Metal-free mesoporous carbon nitride catalyze the Friedel–Crafts reaction by activation of benzene

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Table S1. Surface compositions and the C/N molar ratio of mpg-C_3N_4 prepared with different precursors, detected by XPS measurement

Element	At. % (mpg-C_3N_4_D)	At. % (mpg-C_3N_4_U)	At. % (mpg-C_3N_4_G)
C1s	44.93	44.14	45.61
O1s	3.44	7.65	5.32
N1s	51.63	48.21	49.07
C/N	1.02	1.07	1.08

Table S2. Effect of different reaction parameters on the catalytic activity of mpg-C_3N_4_$D_{(0.7)}$

Entry	Variation	Conversion obtained at different reaction time / %				
		10	30	60	90	120
1	n-heptane [a, b]	74.6	89.1	89.7	92.8	95.6
2	Tetrachloromethane [a, b]	34.6	50.7	55.1	78.5	84.3
3	Benzene [a, b]	35.6	46.3	53.1	59.7	63.4
4	Tetrahydrofuran [a, b]	54.0	82.1	90.3	95.7	100
5	0.085 M [c, b]	—	38.6	46.9	49.8	50.4
6	0.127 M [c, b]	—	19.3	26.1	26.5	36.8
7	propyl alcohol [d, e]	38.6	46.5	65.3	73. 8	82.6
8	acetic acid [d,b]	38.3	39.0	51.7	61.8	70.1

[a] These are variations in the solvents; [b] The reaction conditions are those described in the text; [c] These are variations in the concentration of Hexanoyl chloride; [d] These are variations in the electrophiles; [e] Reaction temperature is 80 ºC.

Table S3. Conversions obtained at different temperatures as a function of reaction time

Temperature / ºC	Conversions (%) obtained at different reaction times / min			
	30	60	90	120
27	75.3	80.5	82.2	85.3
40	78.9	82.7	84.6	87.7
50	79.5	84.0	86.6	90.8
60	80.9	83.8	86.3	91.8
70	80.0	91.1	94.4	96.5
90	89.1	89.7	92.8	95.6

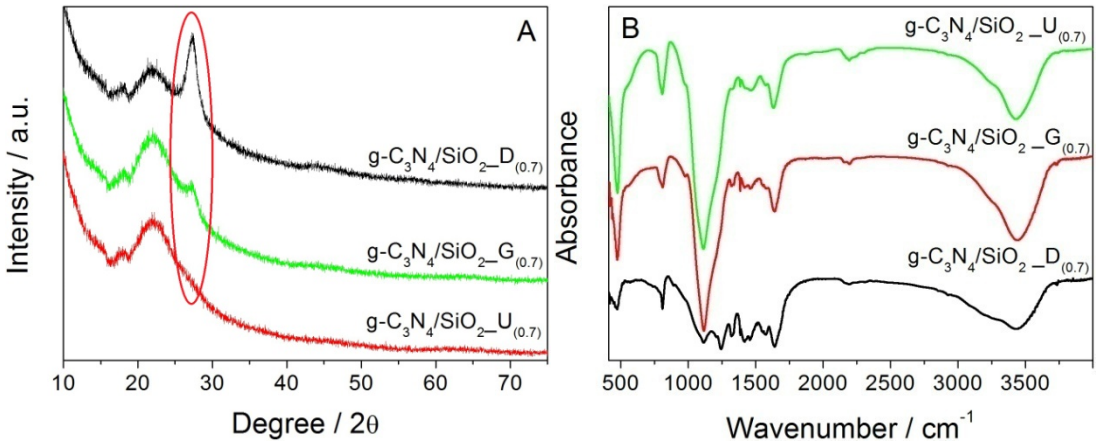

Figure S1. (A) Wide-angle XRD patterns and (B) FT-IR spectra for the supported g-C_3N_4/SiO_2 prepared with different precursors

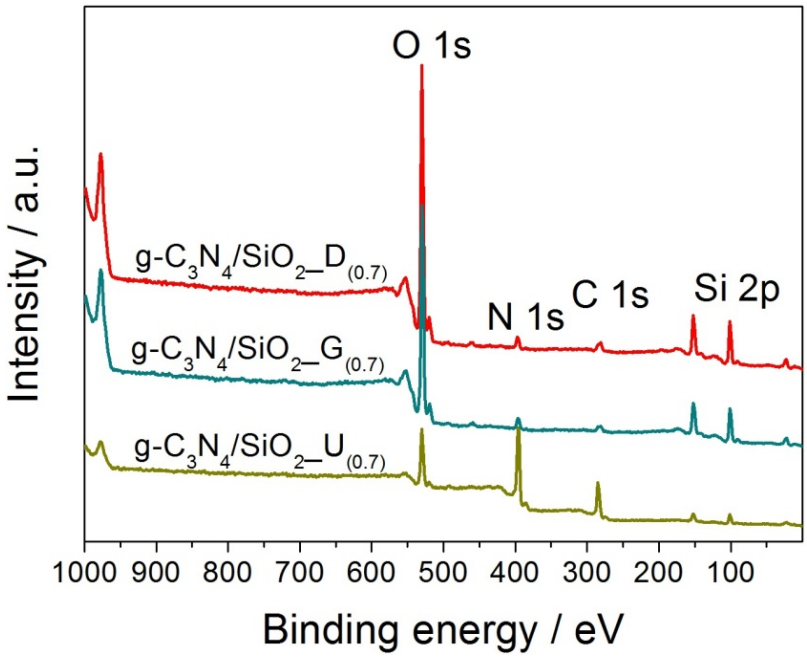

Figure S2. The XPS spectra for the supported g-C_3N_4/SiO_2 prepared with different precursors

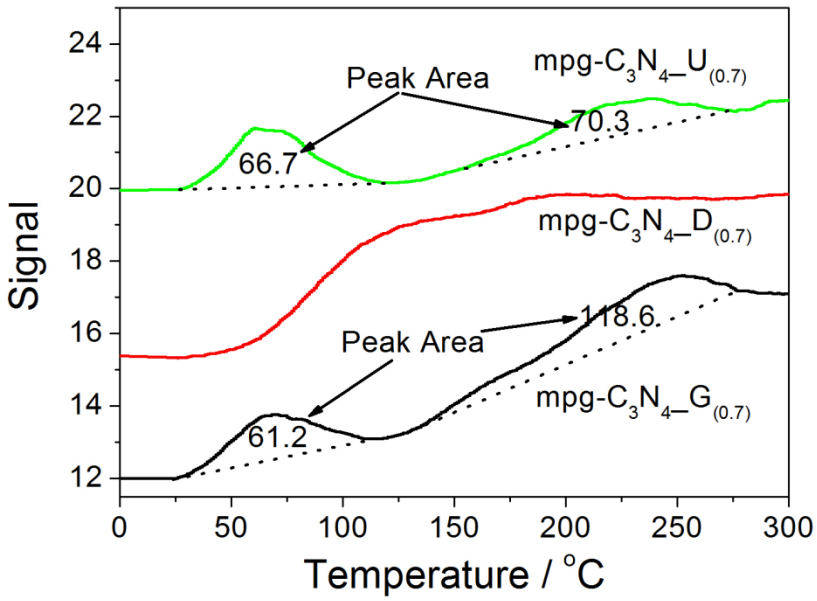

Figure S3. CO_2-TPD profiles measured from mpg-C_3N_4 prepared with different precursors

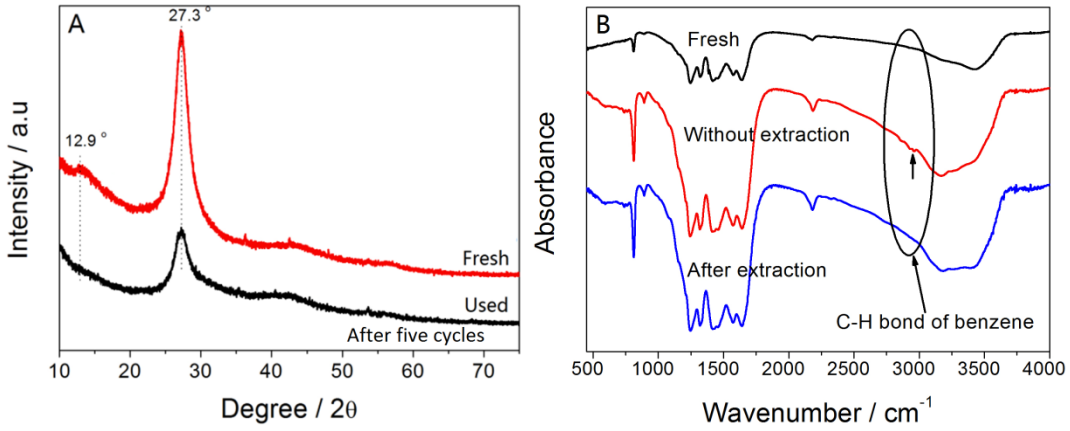

Figure S4. (A) Wide-angle XRD patterns and (B) FT-IR spectra for the fresh and used mpg-C_3N_4_$G_{(0.7)}$. In the FT-IR spectra the profile of the used mpg-C_3N_4_$G_{(0.7)}$, before and after the extraction of benzene by ethanol, were presented