Supporting Imformation

For

Anti-algal activity of fluorine-doped titanium oxide photocatalyst on *Microcystis aeruginosa* and its photocatalytic degradation

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Text S1. Material Characterization Methods

X-ray diffraction (XRD, Rigaku D/MAX 2500V) were performed with an X-ray diffractometer using Cu Kα radiation to analyze the crystal structure. Scanning electron microscope (Phenom, Shanghai, China) was used to observe the morphology of the composites, and the attached energy dispersive spectrometer (EDS) was used to analyze the elemental constitutes. X-ray photoelectron spectroscope (XPS, Thermo Scientific K-Alpha+) was performed to determine the surface elemental composition and electronic structure. EPR radicals trapping tests were conducted on a Bruker E580 spectrometer (Germany) with DMPO (80 mmol/L) as spin-trapping agent.

Text S2. Analytical methods for the photocatalytic inactivation

Calculate the content of chlorophyll a with the method of Wintermans and de Mots, extract the chlorophyll a content of cyanobacteria with acetone (95%) for 24 h, then determine the optical density by the spectrophotometer. Dehydrogenase activity (DHA) was detected by the TTC-DH enzyme-linked-immunosorbent serologic assay to examine the metabolic activity of the algal cells. To analyze the changes of algae organic matter (AOM), the sample was centrifuged at 6,000 rpm for 10 minutes to filter the supernatant through a 0.45 μm cellulose acetate membrane. The organic matter in the filtrate represents the extracellular dissolved organic matter (EDOM). The filtered cell suspension was sonicated in an ultrasonic cell crusher. Subsequently, after centrifugation of the suspension, it is filtered with 0.45 μm cellulose acetic acid membrane. Intracellular dissolved

organic matter (IDOM) is a kind of the filtered organic matter. The value of AOM is detected using the fluorescence chromatograph (FL-7000, Hitachi, Japan).

Standard samples of microcystin-LR were obtained from Beijing North Weiye Measurement Technology Research Institute (China). The determination of MC-LR was carried out on a Shimadzu LC-20A system with a PDA detector and a C_{18} reverse-phase column (250 mm×4.6 mm×5 μm, Agilent). The mobile phase was water containing 0.05% TFA (v/v) and methanol, and the ratio is 35:65. The injection volume of the sample was 20 μL and the flow rate was 0.6 mL/min. The wavelength of the UV absorbance detector was 238 nm.

Text S3 Characterization

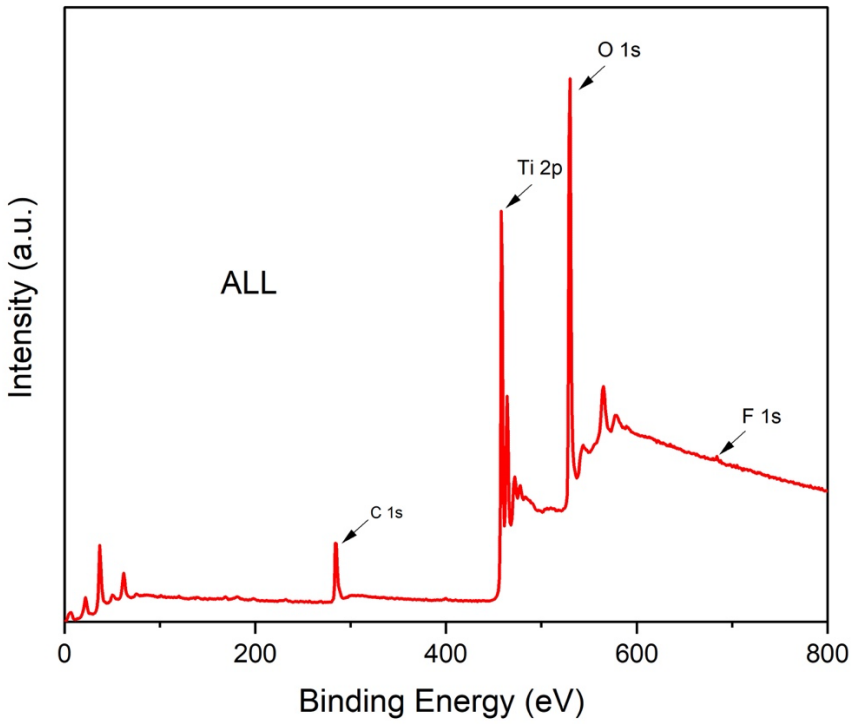

Fig. S1. Full XPS spectra of TiO_2

Text S4 Photocatalytic destruction of *Microcystis aeruginosa*

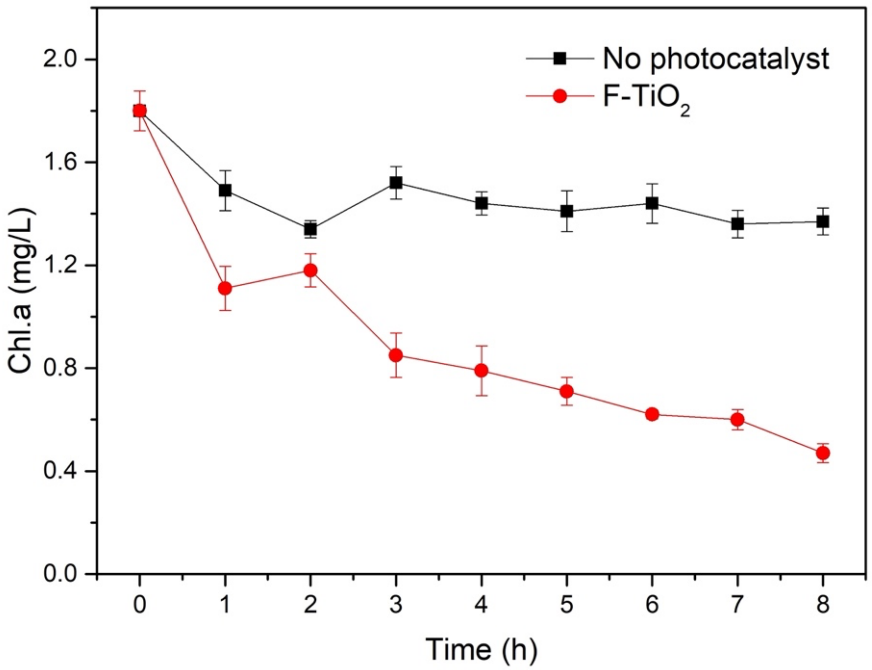

Fig. S2. Changes in Chl.a of F-TiO_2 nanocomposite inactivation experiment without irradiation

Text S5 Photocatalytic destruction of MC-LR

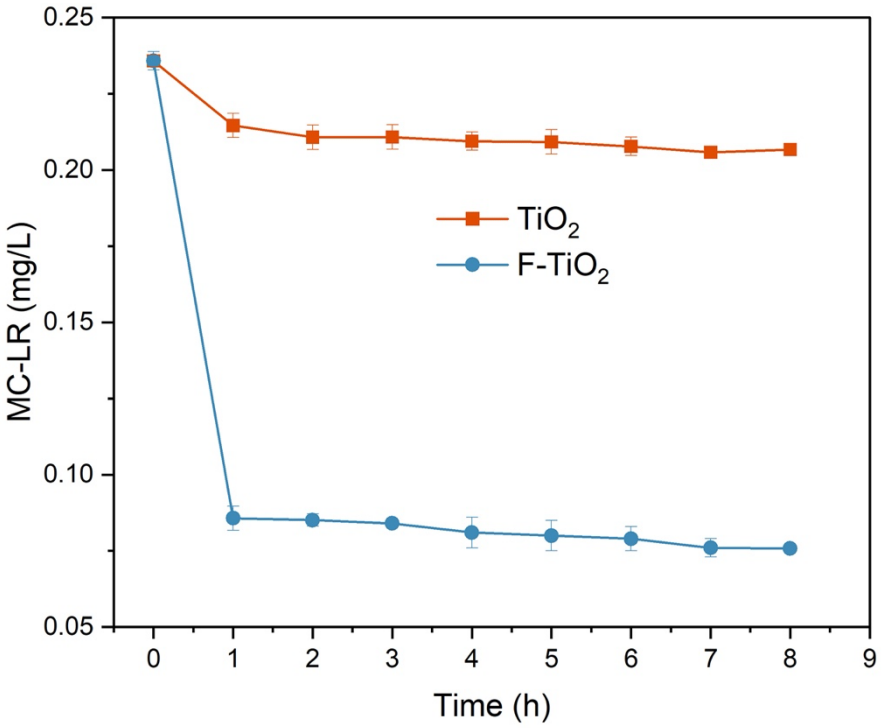

Fig. S3. Photocatalytic degradation of MC-LR by F-TiO_2 and TiO_2.