Supporting Information

Metal-free photocatalyst with reduced graphene oxide-doped graphitic carbon nitride homojunctions for efficient antibacterial applications

Junyan Zhang, Weikun Wang, Shiyue Huang, Yijie Lv, Meilan Li,

Mingliang Wu* and Haiyang Wang*

College of food Science and Technology. Jiangsu Agri-animal Husbandry Vocational College,

Taizhou 225300, China

SEM Observation of Bacteria

To observe the surface morphological changes of bacterial cells, the samples underwent fixation, dehydration, drying, and coating treatments. First, the bacterial suspension was collected (by centrifuging to collect the cell pellet) and washed twice with PBS buffer. The bacteria were then fixed in 2.5% glutaraldehyde solution for 4 hours to preserve cell structural integrity. After fixation, the samples were washed three times with PBS buffer for 10 minutes each time to remove residual fixative. The samples were then dehydrated in a series of ethanol solutions (30%, 50%, 70%, 90%, and 100%) for 10 minutes at each concentration, and finally treated twice with absolute ethanol for 10 minutes each to ensure complete dehydration. After dehydration, the samples were critical-point dried using liquid CO_2 to prevent structural collapse due to surface tension during the drying process. After drying, the samples were mounted on SEM sample holders with conductive adhesive and coated with a thin layer of gold using a sputter coater to improve conductivity and reduce charging effects. Once the sample preparation was complete, the samples were placed in the scanning electron microscope for observation.

Cytotoxicity Assay

The cytotoxicity of UCN/RGO/SCN at different concentrations (0.5, 1, 2 mg mL^{-1}) on L929 cell growth was evaluated using the CCK-8 cell viability assay. L929 cells (5×10^3 cells) were seeded in a 96-well plate and cultured until 80-90% confluence was reached. The cells were then treated with varying concentrations of UCN/RGO/SCN and incubated for 24 hours. Following treatment, 100 μL of CCK-8 working solution was added to each well, and the plate was incubated for an additional 2 hours. Cell viability was assessed by measuring the absorbance at 450 nm using a microplate reader. The optical density (OD) values were used to evaluate the cell viability.

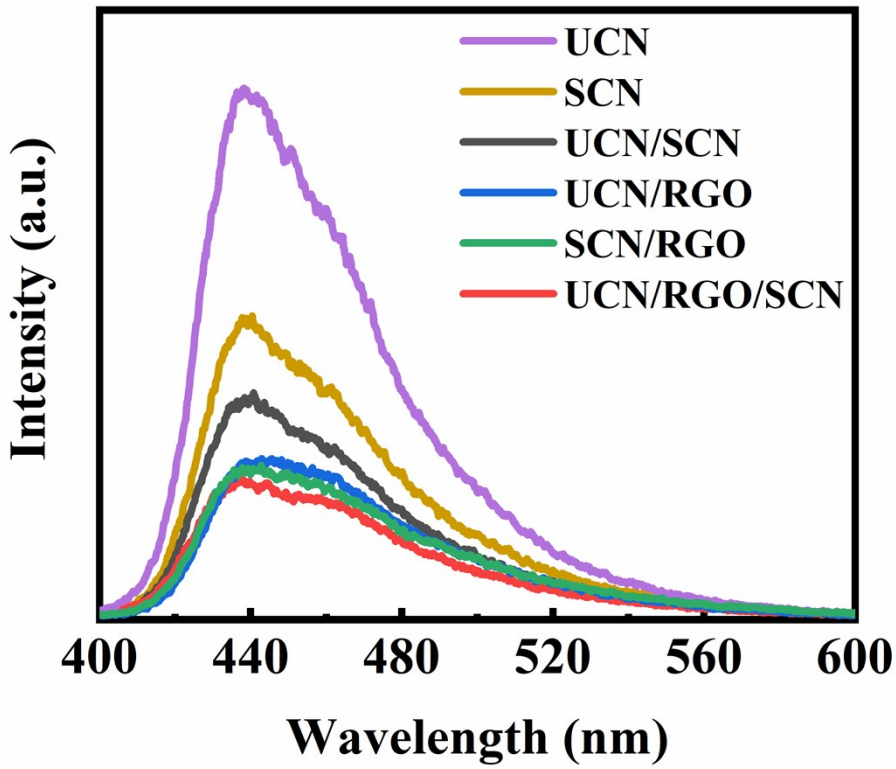

Fig. S1 PL spectra of different samples.

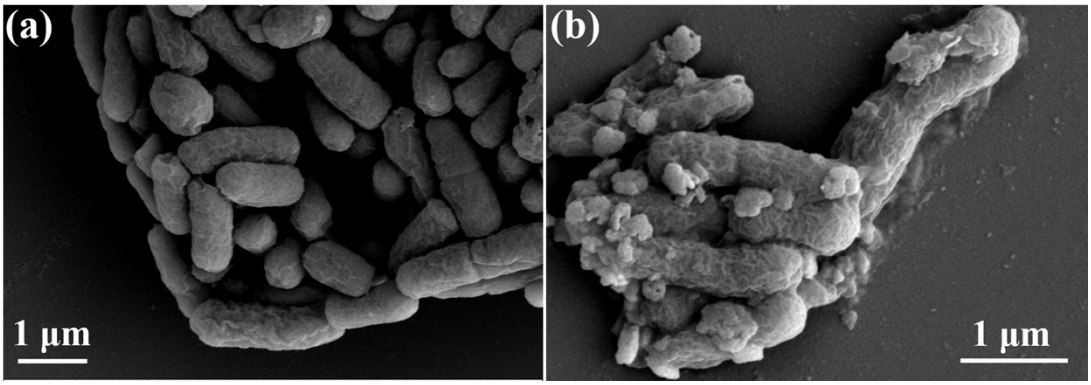

Fig. S2 SEM images of E. coli before treatment and after dark treatment with the catalyst.

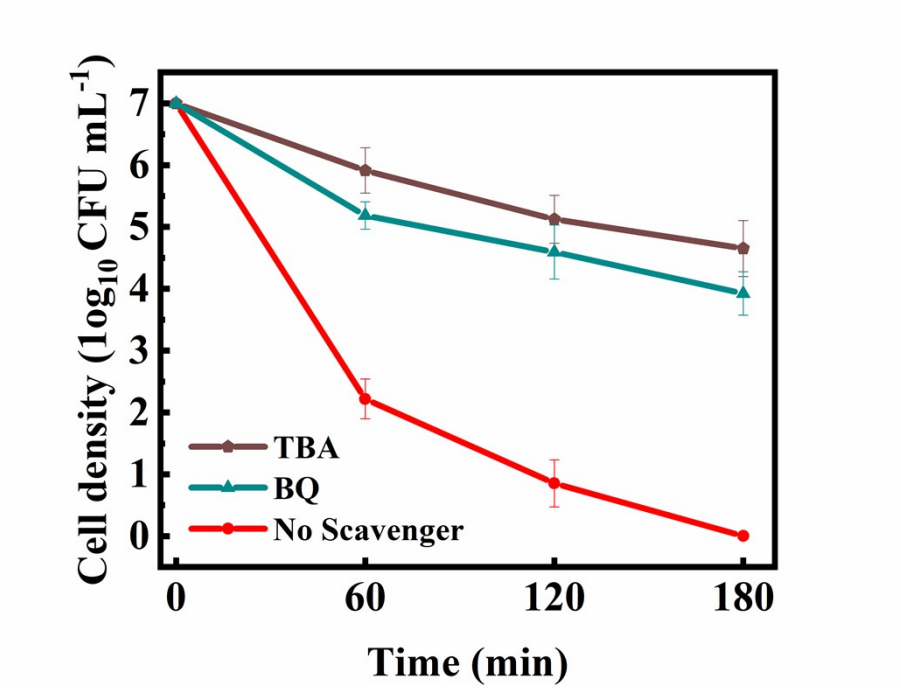

Fig. S3 Free radical capture experiments during photocatalytic antibacterial treatment of E. coli.

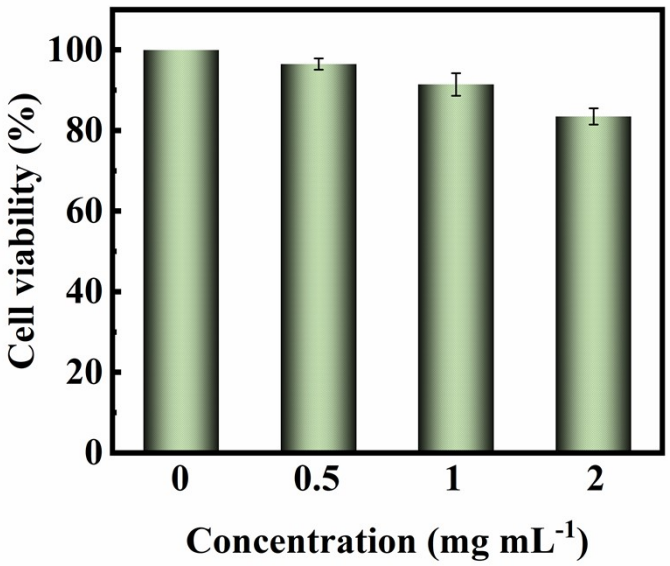

Fig. S4 Cell viability of L929 cells treated with different doses of UCN/RGO/SCN.