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# Supplementary Information for

## Black Graphitic Carbon Nitride Nanosheets with Mid-gap States Realizing Highly Efficient Near-Infrared Photo-thermal Conversion for Photoacoustic Imaging

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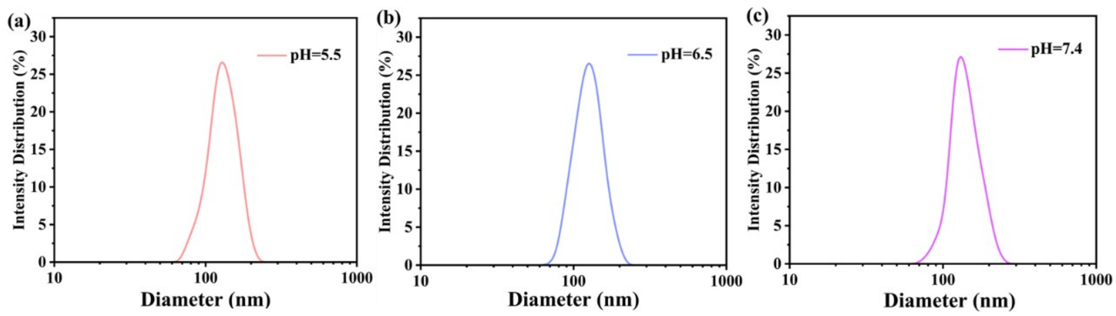


**Figure S1.** The size distribution of B-g-$C_3N_4$ (375 μg/mL) in different physiological conditions.

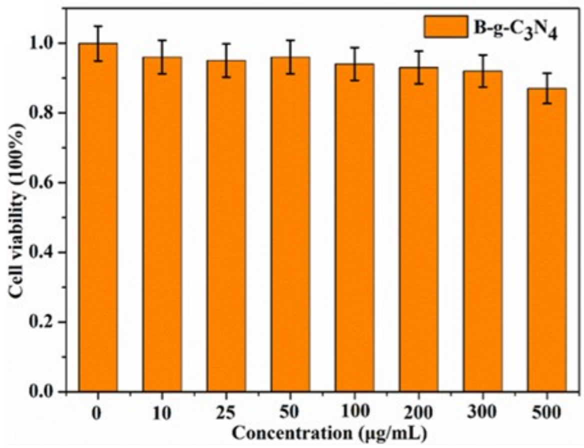


**Figure S2**. Cytotoxicity of B-g-$C_3N_4$ incubated with HeLa cells assessed by standard MTT assay.

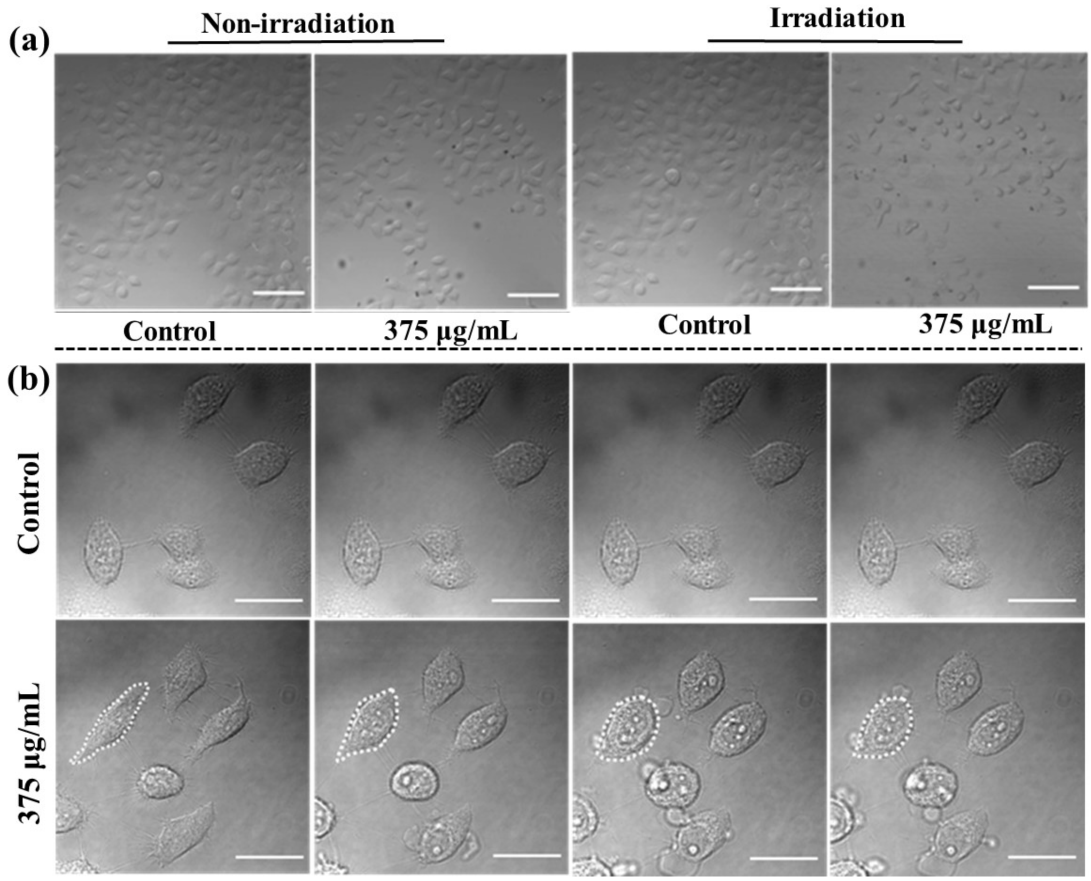


**Figure S3**. Contrast between cells treated without/with B-g-$C_3N_4$ and without/with irradiation revealed by confocal images of bright field. (a) Confocal images of bright field for HeLa cells after non-irradiation and irradiation of the control group and B-g-$C_3N_4$ (375 μg/mL). Scale bar is 100 μm; (b) Confocal images of bright field for HeLa cells exposed to the 808 nm laser for 20 min of the control (upper row) and 375 μg/mL of B-g-$C_3N_4$ (lower row). Scale bar is 30 μm.

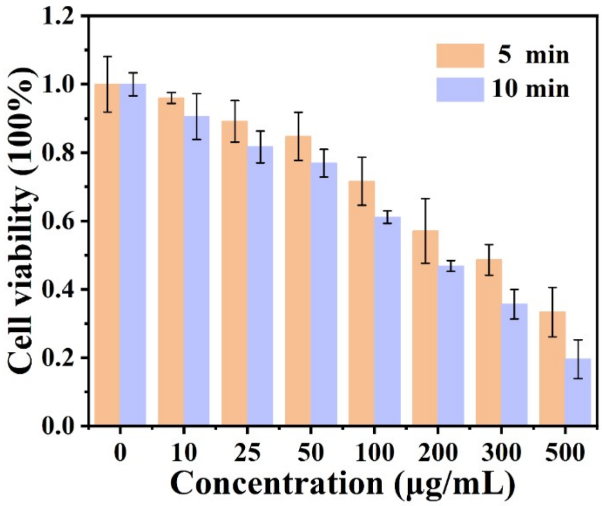


**Figure S4**. Cytotoxicity of B-g-$C_3N_4$ incubated with HeLa cells under 808 nm laser irradiation.

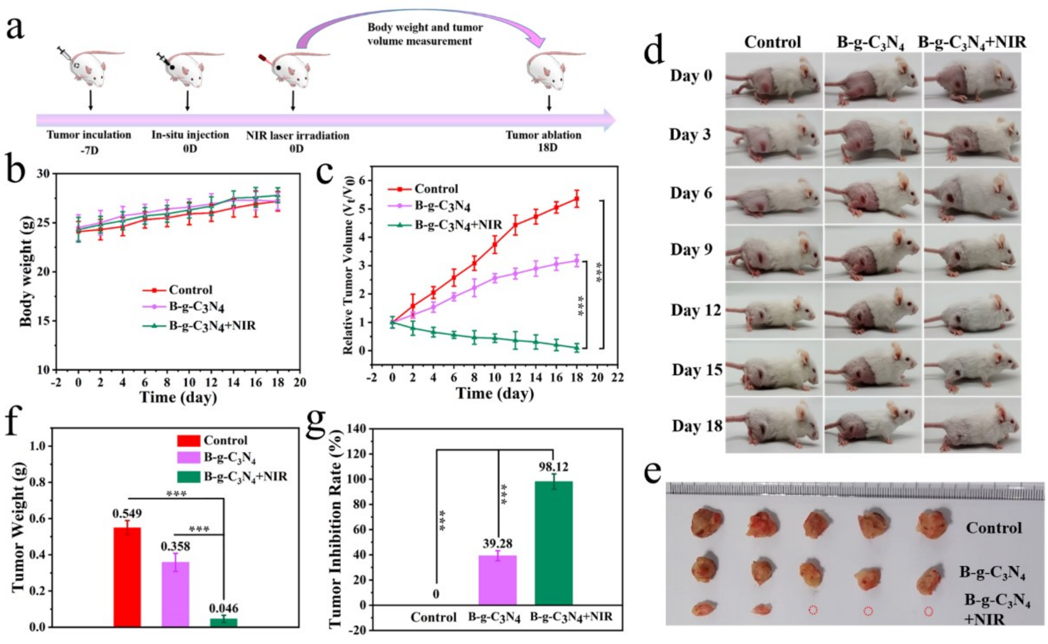

**Figure S5**. *In vivo* photothermal cancer therapy based on B-g-$C_3N_4$. (a) Schematic illustration of the treatment regimen. (b and c) Relative body weight and tumor volume variation in three groups during 18 days of the therapy. The error bars represented standard deviations (n = 5). (d) Representative photographs of the mice treated 0, 3, 6, 9, 12, 15 and 18 days (control, B-g-$C_3N_4$ only, B-g-$C_3N_4$ + NIR). (e) Digital photos of dissected tumors of three groups at day 18. The comparison of tumor weight (f) and tumor inhibition rate (g) of three groups of mice ($n = 5$, mean ± SD). $^{*}P < 0.05$, $^{**}P < 0.01$, $^{***}P < 0.001$.

Fifteen U14 tumor-implanted mice were randomly divided into three groups ($n = 5$) when tumor volumes developed around 100 $mm^3$: (a) PBS (control group); (b) B-g-$C_3N_4$; (c) B-g-$C_3N_4$ +808 nm laser. The weight and tumor volumes of mice were carefully measured every two days during the treatment (Figure S5b and S5c). The digital photographs of the mice were taken every day to document their living state and the representative ones were showed in Figure S5d. Apparently, compared to the other two groups, the photothermal therapy by B-g-$C_3N_4$ under 808 nm laser implemented the optimum therapeutic effect as the growth of malignant tumor was almost inhibited thoroughly (Figures S5c-e). Amid the 18 days, the body weight of mice showed an inconspicuous change for curative groups without abnormalities (Figure S5b), suggesting the superior biocompatibility of B-g-$C_3N_4$.