**Supplementary Material**

**Highly Sensitive Biosensors for Real-time Monitoring of Histamine at Acupoint PC6 of Rats Based on Graphene-modified Acupuncture Needles**

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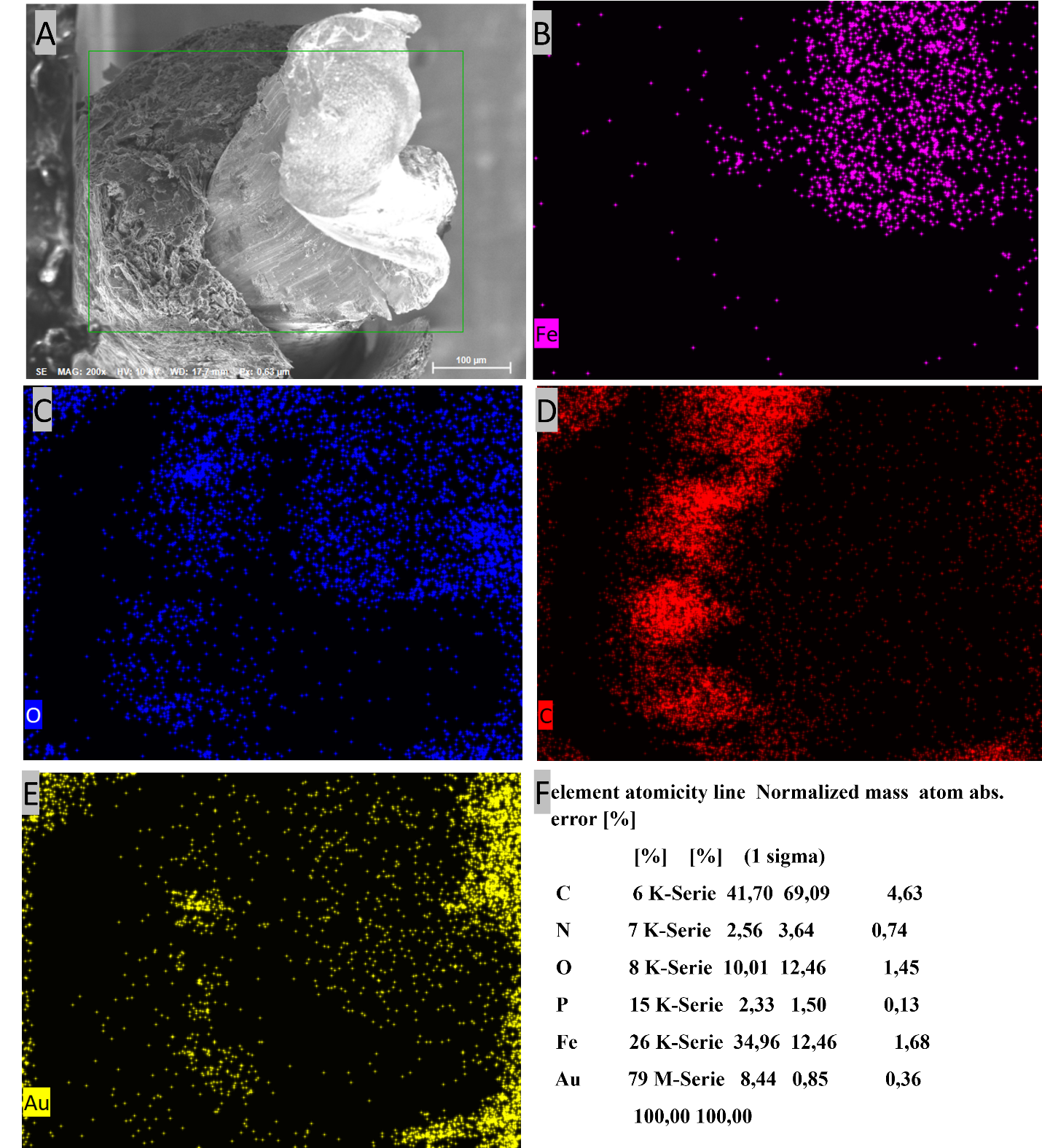
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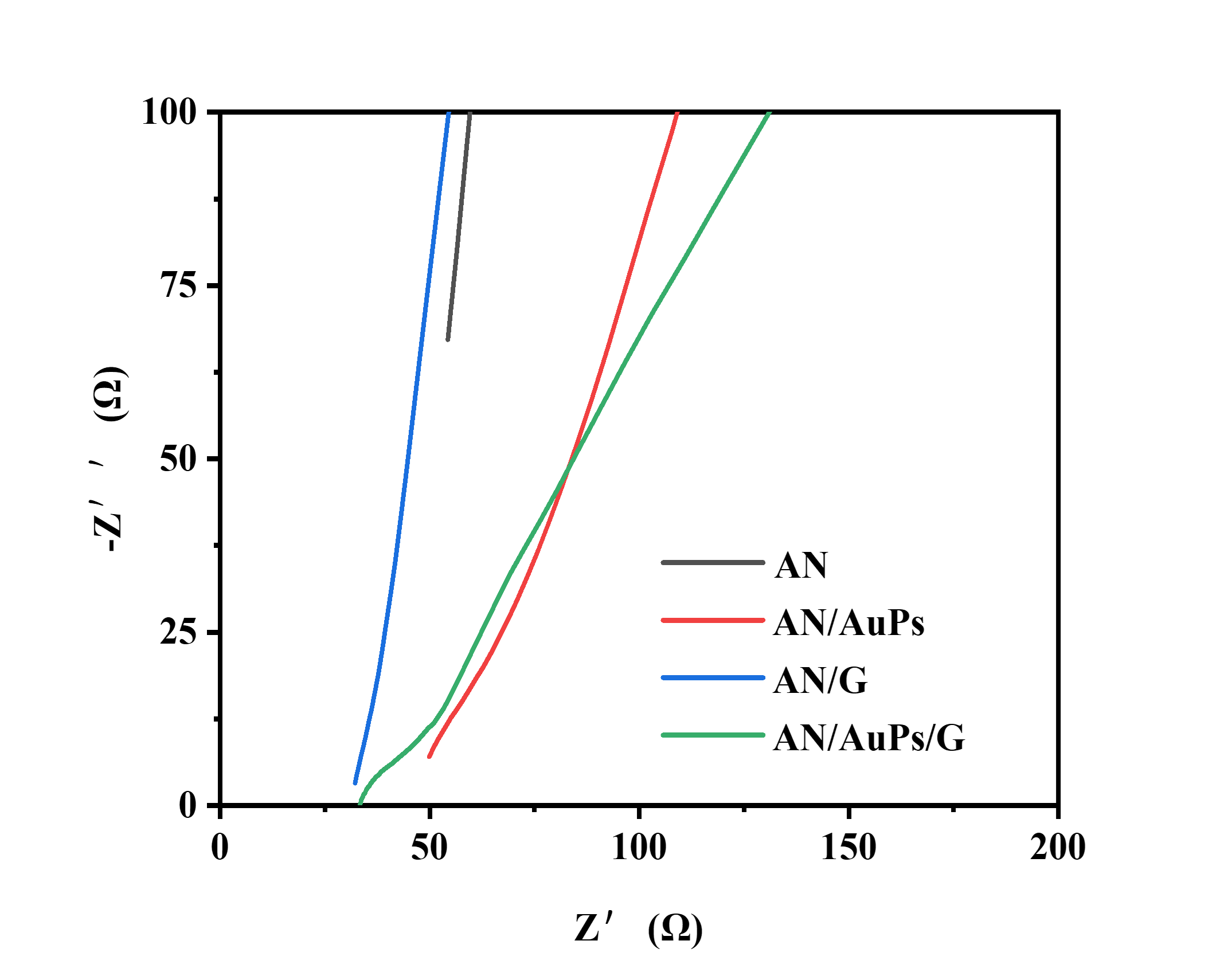
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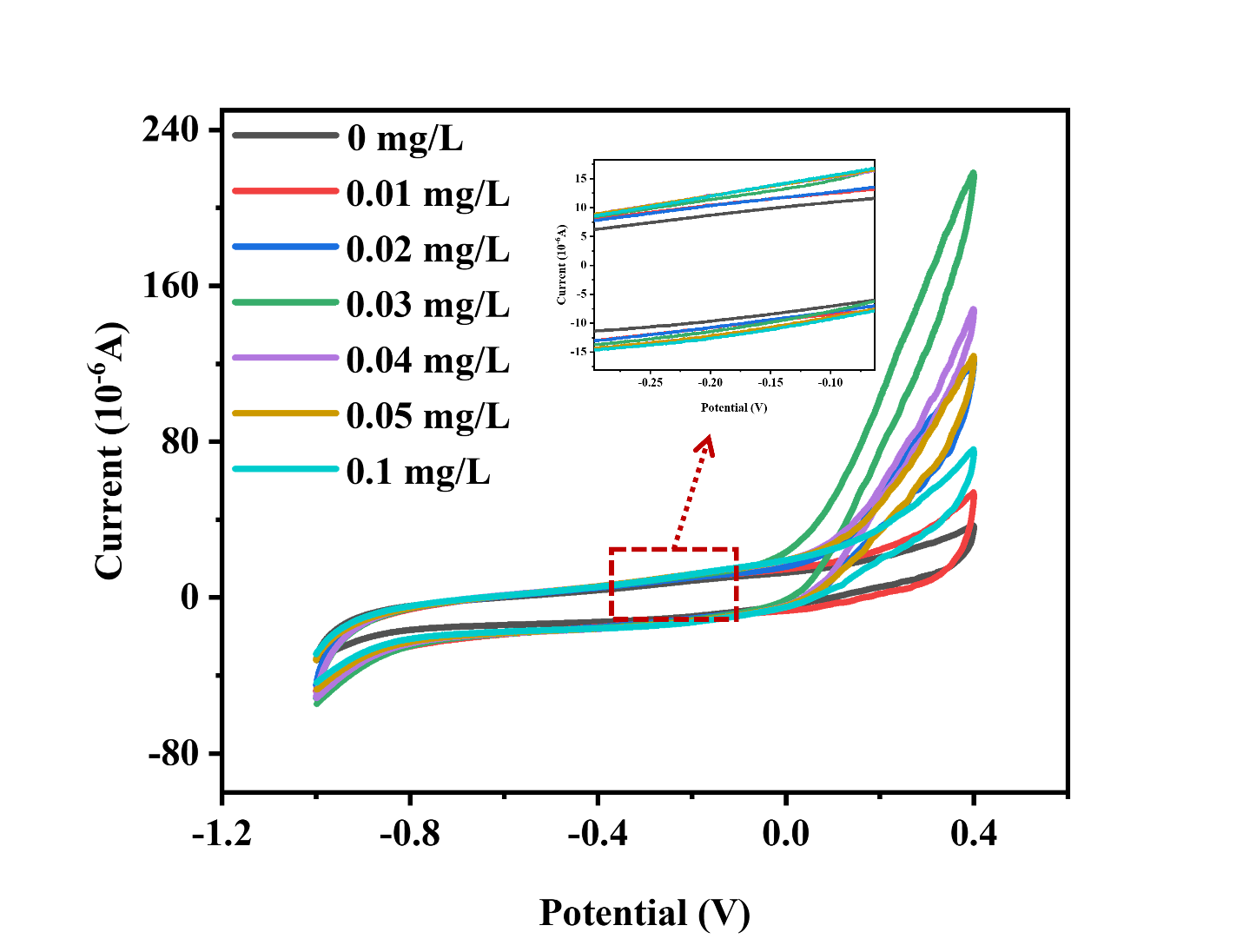
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**Fig. S1.** **EDS: The rest of the Element diagram.**



**Fig. S2. EIS of AN, AN/AuPs, AN/G, AN/AuPs/G in a 0.1M KCL solution (containing 5.0 mM K3[Fe (CN)6]).**



**Fig. S3.**  **CVs of different concentrations of histamine solution on AN/AuPs/G.**

**Table S1**   **Different substances shared the same concentration**

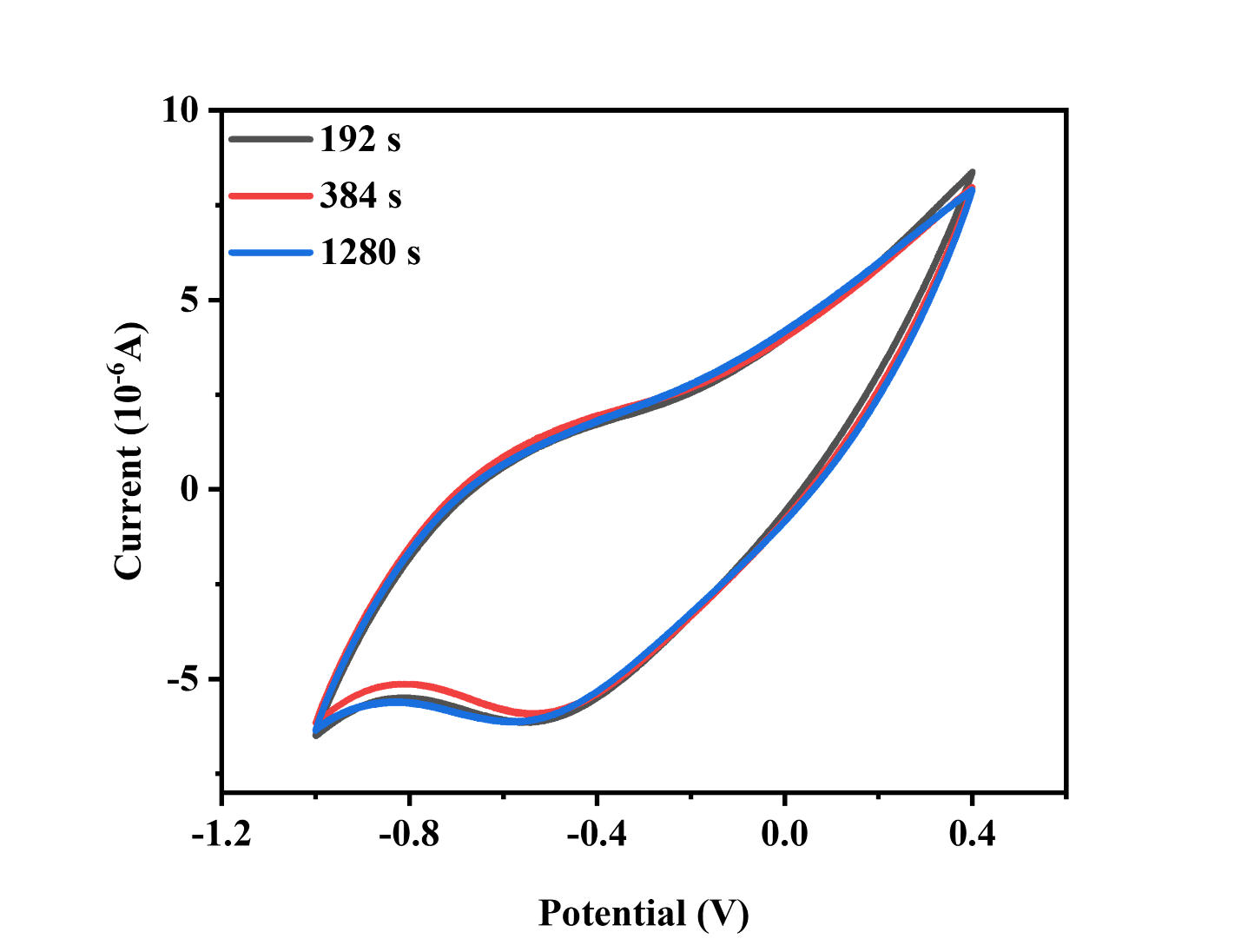
|  |  |  |  |
| --- | --- | --- | --- |
| Substance | Molecular mass | Configurable concentration (mg/L) | Actual concentration (μM) |
| KCl | 74.45 | 5 | 67 |
| CaCl2 | 110.9 | 5 | 45 |
| C5H14N2 | 88 | 5 | 56 |
| C6H9N3O2 | 155 | 5 | 32 |
| C5H9N3 | 111.1 | 5 | 45 |



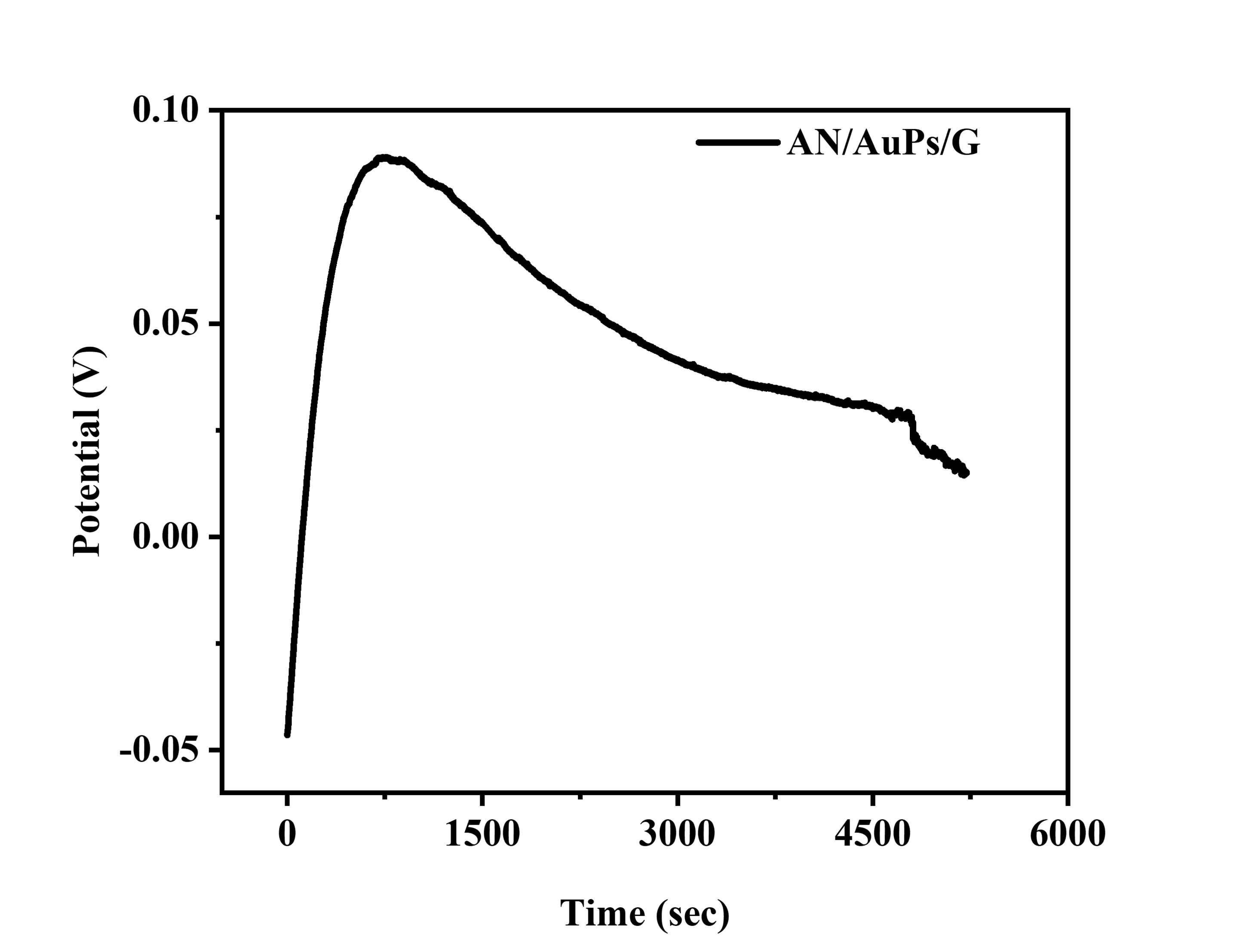
**Fig. S4. Image of the acupuncture experiment.**

Anesthetized rats were monitored the changes of histamine concentrations at the PC6 acupoint.

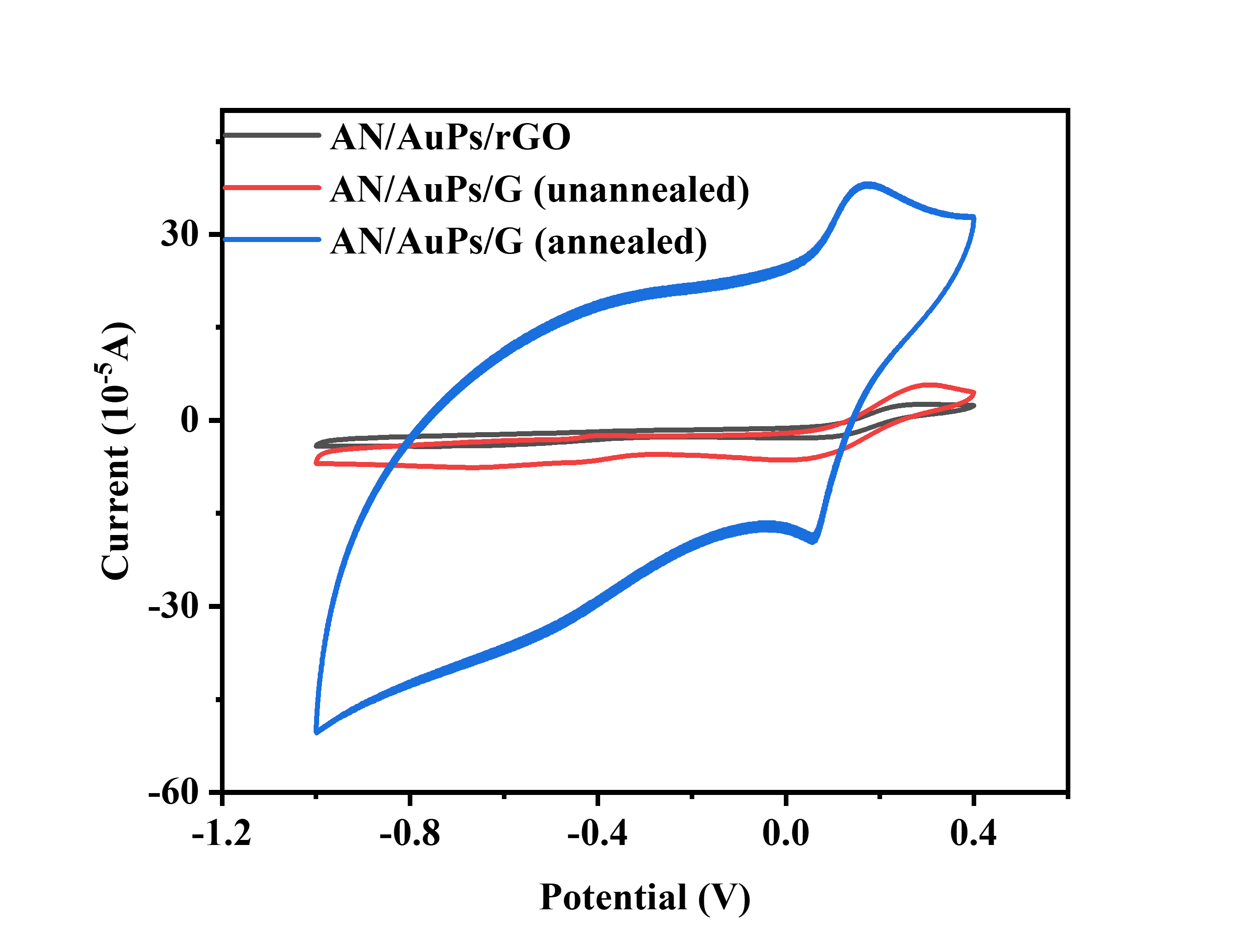
The AN or AN/AuPs/G electrodes were pierced 2~3 mm into the acupoint PC6, forming a three-electrode system.



**Fig. S5. CV of AN/AuPs/G: Real-time recording of AN/AuPs/G during the acupuncture experiment.** Anesthetized rats were monitored the changes of histamine concentrations at a site which was not an acupoint.



**Fig. S6. OCPT: Real-time recording of histamine concentrations at acupoint PC6 in anesthetized rats by the AN/AuPs/G biosensor during the acupuncture stimulation.**



**Fig. S7. CVs on** **AN, AN/AuPs, AN/AuPs/GO, AN/AuPs/G (unannealed),** **AN/AuNPs/G (annealed)** **biosensors in 0.1M KCl solution (containing 5.0 mM K3[Fe (CN)6]) with the scan rate of 100mV/s.**