Supporting information

Graphitic carbon nitride ($g\text{-}C_3N_4$) as a metal-free catalyst for thermal decomposition of ammonium perchlorate

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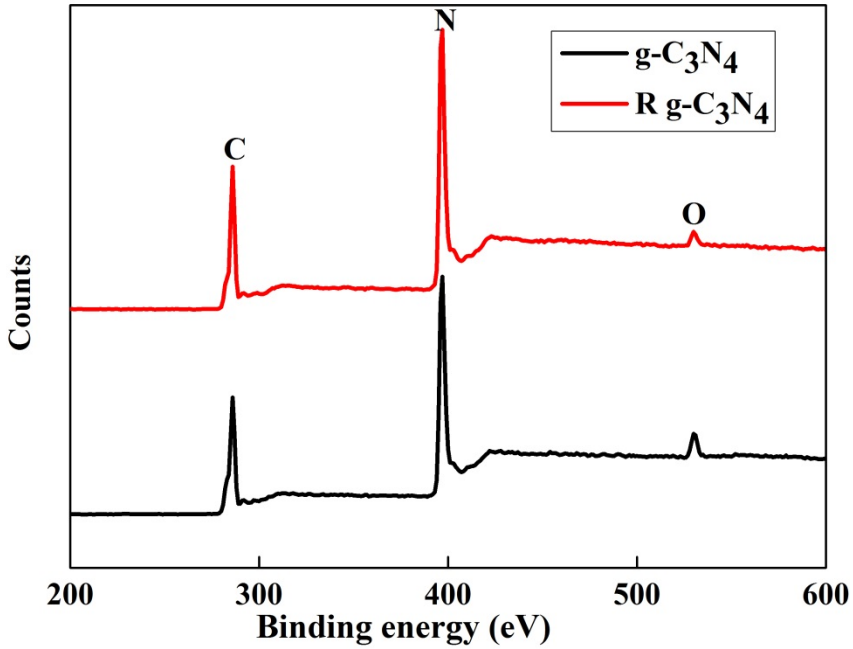

Figure S1. X-ray photoelectron spectroscopy of g-C_3N_4 sample and residual g-C_3N_4.

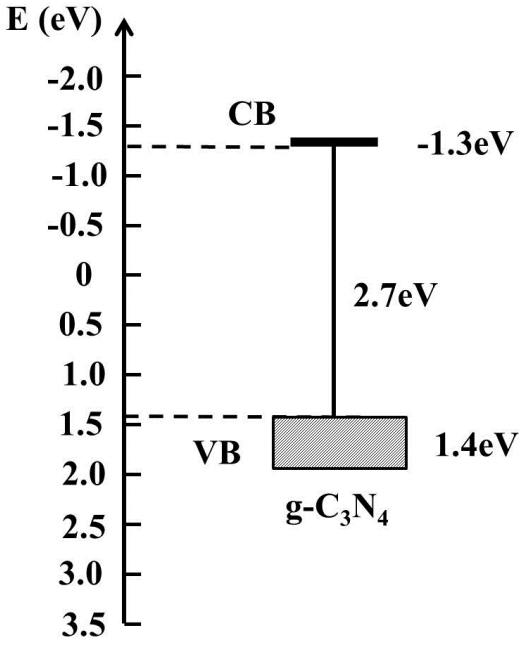

Figure S2. Electronic band structure of g-C_3N_4.

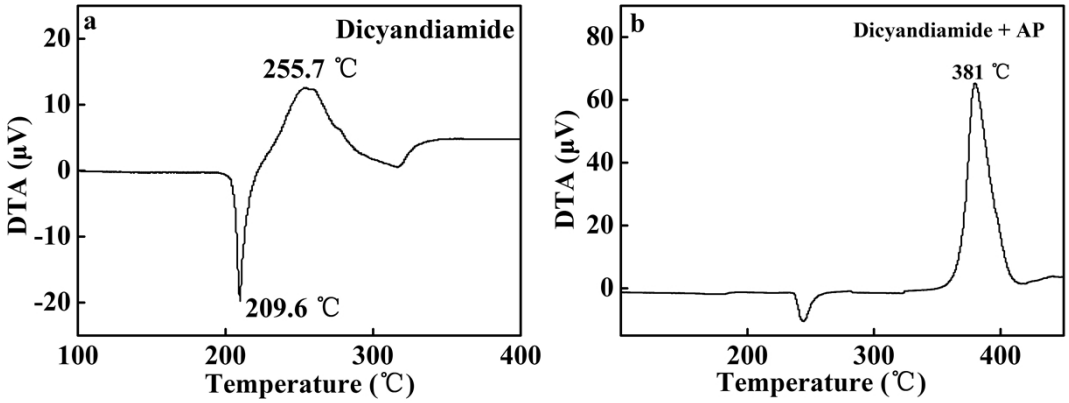

Figure S3. DTA curves of pure dicyandiamide (a), and AP mixed with 10 wt% dicyandiamide (b) at a heating rating of 10 °C•min^{-1}.

As shown in Figure S3, the decomposition temperature of dicyandiamide (DCDA) at about 255.7 °C, demonstrated that DCDA has no effect on ammonium perchlorate (AP). Compared with the AP with 10 wt% DCDA (Figure S3b), the decomposition

temperature of AP at 381 °C, (g-C_3N_4 was produced by the decomposition of DCDA at 381 °C), which is similar to previous report (Figure 2). Above results confirmed that g-C_3N_4 is unique among metal free substance in promoting AP decomposition in background studies.

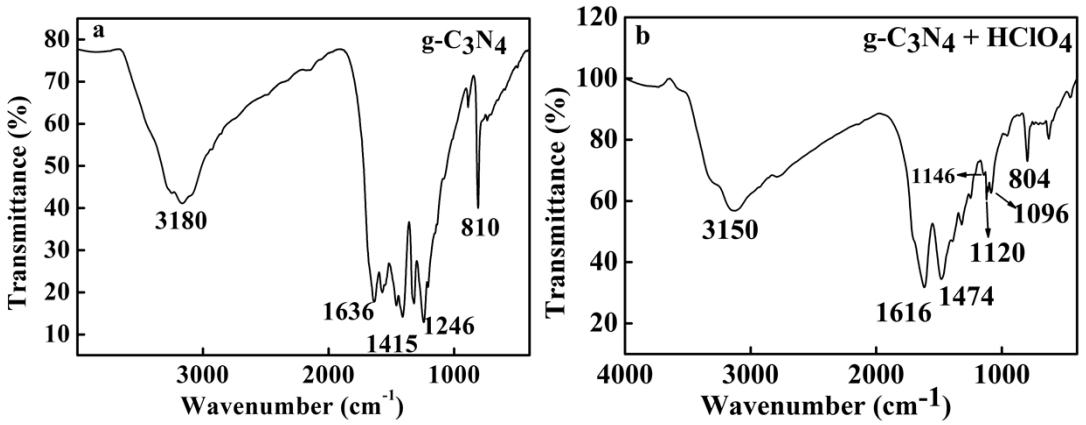

Figure S4. FT-IR spectra of crude g-C_3N_4 (a) and treated g-C_3N_4 with $HClO_4$ (b).

In order to demonstrate the acid base reaction is involved in the mechanism, g-C_3N_4 was mixed with $HClO_4$ and incubated for 5 min, followed by centrifugation and air-drying. The treated g-C_3N_4 was further investigated by FT-IR. As shown in Figure S4, there was an obvious change of the FT-IR spectra of crude g-C_3N_4 and treated g-C_3N_4. The peaks at 1146, 1120 and 1096 cm^{-1} are the characteristic peaks of ClO_4^-. Therefore, we confirmed that acid base reaction is involved in the catalytic mechanism.