

Electronic supplementary information

**Graphitic carbon nitride nanosheets coated carbon black as high-performance PtRu catalyst support material for methanol electrooxidation**

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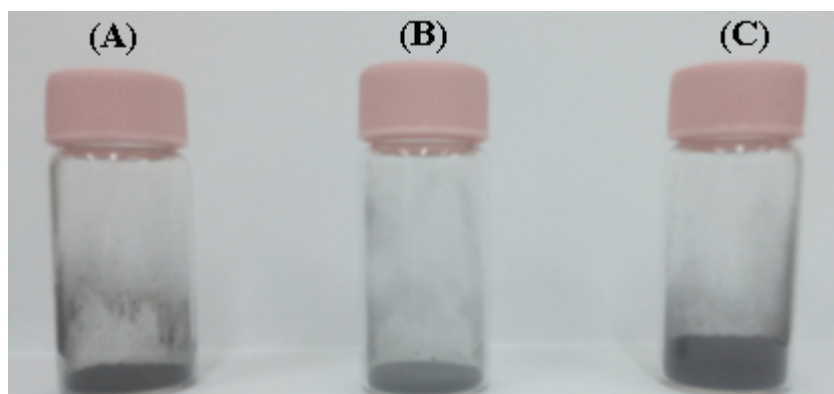
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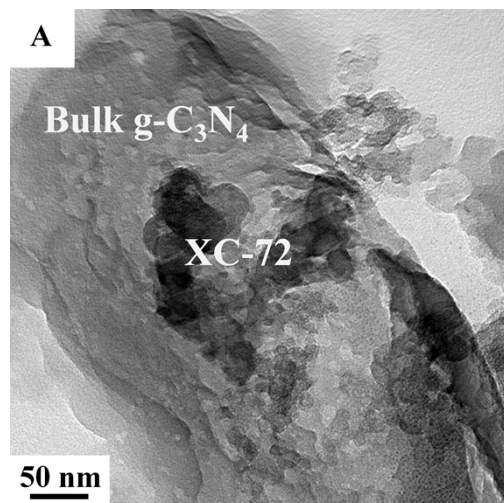
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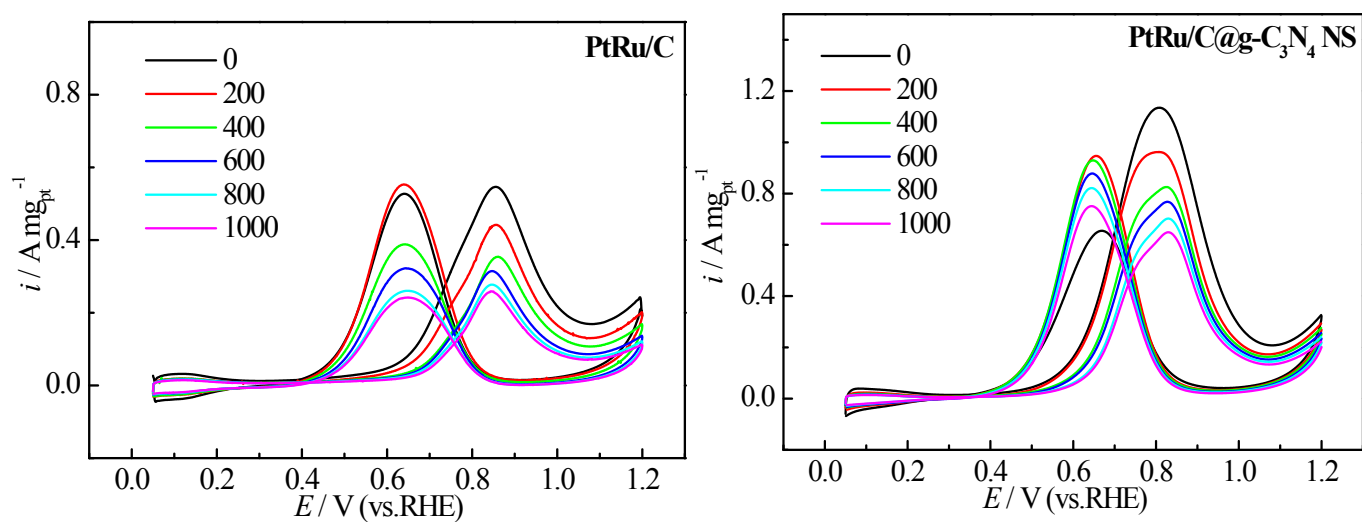
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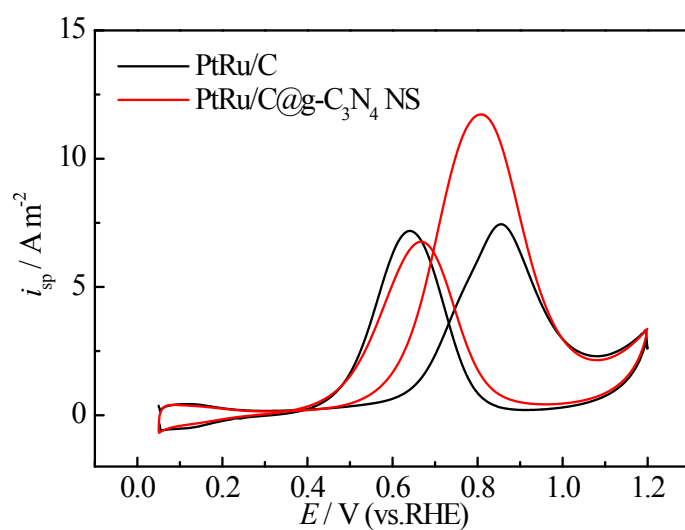
**Fig. S1** A volume comparison of 80 mg powder of Vulcan XC-72R (A), C@bulk g-C<sub>3</sub>N<sub>4</sub> (B) and C@ g-C<sub>3</sub>N<sub>4</sub> NS (C).



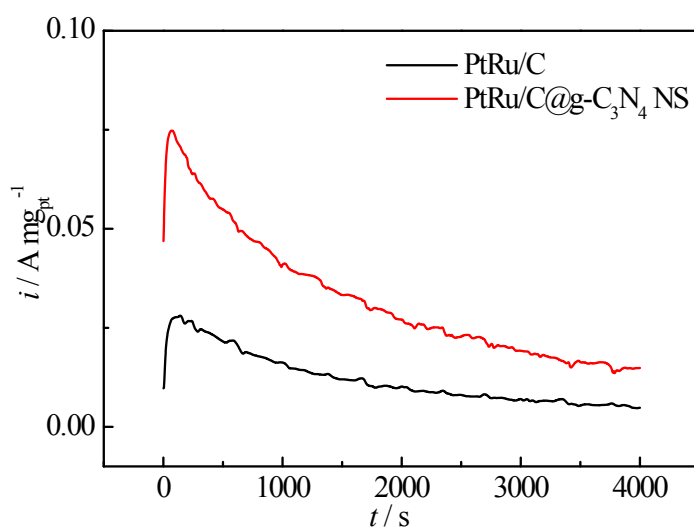
**Fig. S2** TEM images of C@bulk g-C<sub>3</sub>N<sub>4</sub>.



**Fig. S3** Cyclic voltammograms in an Ar-saturated solution of 0.5 mol L<sup>-1</sup> CH<sub>3</sub>OH and 0.5 mol L<sup>-1</sup> H<sub>2</sub>SO<sub>4</sub> at 25°C for PtRu/C and PtRu/C@g-C<sub>3</sub>N<sub>4</sub> NS catalysts during the accelerated potential cycling test. Scanning rate: 50 mV/s; Test temperature: 25°C.



**Fig. S4** The cyclic voltammograms of CH<sub>3</sub>OH electrooxidation with specific activity,  $i_{sp}/\text{A m}^{-2}$  (current density per electrochemical active specific surface area), on as-prepared PtRu/C and PtRu/C@g-C<sub>3</sub>N<sub>4</sub> NS catalyst. Scanning rate: 50  $\text{mV s}^{-1}$



**Fig. S5** Chronoamperometric curves of methanol electrooxidation in a solution of 0.5  $\text{mol L}^{-1}$  CH<sub>3</sub>OH and 0.5  $\text{mol L}^{-1}$  H<sub>2</sub>SO<sub>4</sub> on the PtRu/C and PtRu/C@g-C<sub>3</sub>N<sub>4</sub> NS catalysts. Potential at 0.6 V.