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Supporting information

One-step Synthesis of SnO_2 Nanoparticles-Loaded Graphitic Carbon Nitride Hybrids and their Application in Thermal Decomposition of Ammonium Perchlorate

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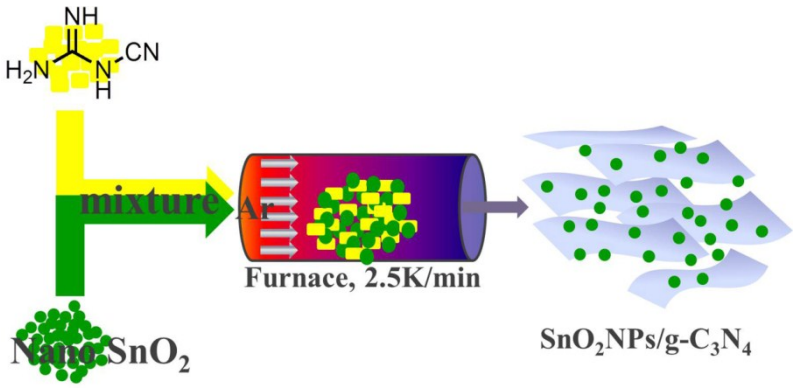

Fig. S1 Preparation schematic of micron SnO_2NPs/g-C_3N_4 of the one-step for calcination

Raw materials of dicyandiamide (DCDA) and high-purity SnO_2 nanoparticles were mixed uniformly, than the mixed powder was placed in the tubular furnace atmosphere and calcined at 550 °C under argon flow with a heating rate of 2.5 K •min^{-1}.

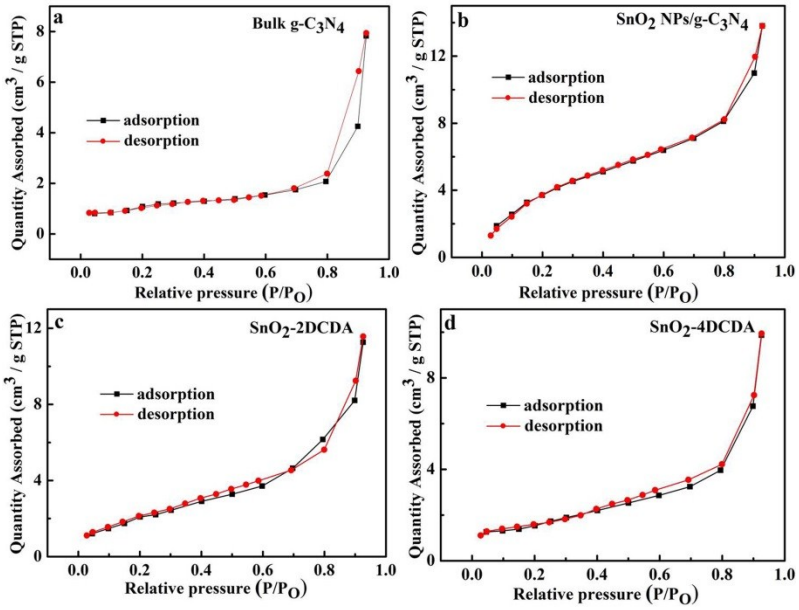

Fig. S2 The N_2 sorption-desorption isotherm of the bulk g-C_3N_4 (a), SnO_2NPs/g-C_3N_4 hybrids (b), hybrids 2 (prepared by molar ratios of 1:2 between SnO_2NPs and DCDA) (c), hybrids 3(prepared by molar ratios of 1:4 between SnO_2NPs and DCDA) (d).

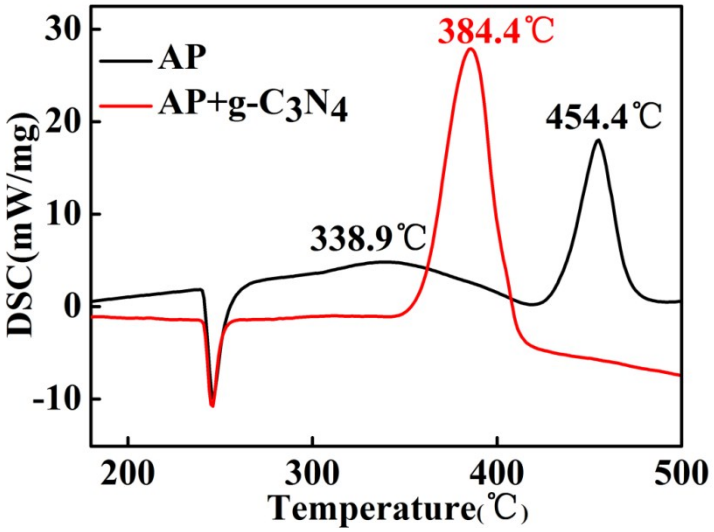

Fig. S3 DSC curves of pure AP and AP mixed with g-C_3N_4.

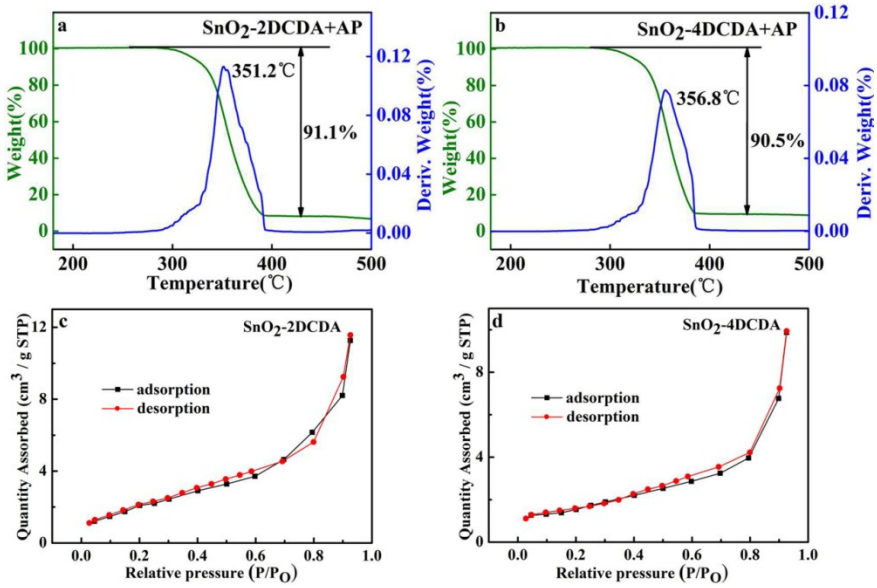

Fig. S4 (a) TGA-DTG curve of AP mixed with SnO_2-2DCDA, (b) SnO_2-4DCDA (the molar ratio between SnO_2NPs and (DCDA) equal 1:4 and 1:2, respectively.). (c) The N_2 sorption-desorption isotherm of the hybrids 2 (prepared by molar ratios of 1:2 between SnO_2NPs and DCDA) (c), hybrids 3 (prepared by molar ratios of 1:4 between SnO_2NPs and DCDA) (d).

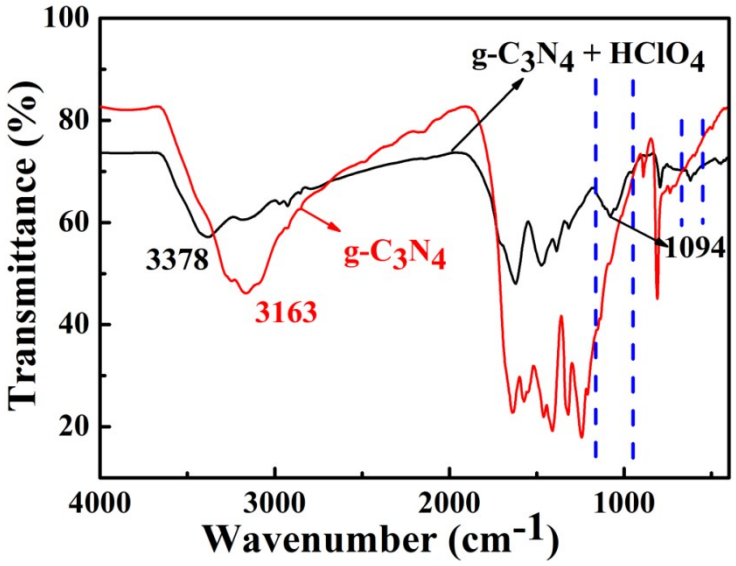

Fig. S5 FT-IR spectra of crude g-C_3N_4 (red curve), treated g-C_3N_4 with $HClO_4$ (black curve).

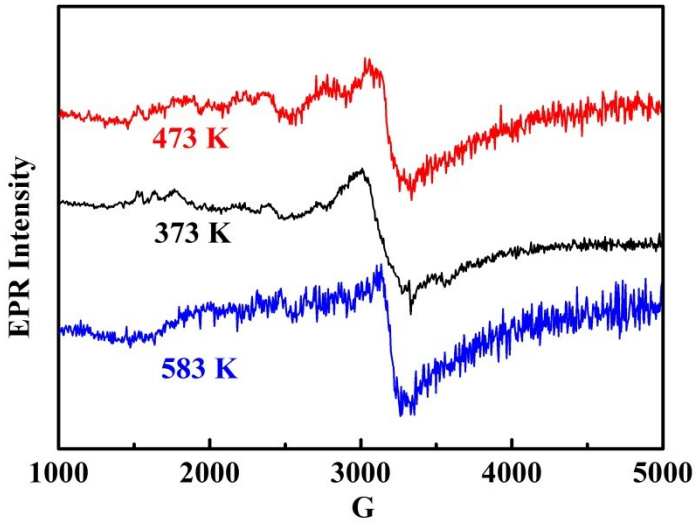

Fig. S6 Typical spin-adduct EPR of superoxide radicals

Fig. S6 exhibited the EPR of SnO_2NPs/g-C_3N_4, the obvious characterization peak is corresponded to the superoxide radicals.[S1]

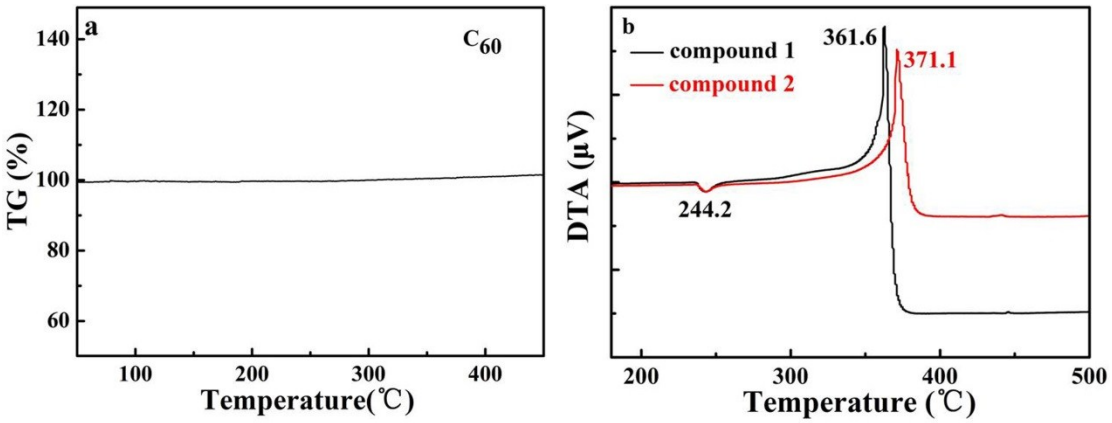

Fig. S7 (a) The TG curve of C_{60}. (b) DTA curves of compound 1 (SnO_2NPs/g-C_3N_4 : C_{60} : AP = 1 : 1 : 9, weight ratio) and compound 2 (SnO_2NPs/g-C_3N_4 : C_{60} : AP = 1 : 1.5 : 9).

As shown in Fig. S7, the TG curve of C_{60} confirmed that C_{60} is very stable before 450 °C. Interestingly, C_{60} is a kind of good substance for absorbing electrons and free radicals, so we designed the contrast experiment to verify the production of electron when SnO_2NPs/g-C_3N_4 was heat excitation. In the Fig. S6b, for compound 1, compared with the SnO_2NPs/g-C_3N_4 hybrids (352.2 °C), the addition of fullerene resulted in lagging of the decomposition temperature (361.6 °C). Meanwhile, for the compound 2, with the increase of fullerene weight, the lagging trend of decomposition temperature was increased. Above results confirmed that SnO_2NPs/g-C_3N_4 can product the electrons and holes under heat excitation.

[S1] Villamena, F, A.; Zweier, J, L. *Antioxid. Redox Sign.* **2004**, 6, 619-629.