Supplementary Information

An electrochemical sensor for detection of lead (II) ions using biochar of spent coffee grounds modified by TiO_2 nanoparticles

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Supporting figure captions:

Fig. S1 (A) The particle size distribution histogram of TiO_2 nanoparticles. (B) The real samples of BC and BC@TiO_2NPs.

Fig. S2 (A) Effects of various electrolytes including PBS, NaAc-HaC, NH_3H_2O-NH_4Cl. (B) The error bars represent the standard deviation of three independent experiments, n=3.

Fig. S3 Effects of the pH on the sensor in the NaAc-HAc buffer. The error bars represent the standard deviation of three independent experiments, n=3.

Fig. S4 Effects of the BC@TiO_2NPs concentration. The error bars represent the standard deviation of three independent experiments, n=3.

Fig. S5 Effects of the deposition time on the Pb^{2+} detection. The error bars represent the standard deviation of three independent experiments, n=3.

Fig. S6 (A) DPV responses of one BC@TiO_2NPs/GCE electrode for detecting lead ions at different concentrations including 1 pM, 10 pM, 100 pM, 1 nM, 10 nM in 0.1 M NaAc-HAc buffer (pH 4.5). (B) Cyclic voltammograms of 10 μM of lead ions recorded at the BC@TiO_2NPs/GCE sensor in 0.1 M NaAc-HAc of pH 7.0 at a scan rate of 0.05 V/s, 50 cycles, and a potential range of -1.80 to 0.4 V.

Table S1 Porosity data of BC material.

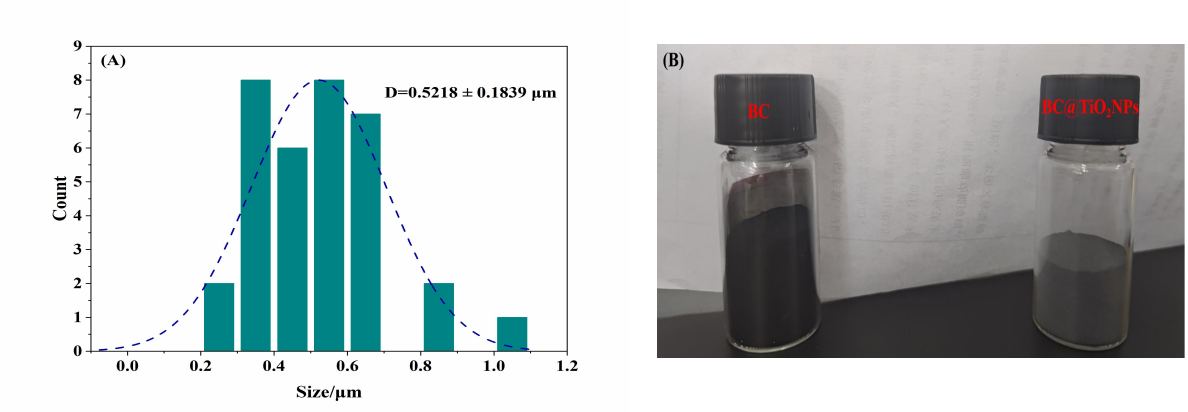


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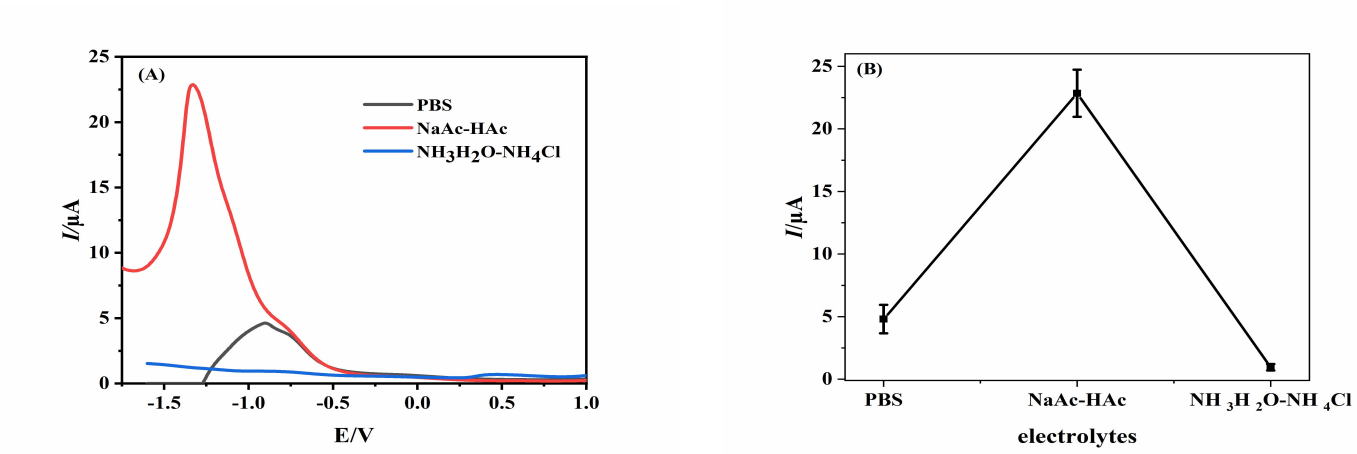


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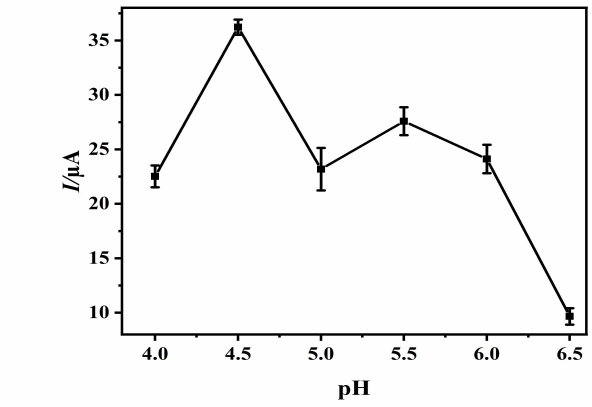


Fig. S3 Effects of the pH on the sensor in the NaAc-HAc buffer. The error bars represent the

standard deviation of three independent experiments, *n*=3.

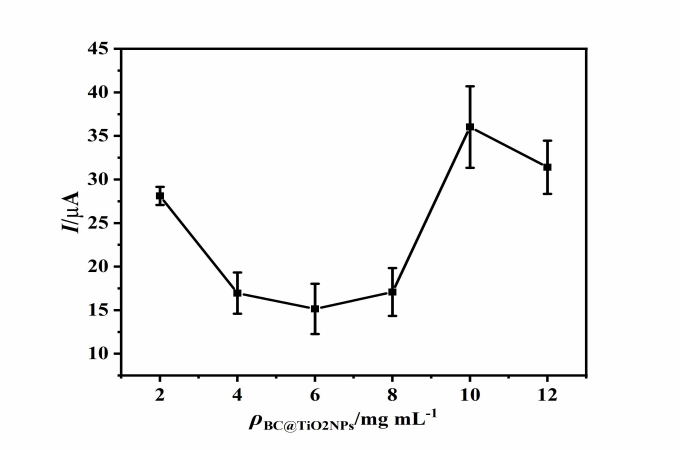


Fig. S4 Effects of the BC@TiO_2NPs concentration. The error bars represent the standard deviation of three independent experiments, *n*=3.

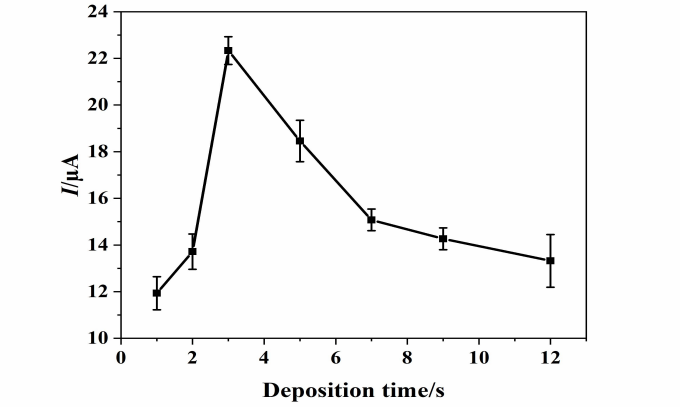


Fig. S5 Effects of the deposition time on the Pb^{2+} detection. The error bars represent the standard deviation of three independent experiments, *n*=3.

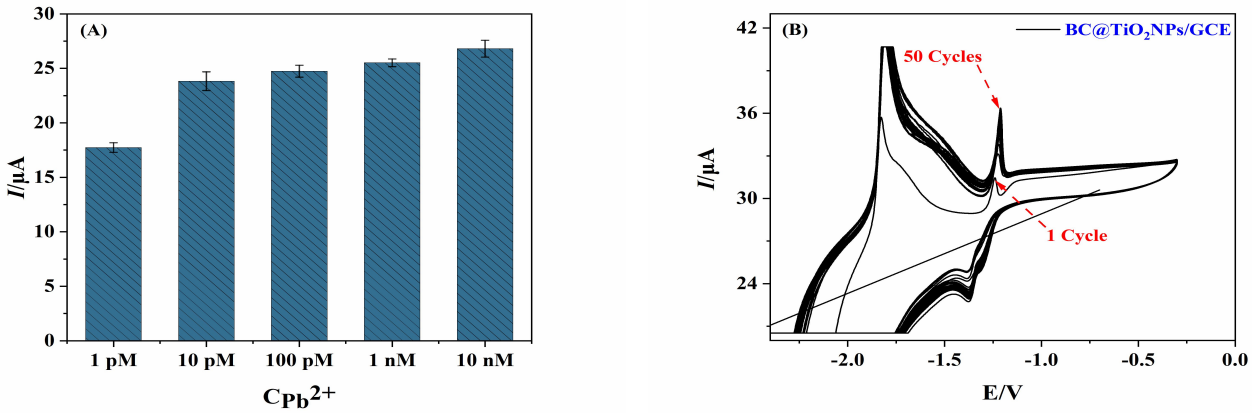


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Count	Total Area	Average Size	Porosity/%
441	33083	75.018	4.207