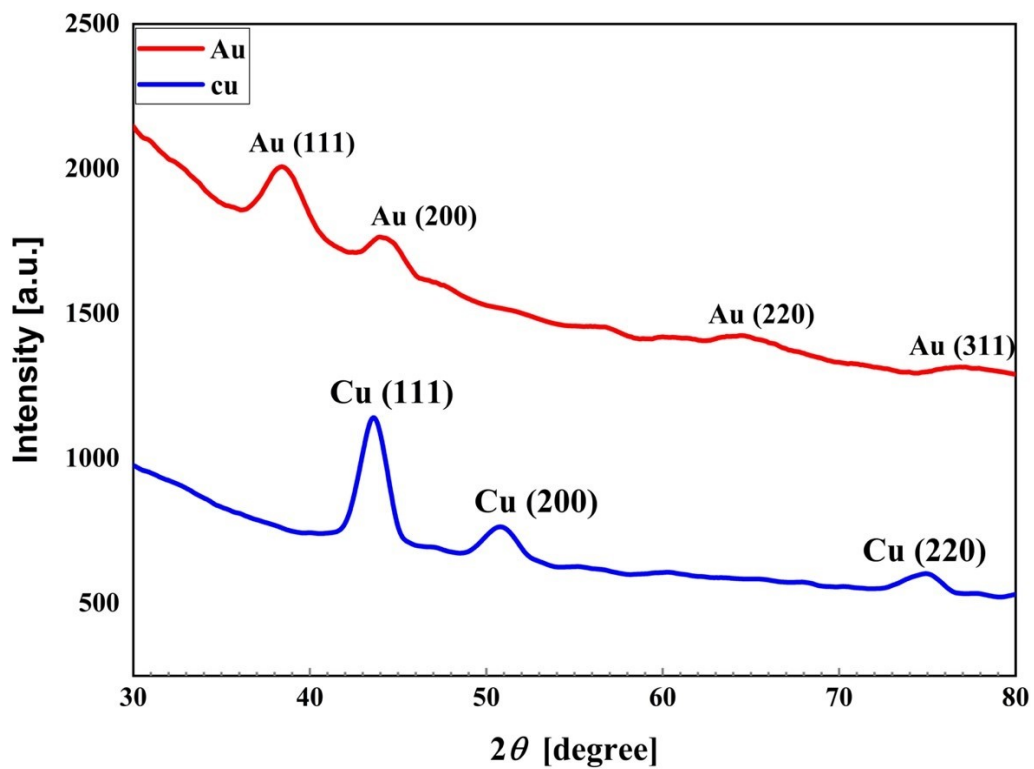


Figure. S3 XRD spectra of the as-prepared Cu and Au electrode (concentration of HAuCl_4 3 mM and the galvanic reaction time of 3 min).

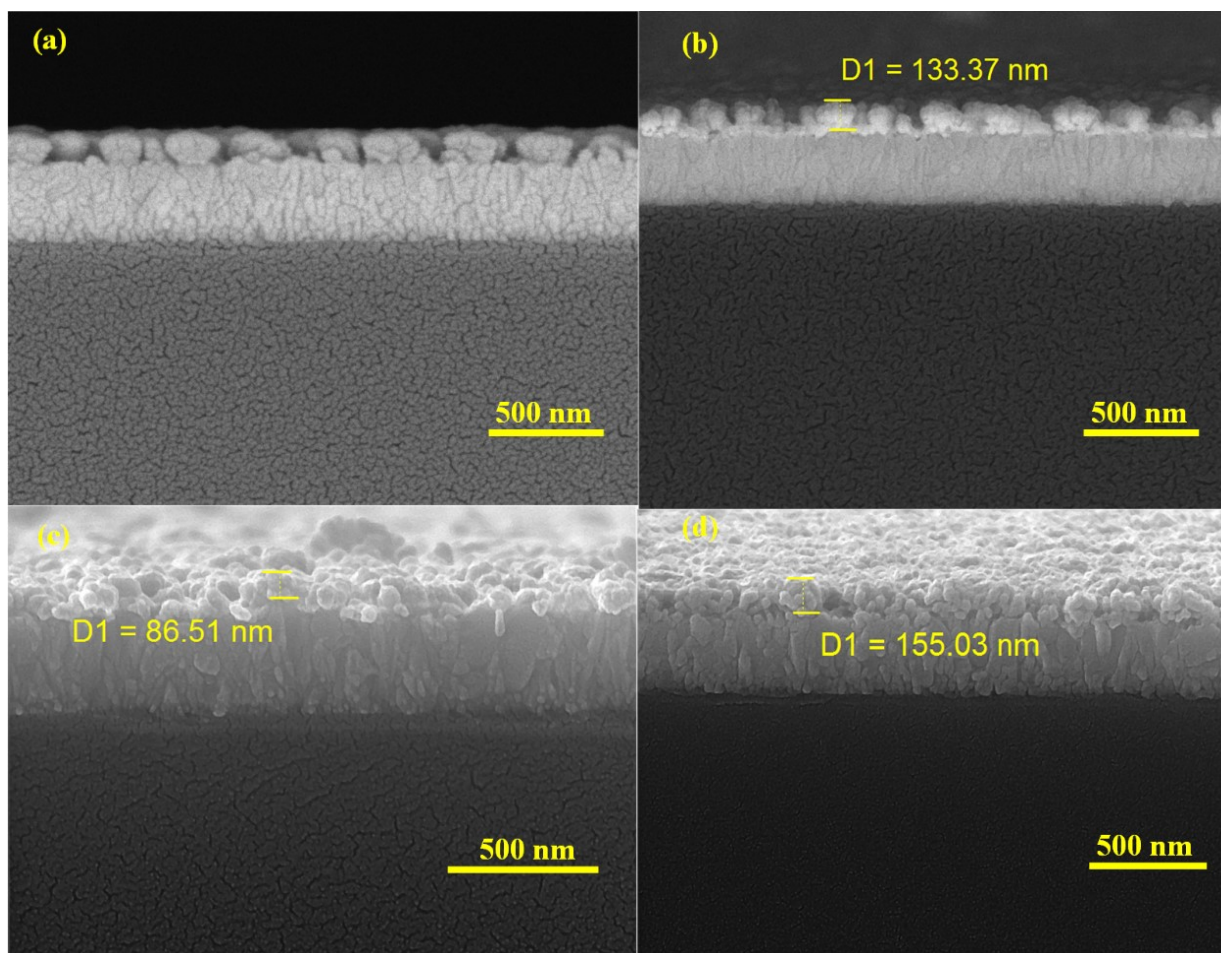


Figure. S4 The cross-sectional SEM image of the Cu nanocolumns (a), the superior Au nanocolumns (b), the Au nanocolumns with concentration (4 mM HAuCl_4) for 1min (c), the Au nanocolumns with concentration (3 mM HAuCl_4) for 4min (d).

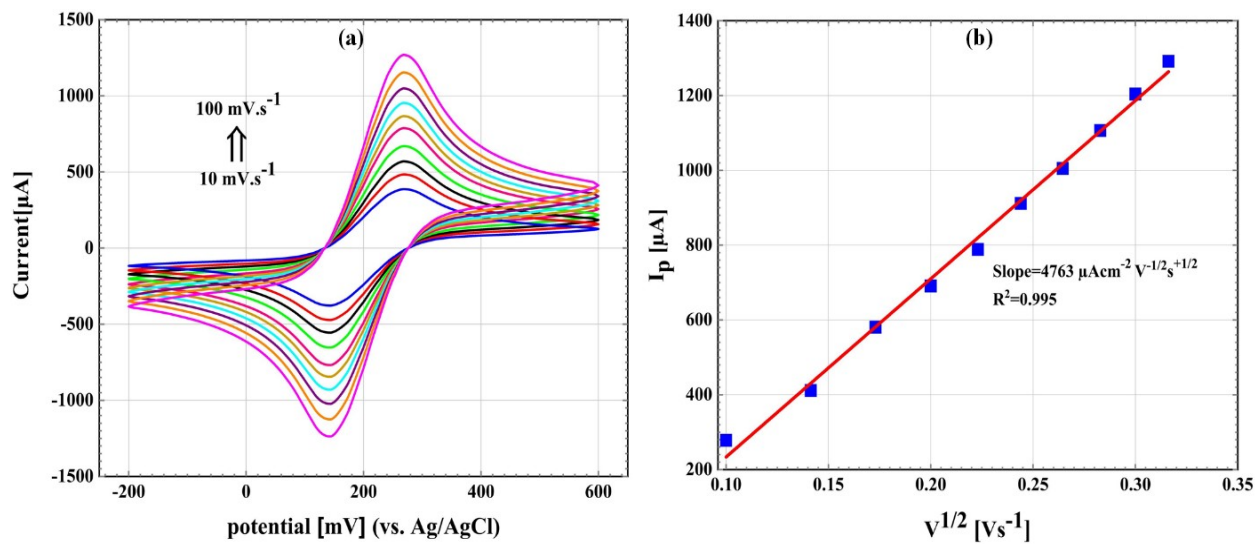


Figure. S5 CV curves obtained for the superior electrode at various potential sweep rates within the range of 10–100 mV.s⁻¹ (a), and a linear relationship between the anodic current peak and the square root of the scan rate (b).

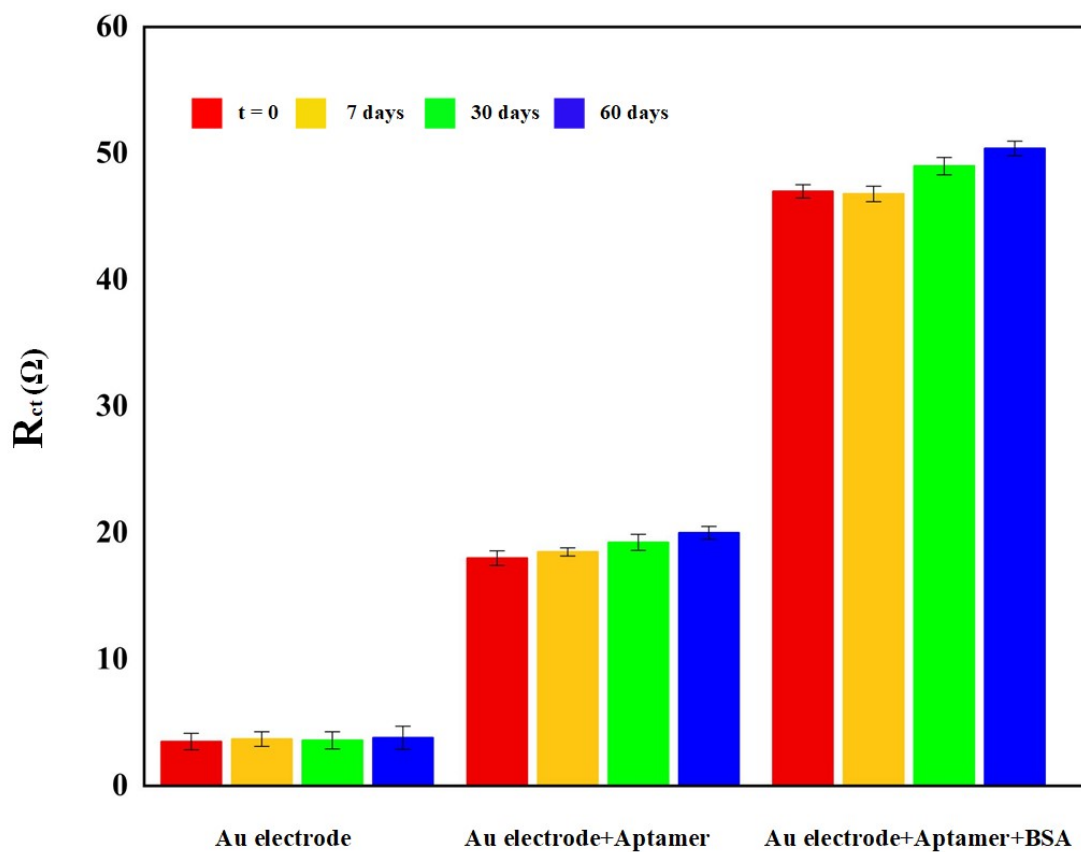


Figure. S6 Stability assessment was conducted across various time intervals to evaluate the variations in charge transfer resistance (R_{ct}) for the Au electrode alone, the Au electrode with aptamer, and the Au electrode with both aptamer and BSA.

Table S1. Mean R_{ct} values (averaged over three repetitions) for various steps of Aptasensor fabrication and measurement of MCF-7 cells.

Electrode	Au	Au+Aptamer	Au+Aptame+BSA	Au+Aptame+BSA+MCF-7 Cells (30 Cells.mL ⁻¹)
Mean of R_{ct} (Ω)	6	19	49	148
RSD%	16.67	5.26	2.04	1.16