Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A
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Electronic supplementary information

Nitrogen-doped Graphene Decorated with Pt-Au Alloy Nanoparticles for Enhanced Electrochemical Activities

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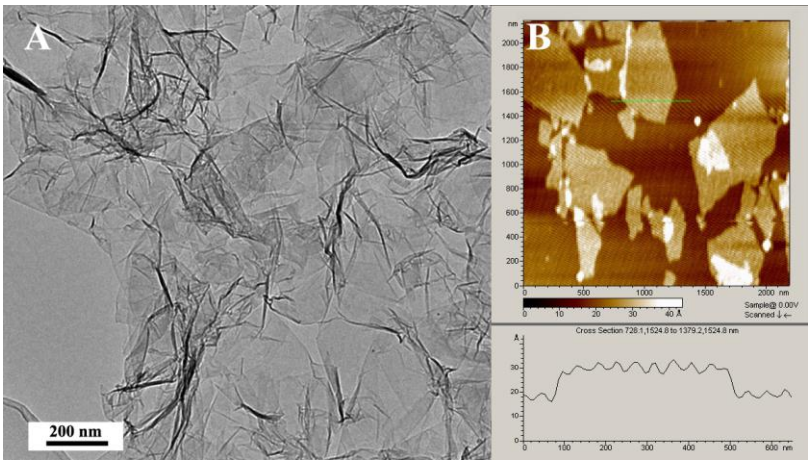

Figureure S1: Typical TEM (A) and AFM (B) images of the as-prepared N-G sheets.

As shown in Figure S1, TEM image exhibited a wrinkle-like thin sheet with many folds, which was the intrinsic feature of N-G sheets. The AFM image confirmed that the synthesized N-G had a thickness of approximately 1.1 nm.

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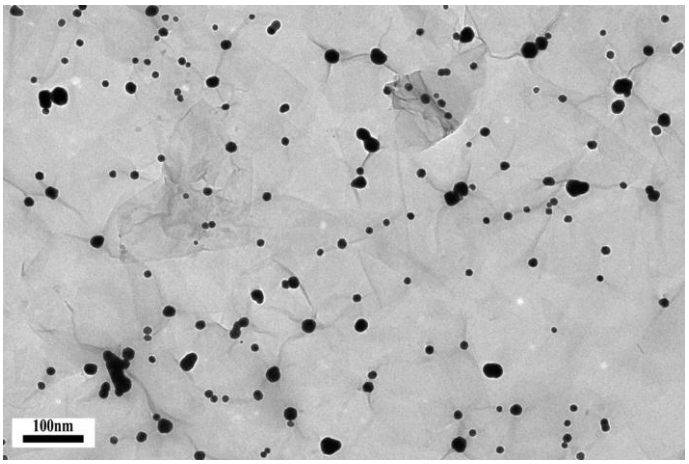

Figure S2: The Pt_3Au/N-G prepared via two steps: synthesis of Pt_3Au alloy NPs followed by simply mixing with N-G sheets under thorough stirring.

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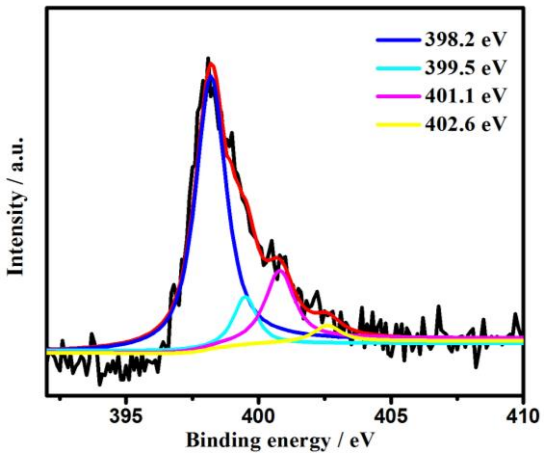

Figure S3: N1s XPS spectra of N-G.

The binding energy of nitrogen atoms in N-G sheets were characterized by high-resolution N1s XPS spectrum (Figure S2). The N1s spectrum of N-G could be fitted into four peaks at 398.2, 399.5, 401.1, and 402.6 eV. The peaks at about 398.2, 399.5 and 401.1 eV correspond to pyridine-like nitrogen, pyrrole-like nitrogen and "graphitic" nitrogen respectively. The high energy peak at 402.6 eV was commonly attributed to oxidized nitrogen.

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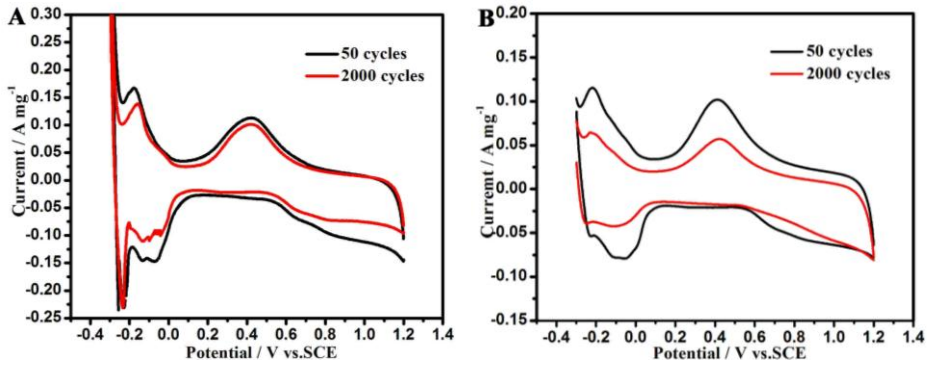

Figure S4: CVs of (A) the Pt_3Au/N-G and (B) E-TEK Pt/C in the N_2-saturated 0.5 M H_2SO_4 solution at different CV cycles at the scan rate of 50 mV s^{-1}.

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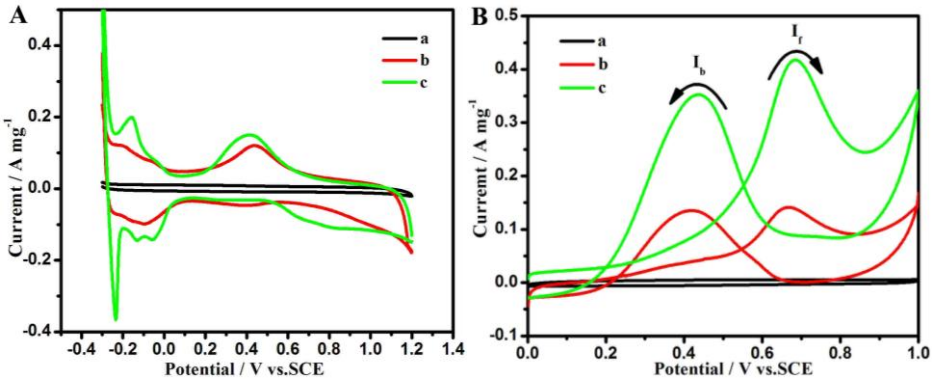

Figure S5: CVs of the N-G (a), Pt_3Au/CB (b) and Pt_3Au/N-G (c) catalysts in the N_2-saturated 0.5 M H_2SO_4 solution (A), N_2-saturated 0.5 M H_2SO_4 and 0.5 M CH_3OH solution (B) at the scan rate of 50 mV s^{-1}.