Supplementary Information

# All-solid-state potassium-selective electrode using graphene as the solid contact

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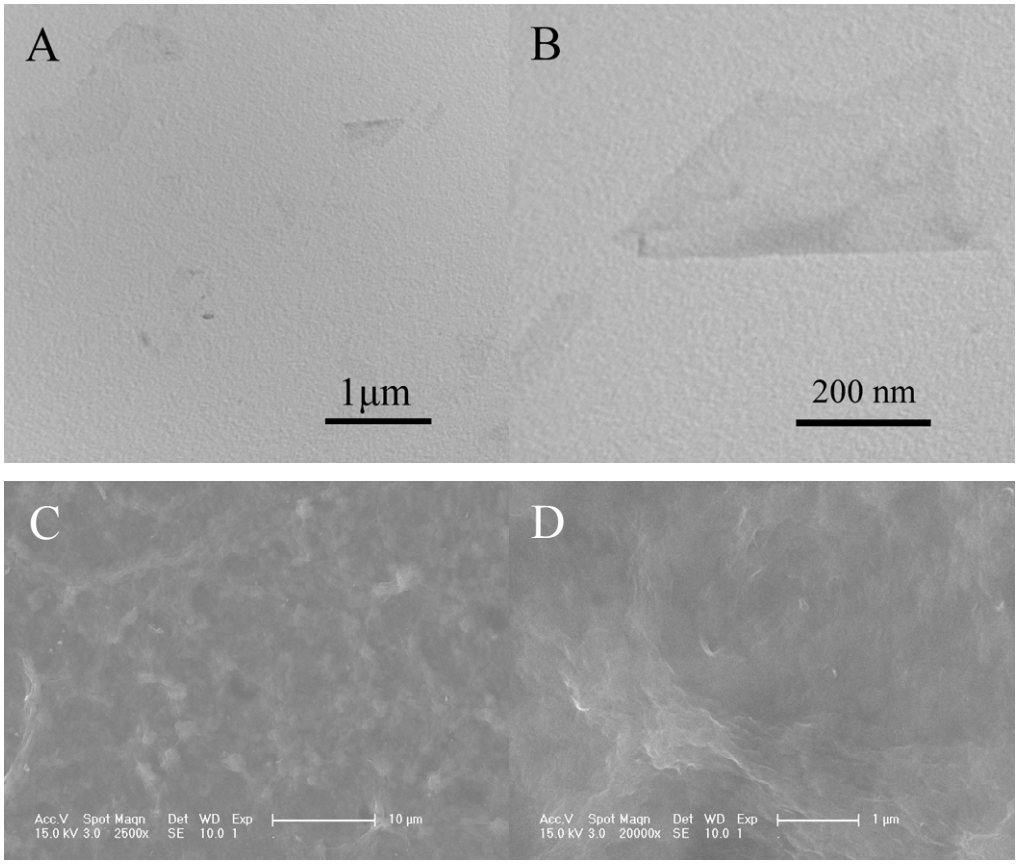


**Fig. S1.** (A, B) TEM images of the synthesized graphene sheets and (C, D) SEM images of the graphene transducer layer.

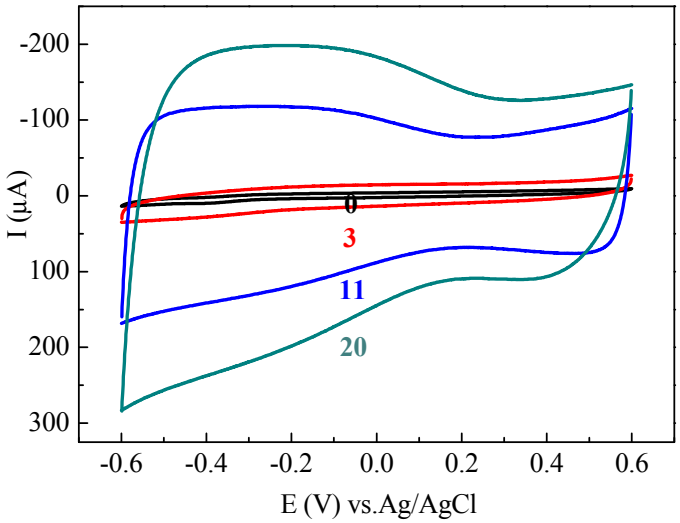


**Fig. S2.** CVs for the GC/graphene electrodes in 0.1 M KCl at different transducing layers. From inner to outer: 0, 3, 11, 20. *Potential scan* rate: 0.1 V $s^{-1}$.

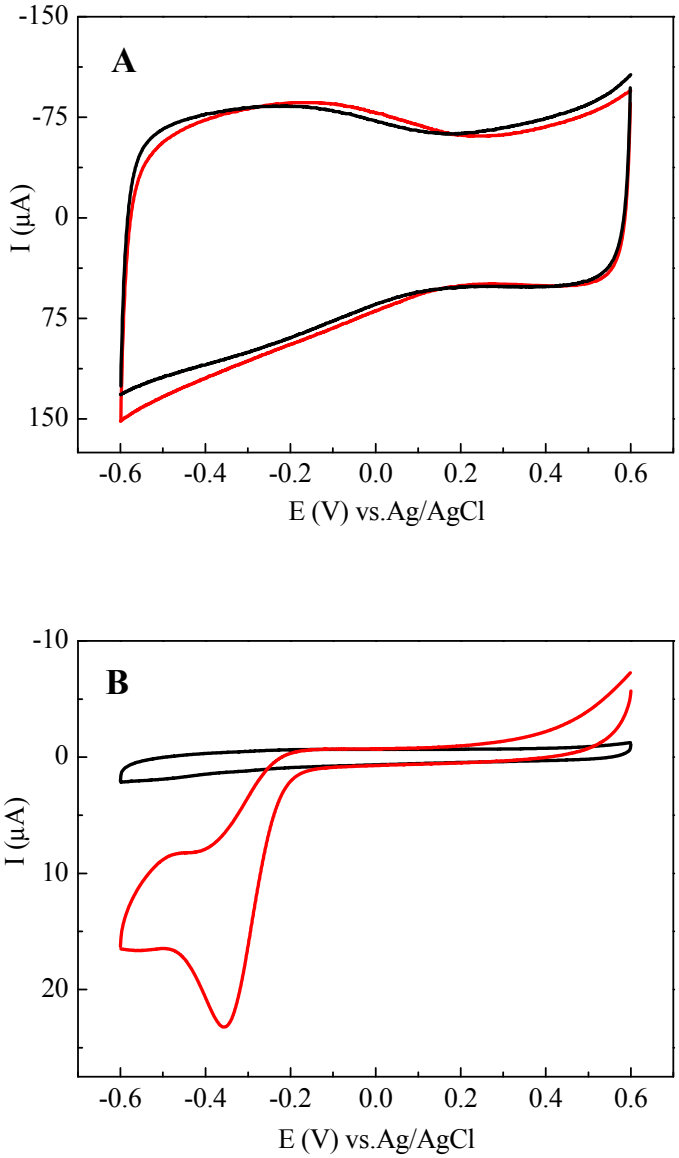


**Fig. S3.** CVs for GC/graphene electrodes (20 layers) (A) and bare GC electrodes (B) in 0.1 M KCl in the presence (red) and absence (black) of oxygen.

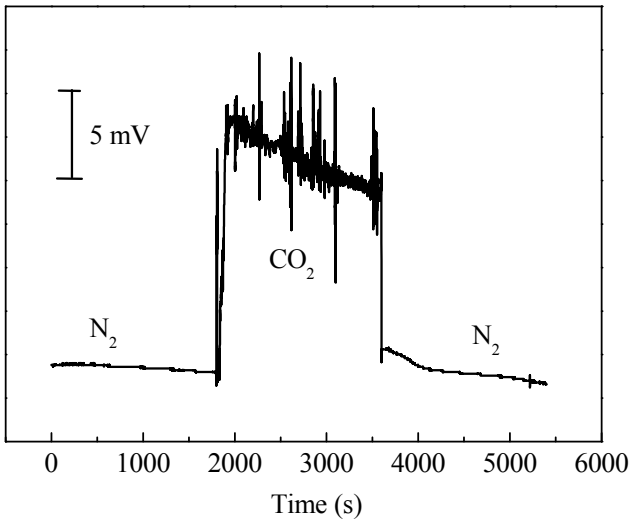


**Fig. S4.** Effect of $CO_2$ on the potential stability of GC/graphene/$K^+$-ISE.

| Brand of water | The dimension values (M) | Values detected by the electrode (M) |
|---|---|---|
| Quanyangquan | $2.05\text{-}7.67\times10^{-5}$ | $5.14\pm0.09\times10^{-5}$ |
| Nongfu spring | $\geq8.97\times10^{-6}$ | $2.31\pm0.10\times10^{-5}$ |
| Wahaha pure water added $1.0\times10^{-3}$ M $K^+$ | $1.0\times10^{-3}$ | $1.03\pm0.07\times10^{-3}$ |

**Table S1.** The detection of $K^+$ concentration in drinking water by the GC/graphene/$K^+$-ISE.