Electronic Supplementary Information for

New insights into how Pd nanoparticles influence the photocatalytic oxidation and reduction ability of g-C₃N₄ nanosheets

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Scheme S1. Schematic of photocatalytic experimental setup for NOx removal.



Scheme S2. Schematic of experimental setup for the photocatalytic reduction of CO₂.







Figure S1. TEM images (a ,b, c) of C_3N_4 -Pd-5% photocatalysts.





Figure S2. HRTEM images (a, b) of C_3N_4 -Pd-5% photocatalysts.





Figure S3. UV-vis DRS (a), TEM image (b), and Visible-light photocatalytic

performance of Pd^{2+}/C_3N_4 for NO removal.

Synthesis of Pd²⁺/C₃N₄ samples.

To prepare Pd^{2+}/C_3N_4 composites, 1.0 g of the as-prepared g- C_3N_4 was added into 100 mL of ethanol and was sonicated for 2 h to get thin g- C_3N_4 nanosheets. The resultant was dried at 60 °C. Then, 1g of the dried thin g- C_3N_4 nanosheets was added

into 100 mL of H₂O and was kept stirring for 30 min. Then, an appropriate amount of $Pd(NO_3)_2$ dissolved in 60 mL of H₂O was added dropwise into the above suspension (n(Pd) : n(C₃N₄) = 5%). After stirring for 30 min, the resulted suspension was aged for 2 h. Finally, the Pd²⁺/C₃N₄ samples were collected by filtration, washed with water and ethanol for four times and dried at 60 °C.

To explore the effect of Pd^{2+} on NO removal performance, we conducted an experiment in which g-C₃N₄ was immersed in $Pd(NO_3)_2$ and the photocatalytic activity of Pd^{2+}/C_3N_4 was tested as shown in Electronic Supplementary Information (Figure S3). The NO removal ratio of Pd^{2+}/C_3N_4 was 47.6%, slightly higher than the individual g-C₃N₄ (40.7%). The test showed that Pd^{2+} enriched composition did little to influence the photocatalytic activity in comparison with C₃N₄-Pd-5% (60.6%). It was Pd nanoparticles that played a dominant role in the enhancement of photocatalytic activity.



Figure S4. Visible-light photocatalytic performance of heat-treated C₃N₄-Pd-5% for

NO removal.

Synthesis of heat-treated C₃N₄-Pd-5% samples.

The as-prepared C_3N_4 -Pd-5% samples are under heat treatment for 400 °C in an hour to get heat-treated C_3N_4 -Pd-5% samples.