Electronic Supplementary Material (ESI) for Industrial Chemistry & Materials.

Supplementary Information for

Improved Voltammetric Discrimination of Acetaminophen and Uric Acid in Urine Using CoO Biochar Nanocomposite

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Fig. S1 SEM image of CoO-FBC for clear view of the cracks in the cobalt oxide nanoplate.

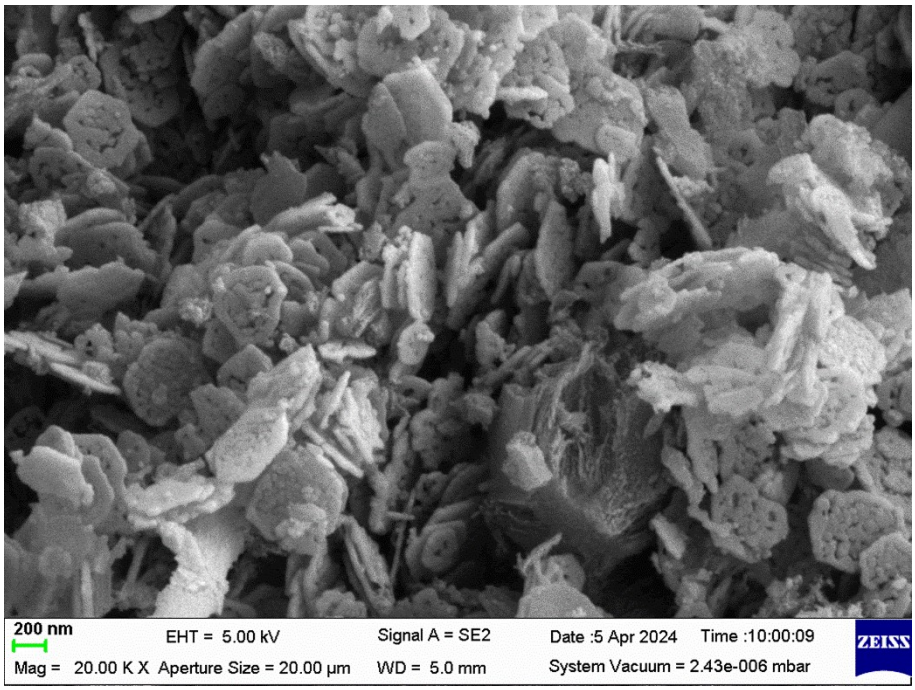

Fig. S2 (a-d) SEM image, elemental mapping and EDS spectrum of BC, (b) carbon, (c) oxygen; (e-h) SEM image, elemental mapping and EDS spectrum of FBC, (f) carbon, (g) oxygen, (i) EDS spectrum of CoO-FBC.

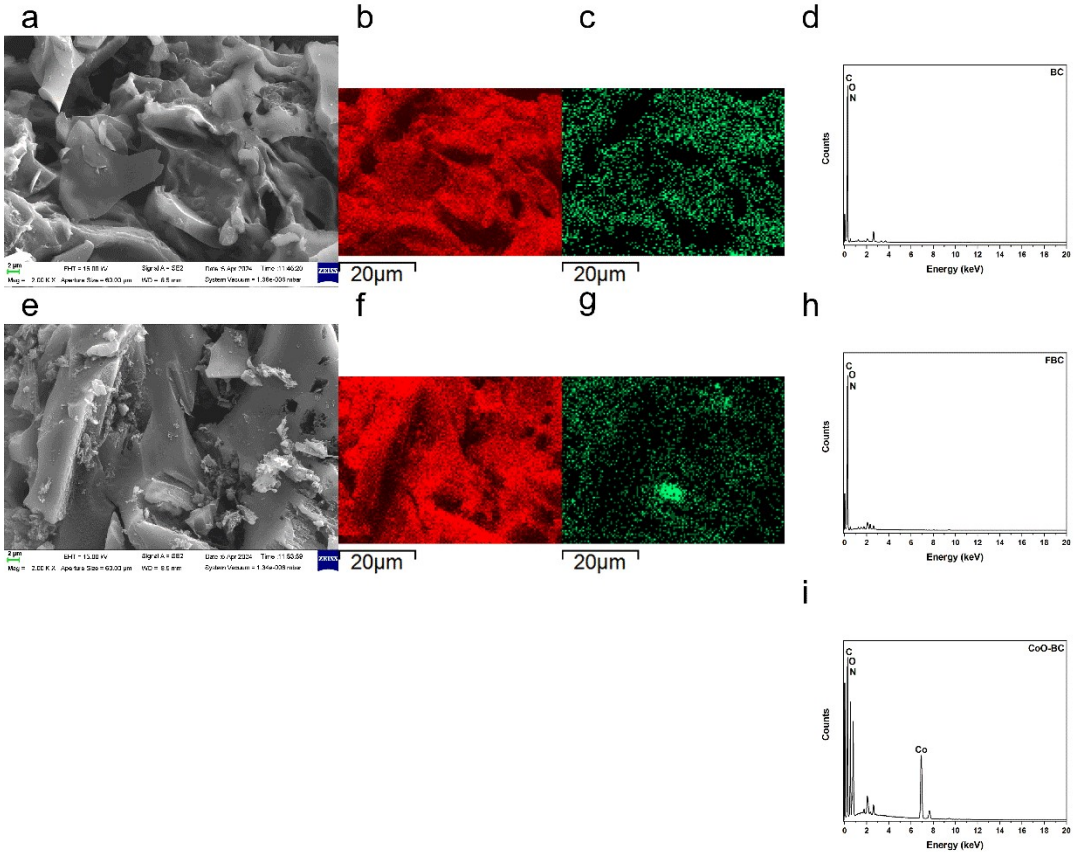

Fig. S3 pore size distribution of the biomass carbon materials.

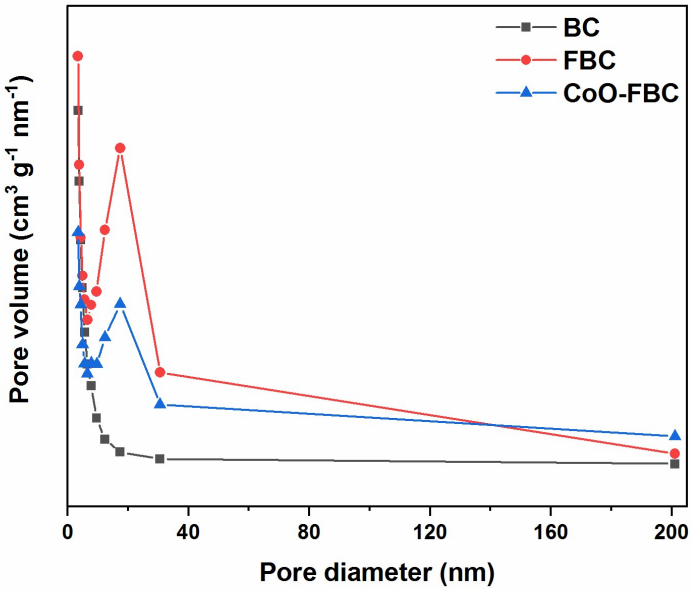

Fig. S4 Magnified view of the high frequency part.

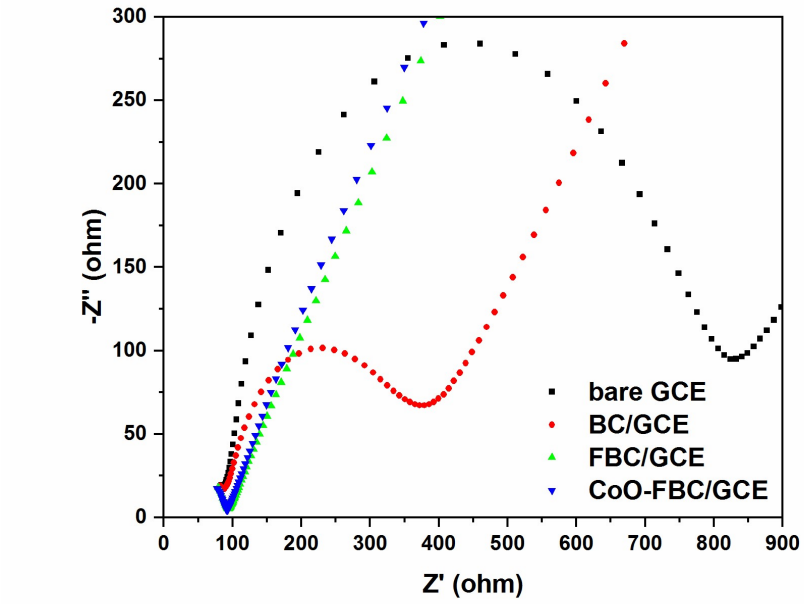

Fig. S5 CV spectra of the bare GCE and biomass derived carbon electrocatalyst modified GCE in 0.1 M PBS solution, scan rate 50 mV s^{-1}.

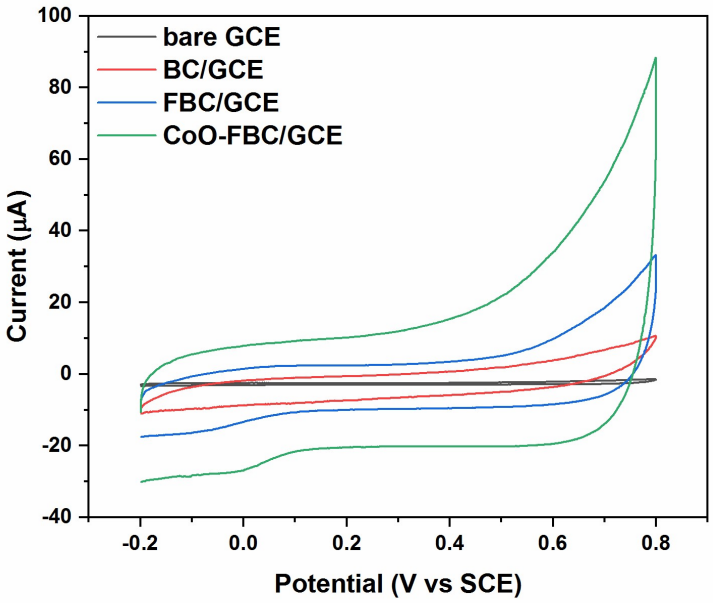

Fig. S6 CoO-FBC/GCE was tested with continuing CV measurement for 10 cycles in APAP solution (500 μM in 0.1 M PBS, scan rate 50 mV s^{-1}), the acetaminophen I_{pa} current remained about 82.1 % at the 10^{th} cycle.

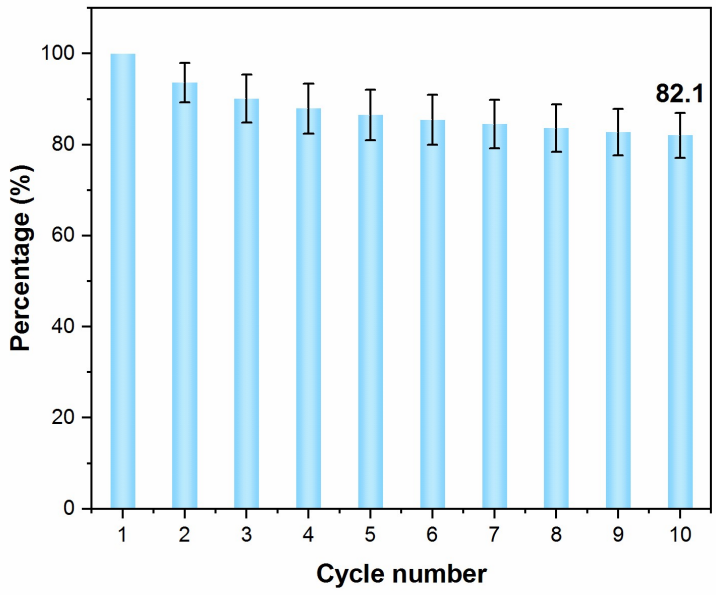

Table S1 speculated calculation of the mass loss of CoO-FBC.

	At 400 °C	At 700 °C	At 1000 °C
FBC mass (%)	86.593	83.159	79.569
CoO-FBC mass (%)	94.436	88.079	71.507

Let's assume there is a 100 g of FBC, and a 100 g of CoO-FBC used in the TGA experiment.
Then the mass of CoO is 50 g, and the mass of FBC is 50 g.
The mole of Co_3O_4 ($Co^{2+}OCo_2^{3+}O_3$) is 0.208 mol (50 g divided by 240.797 g mol^{-1}).
The reduction of CoO would lead to mass loss of the oxygen atom, about 3.328 g (0.208 mol multiplied by 15.999 g mol^{-1}).
The reduction of Co_2O_3 would lead to mass loss of the oxygen atom, about 9.984 g (0.208 mol multiplied by 3, and by 15.999 g mol^{-1}).

For 100 g of FBC, the mass loss difference between 400 °C and 700 °C is 3.434 g.
For 100 g of CoO-FBC, the mass loss difference between 400 °C and 700 °C is 6.357 g.
The 3.434 g divided by 2.5 is 1.374 g, and 1.374 g plus 3.328 g is 4.702 g, which is close to 6.357 g.

For 100 g of FBC, the mass loss difference between 700 °C and 1000 °C is 3.590 g.
For 100 g of CoO-FBC, the mass loss difference between 700 °C and 1000 °C is 16.572 g.
The 3.590 g divided by 2.5 is 1.436 g, and 1.436 g plus 9.984 g is 11.42 g, which is close to 16.572 g.

Table S2 elemental ratio measured from the XPS analysis.

	BC	FBC	Co-FBC
Element	Atomic ratio (%)		
Cl 2p	9.29	5.94	9.56
C 1s	78.7	87.17	62.9
N 1s	1.73	1.19	1
O 1s	10.29	5.71	18.94
Co 2p			7.6
Sum	100	100	100