Supporting Information for:

Controllable one step copper coating on carbon nanofibers for flexible cholesterol biosensor substrate

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Result and discussion

The EDAX data for the CuO coated CNF revealed the presence of copper compound on nanofiber surface as shown in Figures S2 (a-f). The peak intensities of CuO to CNF were increasing when temperature increases from 100 to 140° C. The atomic % of carbon, oxygen, nitrogen and copper element as shown in Table S1 indicates that the CNF surface coverage ratio of CuO nanoparticles was higher with increase in temperature near to the boiling point of solvent. These results were in agreement with XRD and SEM results.

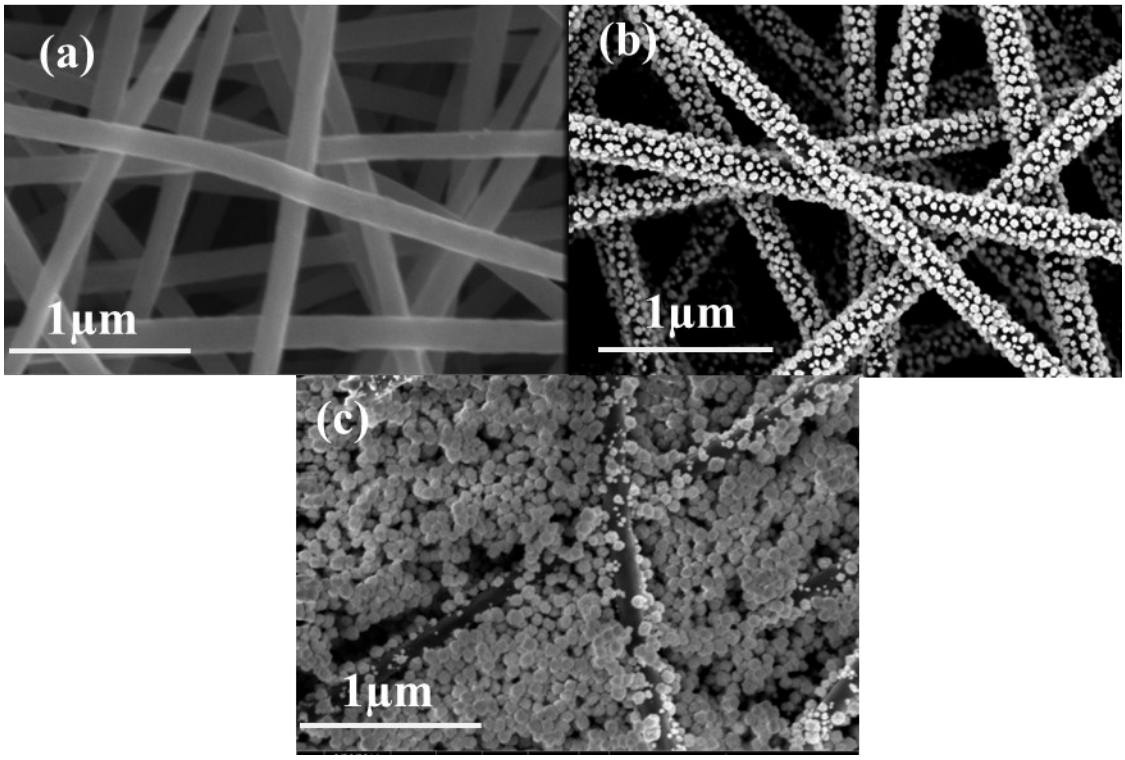


Figure S1. SEM images of CuO decorated CNF: (a) 80 (b) 100°C, and (c) 140°C.

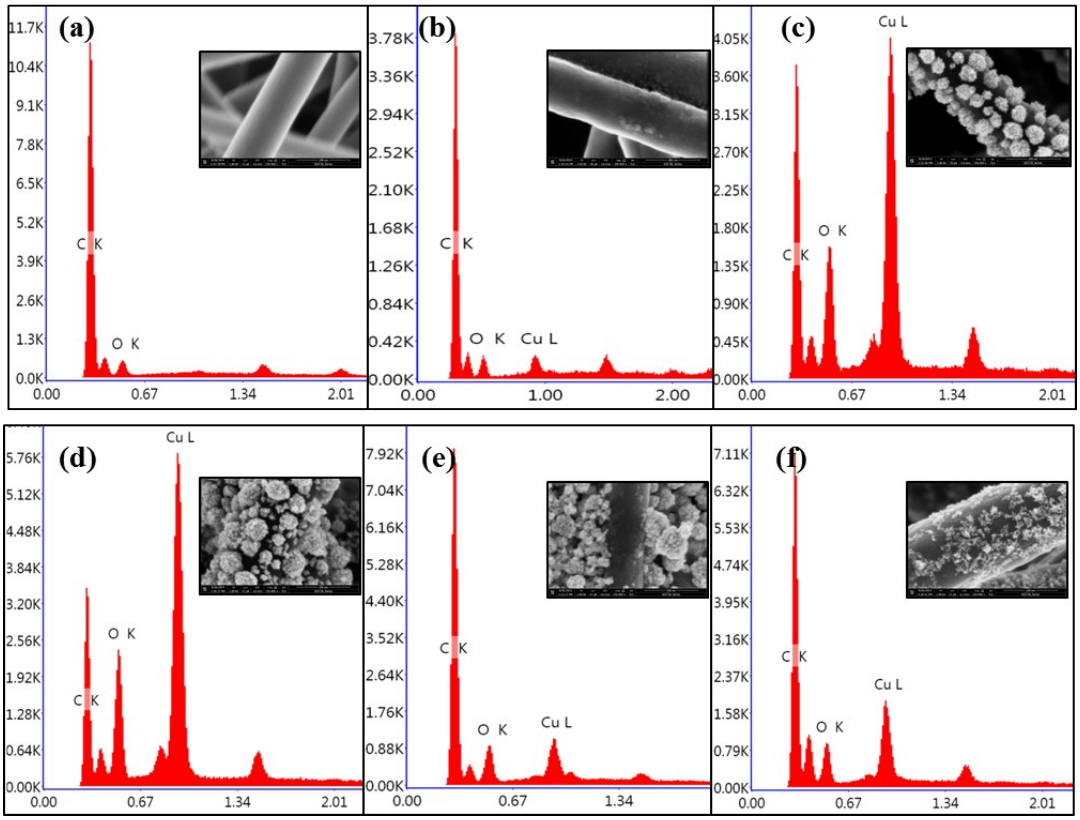


Figure S2. EDAX analysis of CuO decorated CNF: (a) CNF, (b) 80°C, (c) 100°C, (d) 120°C, (e) 140°C and (f) 160°C and inset high resolution SEM images of CuO-CNF.

Table S1. Elemental analysis and conductivity at different temperature

Sample	Carbon Atomic%	Oxygen Atomic %	Nitrogen Atomic%	Copper Atomic%	Conductivity Sm^{-1}
CNF	62.71	7.76	29.53	NA	474
CNF-CuO 80	66.88	6.89	24.77	1.46	203
CNF-CuO100	50.07	18.93	18.63	12.37	224
CNF-CuO120	43.70	22.14	18.29	15.77	251
CNF-CuO140	27.13	35.20	8.32	29.36	308
CNF-CuO160	51.73	11.16	33.20	3.91	210

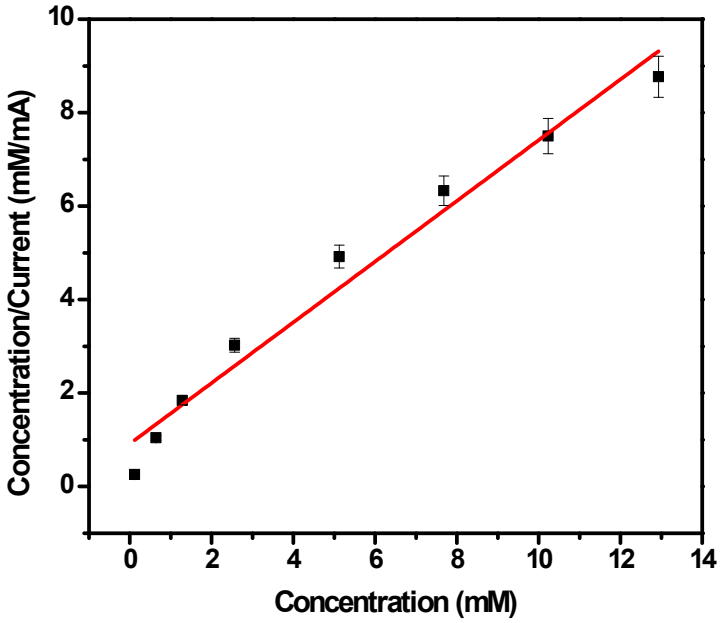
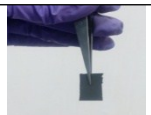
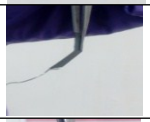
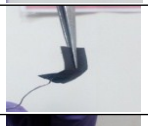
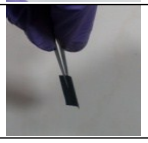


Figure S3. Hanes Plot.

Table S2. Demonstration of flexible sensor- Variation of sensor response with bending condition

Bending Condition	Image	Peak oxidation current of ChOx/CuO/CNF bioelectrdoe upon addition of cholesterol (2.56 mM)
No bending		0.83 mA
Moderate bending		0.80 mA
Complete bending		0.76 mA
Bending reverted back		0.83 mA

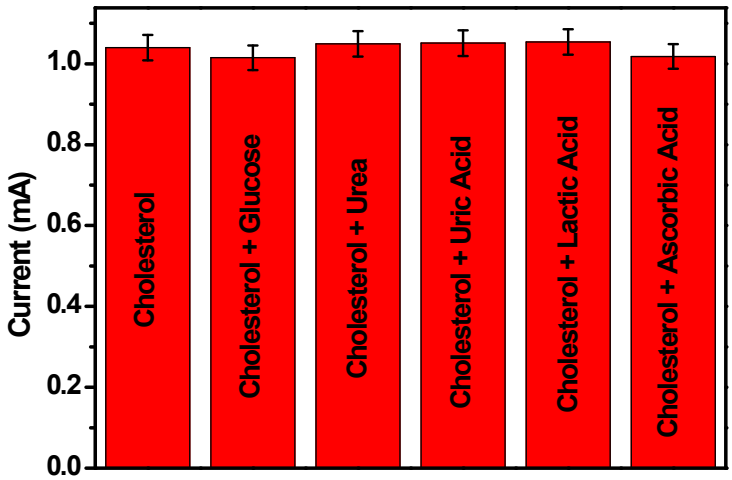


Figure S4. Selectivity test.

Table S3. Real serum sample analysis

Sample Number	Free cholesterol Concentration (mM)		R.S.D. of developed biosensor (n=3)	Spike (mM)	Data after Spike		
	Biosensor	Spectrophotometric			Cholesterol concentration	Recovery (%)	R.S.D. of developed biosensor (n=)
1	1.09	1.16	2.3 %	2.56	3.60	98	2.1 %
2	1.46	1.39	1.9 %	2.56	4.06	101	1.8 %