Supporting Information

Polyethyleneimine-modified graphitic carbon nitride nanosheets: a label-free Raman traceable siRNA delivery system

Lei Liu[a,b,c], Xin Du[d,*]

[a] *Chemical Pharmaceutical Research Center, Tasly Academy, Tasly Holding Group Co., Ltd., Tianjin 300410, P.R. China.*
[b] *Jiangsu Tasly Diyi Pharmaceutical Co.,Ltd.,Huaian 223003, P.R. China.*
[c] *School of Chemical Engineering, The University of Adelaide, Adelaide, SA 5005, Australia.*
[d] *Beijing Key Laboratory for Bioengineering and Sensing Technology, Department of Chemistry & Biological Engineering, University of Science & Technology Beijing, Beijing 100083, P. R. China.*

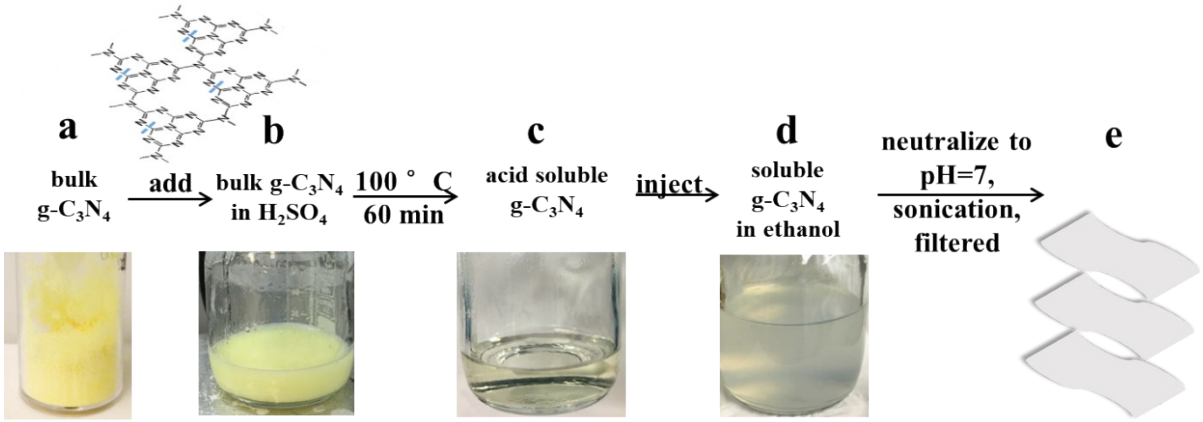

Fig. S1 Synthesis process of acidified layered g-C_3N_4 nanosheets and photographs of (a) bulk g-C_3N_4 powder, (b) g-C_3N_4 powder in H_2SO_4 before reaction, (c) acidified g-C_3N_4 nanosheets soluble in H_2SO_4 after reaction, (d) the suspension of acid-soluble g-C_3N_4 nanosheets in ethanol and (e) layered g-C_3N_4 nanosheets.

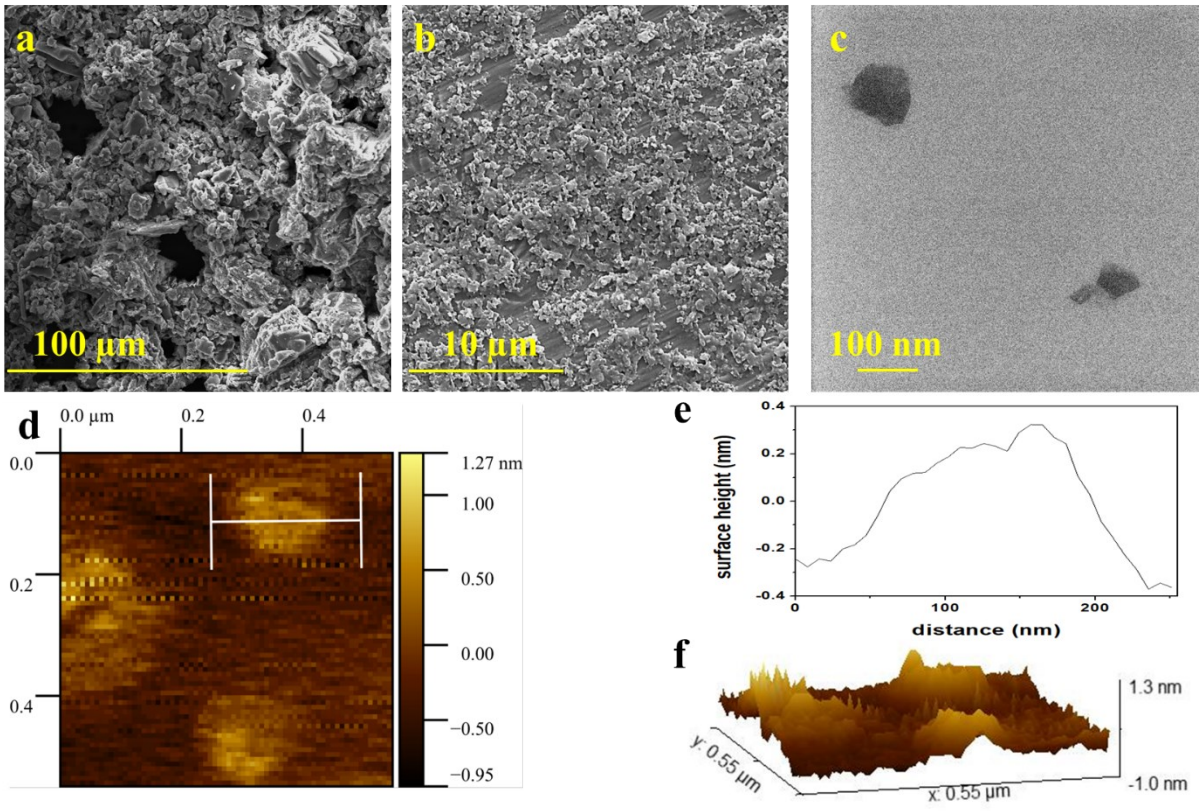

Fig. S2. SEM images of a) bulk g-C_3N_4 powder, b) layered g-C_3N_4 nanosheets and c) the TEM image of layered g-C_3N_4 nanosheets, (d) the AFM image of g-C_3N_4 nanosheets with a randomly selected line, (e) the surface height curve of the selected line from the AFM of g-C_3N_4 nanosheets, (f) the 3D pattern of g-C_3N_4 nanosheets.

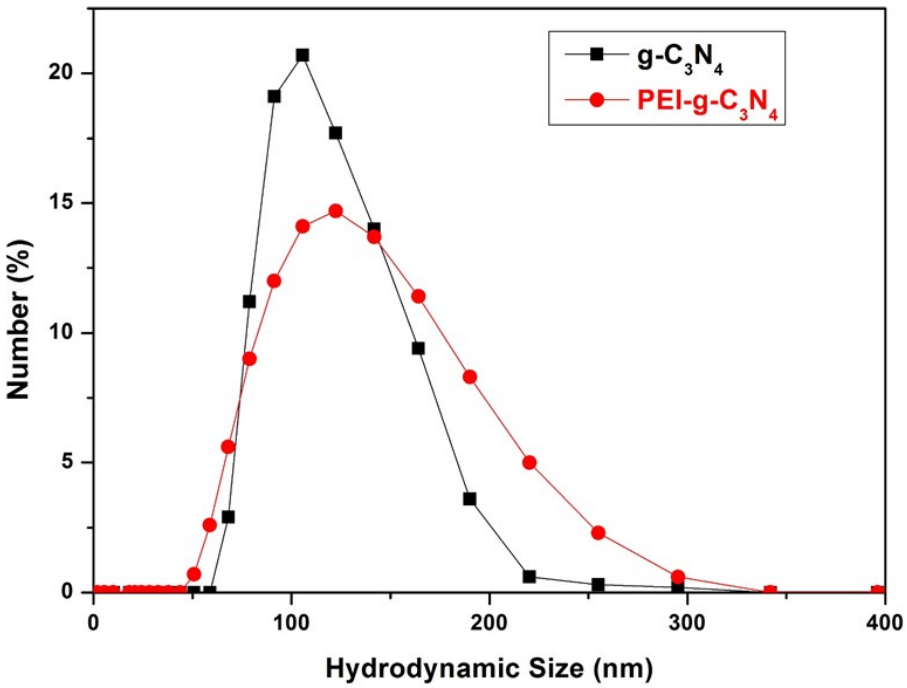

Fig. S3. Hydrodynamic size distributions of g-C_3N_4 nanosheets and PEI-g-C_3N_4 composites in water at pH 7.

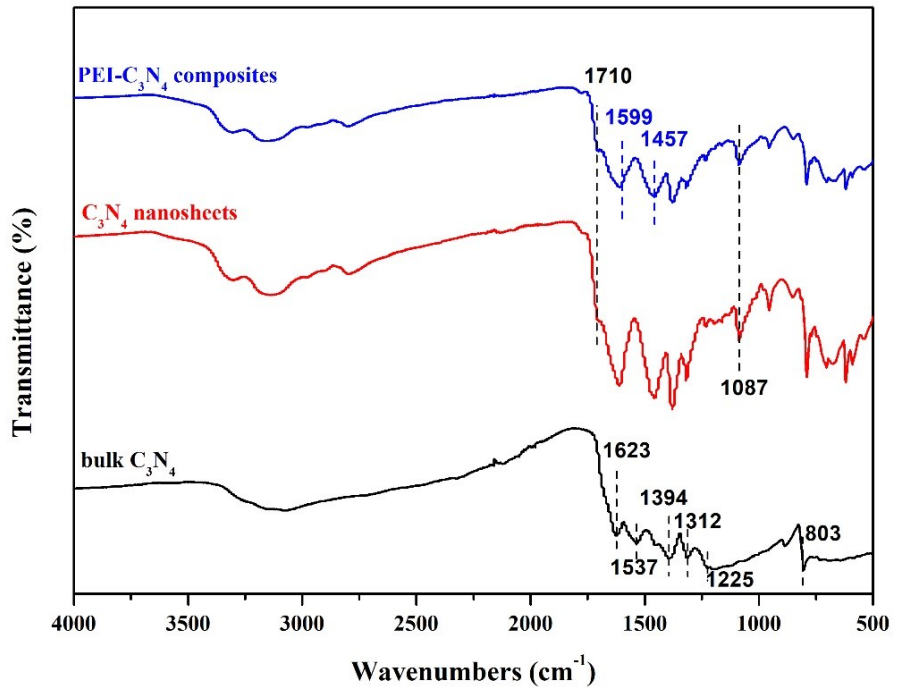

Fig. S4. FT-IR spectra of bulk g-C_3N_4 powder, g-C_3N_4 nanosheets and PEI-g-C_3N_4 composites.

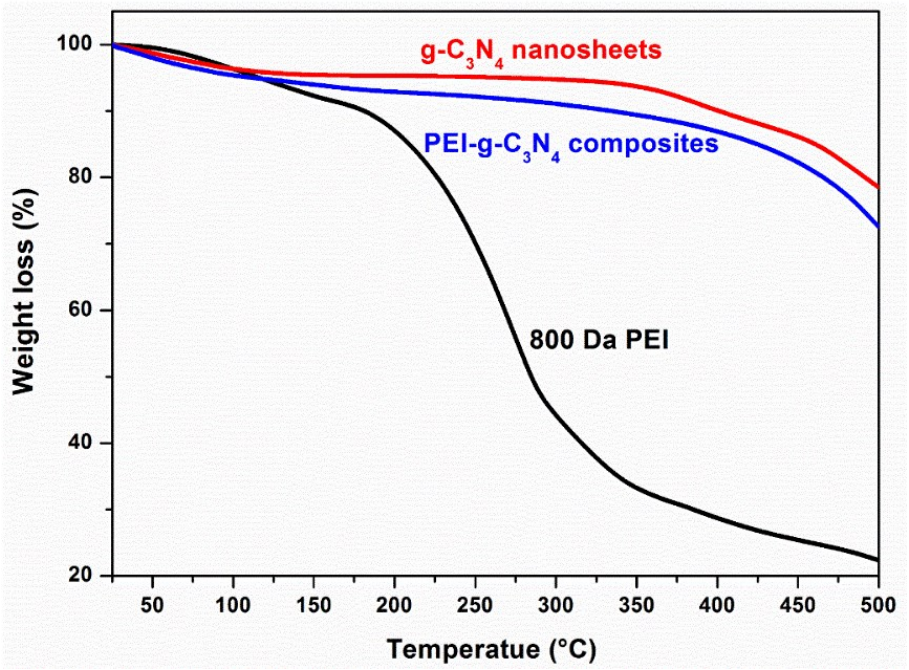

Fig. S5. TGA curves of the calcination processes of 800 Da of branched PEI, g-C_3N_4 nanosheets and PEI-g-C_3N_4 nanocomposites.

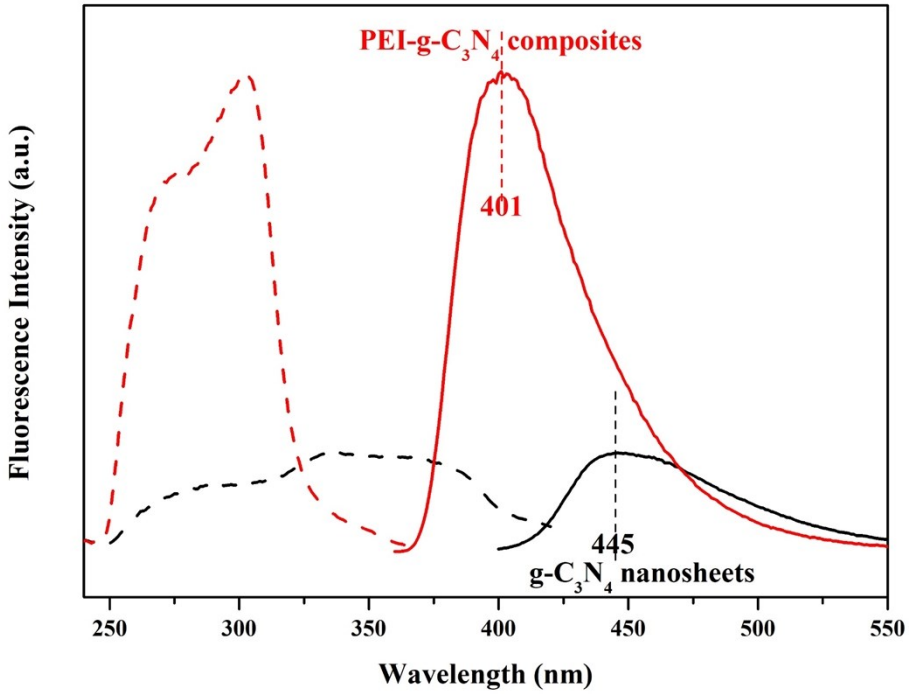

Fig. S6. Fluorescence excitation and emission spectra of g-C_3N_4 nanosheets and PEI-g-C_3N_4 composites.

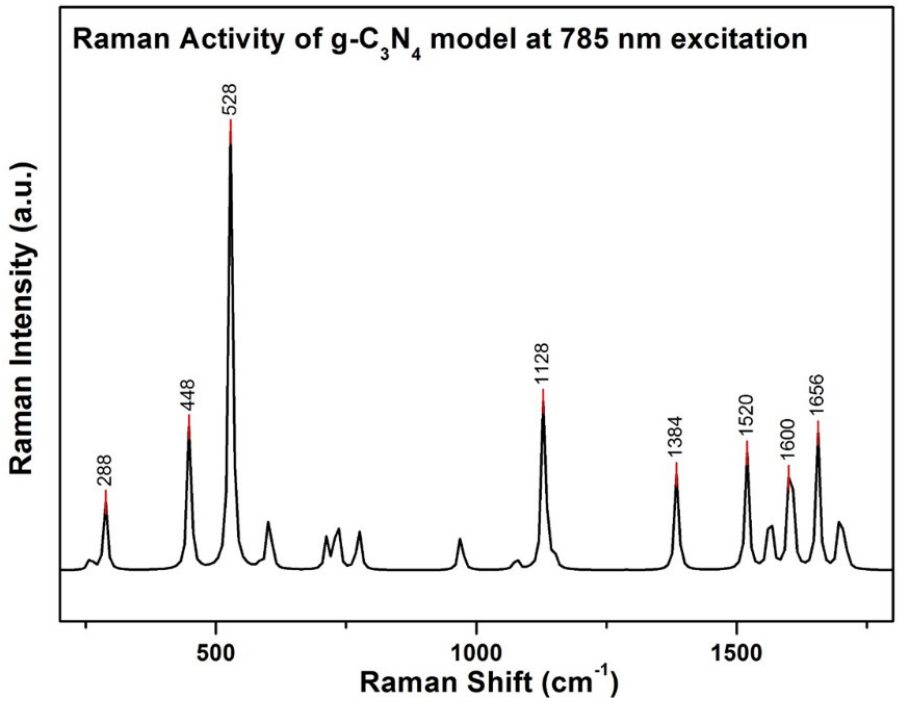

Fig. S7. The calculated Raman activity of g-C_3N_4 model under 785 nm excitation laser and the vibration animations of g-C_3N_4 model at 448 and 528 cm^{-1} Raman shift is in the followed mp4 videos S1 and S2 at https://doi. org/XXXXXXXX

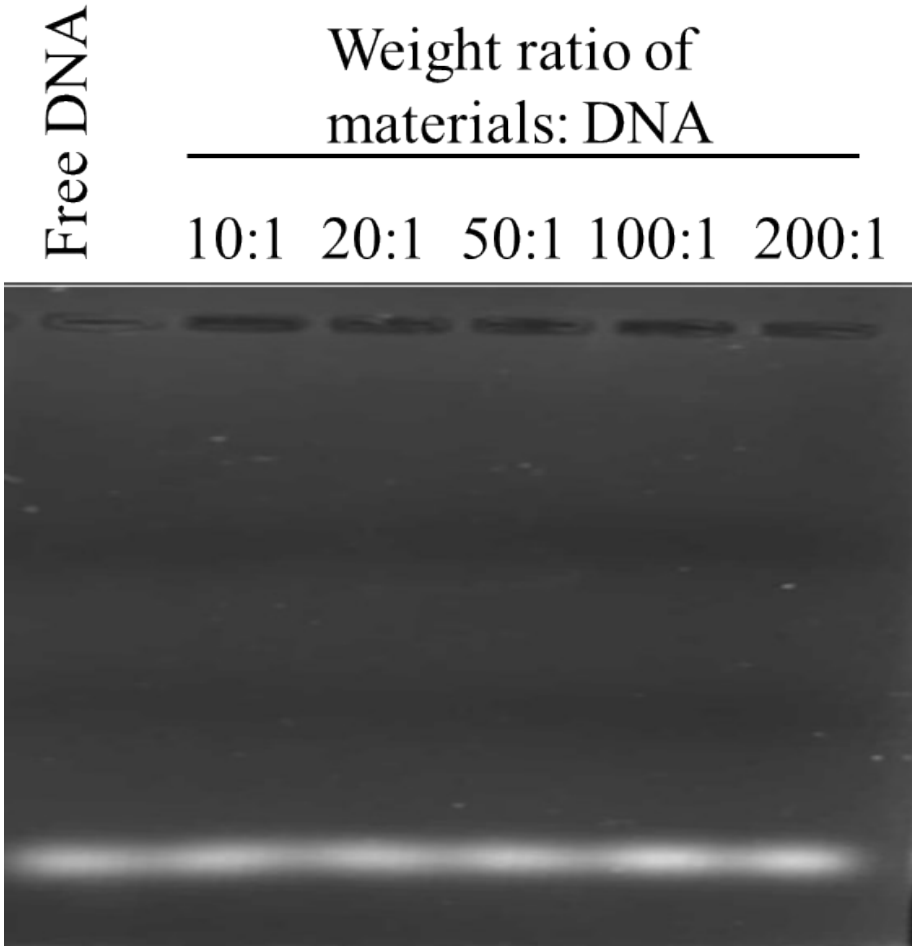

Fig. S8. Agarose gel electrophoresis indicating the model DNA binding capabilities of g-C_3N_4 nanosheets at different materials to DNA weight ratios from 10 to 200.

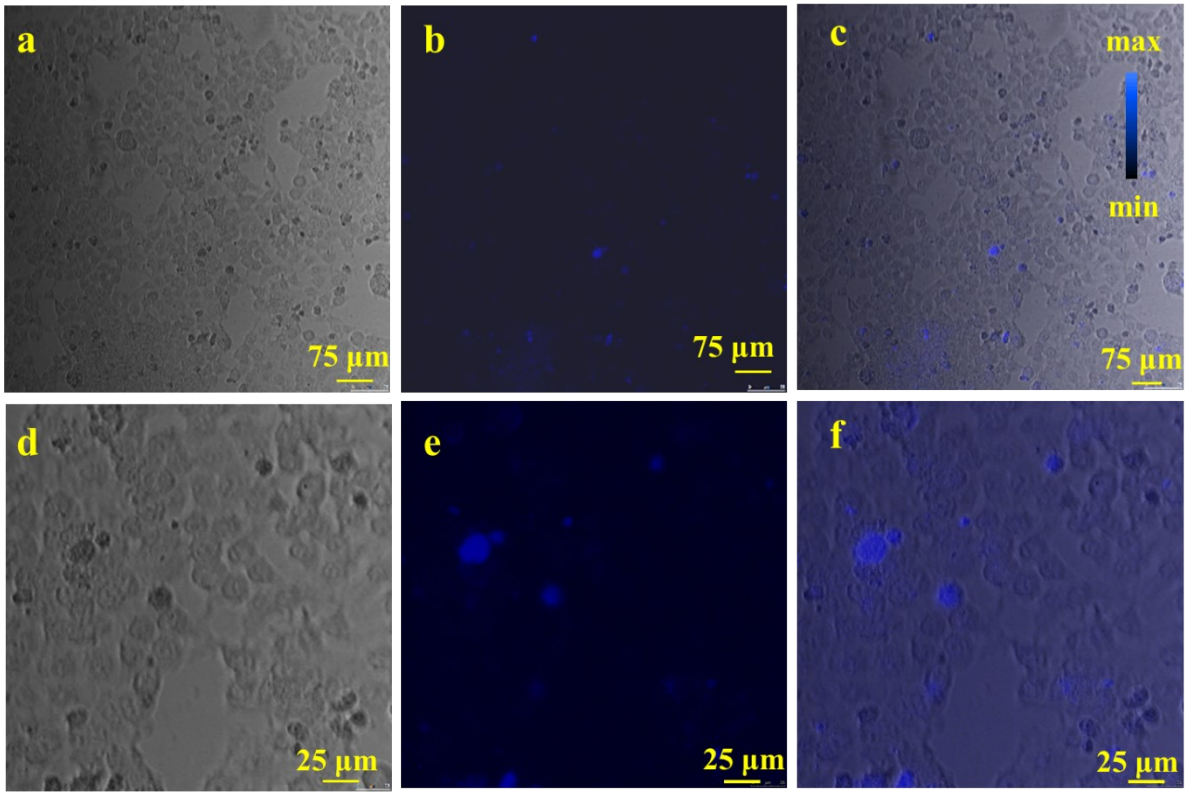

Fig. S9. Fluorescence images of PEI-g-C_3N_4@siRNA composites with low magnitude (a-c) and high magnitude (d-f), (a,d) optical images, (b,e) fluorescence images and (c,f) merged images.

Table S1. Hydrodynamic sizes and zeta potential of g-C_3N_4 nanosheets and PEI-g-C_3N_4 composites measured at pH 7.

Sample name	PDI	Hydrodynamic size [nm]	Zeta potential [mV])
g-C_3N_4	0.25	118.4 ± 0.9	-32.2 ± 1.5
PEI-g-C_3N_4	0.46	122.1 ± 0.5	42.5 ± 0.1