Electronic Supplementary Information

Hot electron prompted highly efficient photocatalysis based on 3D graphene/non-precious metal nanoparticles

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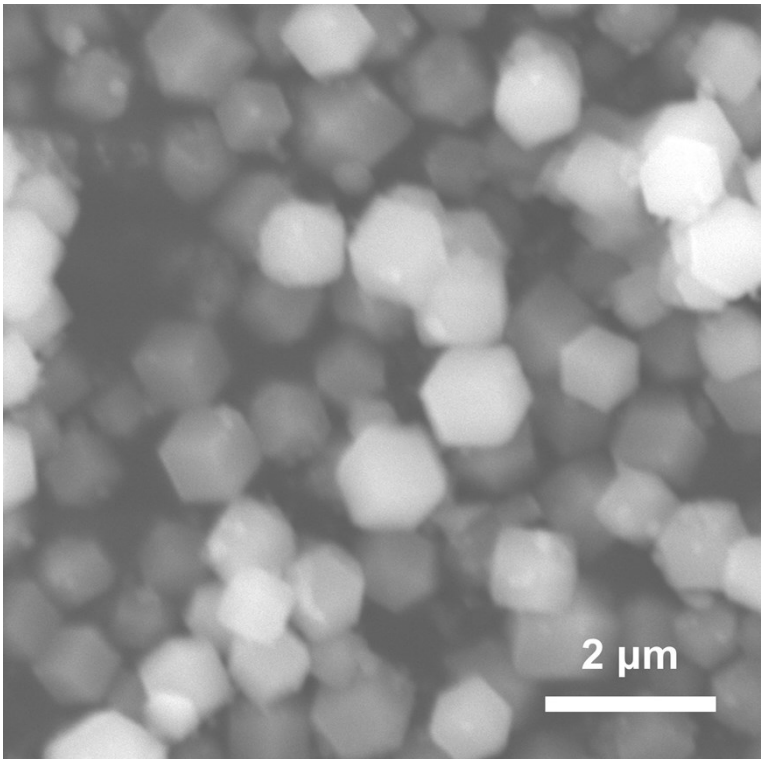

Figure S1 SEM image of prepared ZIF-67 crystals. The prepared ZIF-67 particles show polyhedral shape with a smooth surface and an average size of approximately 500-1000 nm.

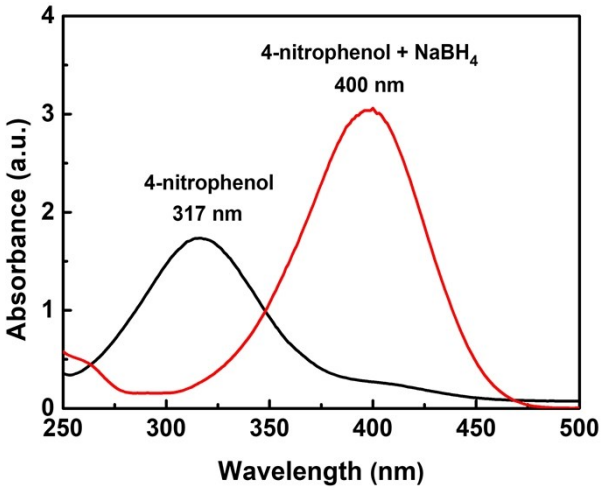

Figure S2 UV–vis spectra of 4-nitrophenol before (black line) and after (red line) adding the reducing agent of $NaBH_4$.

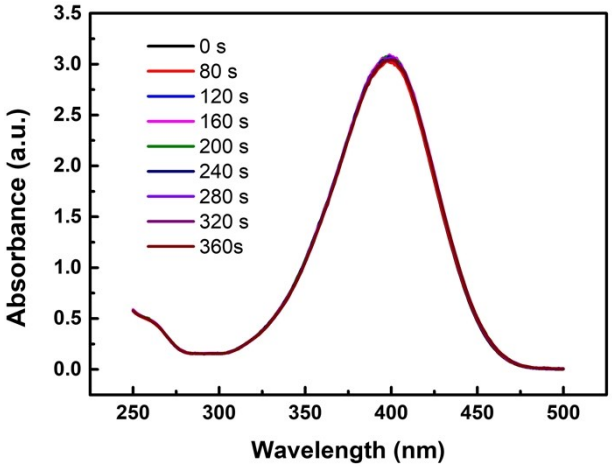

Figure S3 Successive UV–vis spectra for the reduction reaction of 4-nitrophenol by $NaBH_4$ without any catalyst.

Table S1. The apparent rate constant of each cycle based on 3DGraphene/NC@Co catalyst in the seven-cycle stability test for the reduction of 4-nitrophenol to 4-aminophenol at 25 ℃.

cycling number	apparent rate constant k (s^{-1})
1	0.01485
2	0.00982
3	0.00879
4	0.00628
5	0.00495
6	0.00366
7	0.00226

Table S2. The apparent rate constant of each cycle based on 3DGraphene/NC@Co catalyst in the seven-cycle stability test for the reduction of 4-nitrophenol to 4-aminophenol at 0 ℃.

cycling number	apparent rate constant k (s^{-1})
1	0.00376
2	0.00354
3	0.00351
4	0.00317
5	0.00239
6	0.00148
7	0.00117

Table S3. The apparent rate constant of each cycle based on 3DGraphene/NC@Co catalyst in the seven-cycle stability test for the reduction of 4-nitrophenol to 4-aminophenol at 35 ℃.

cycling number	apparent rate constant k (s^{-1})
1	0.01740
2	0.01736
3	0.01710
4	0.01598
5	0.01412
6	0.01302
7	0.00891