Supplementary Material

Modification of porous bismuth molybdate for highly removal of antibiotics and H_2O_2 production

Shilin Li, Yunhui Tian, Guangxin Zhang*

School of Materials Science and Engineering, Shandong University of Science and Technology, Qingdao 266590, PR China

2.1. Materials

Bismuth nitrate pentahydrate ($Bi(NO_3)_3·5H_2O$) was purchased from Sinopharm Chemical Reagent Co., Ltd. Sodium molybdate dihydrate ($Na_2MoO_4·2H_2O$) was sourced from Macklin Biochemical Co., Ltd. Potassium acetate (CH_3COOK) was obtained from Tianjin Guangfu Fine Chemical Research Institute. Sodium hydroxide (NaOH) was provided by Chengdu Chron Chemical Co., Ltd. Ciprofloxacin ($C_{17}H_{18}FN_3O_3$, CIP) was supplied by Shanghai Aladdin Biochemical Technology Co., Ltd. All reagents are analytically pure. The deionized water used throughout the experiment.

2.2. Characterization of photocatalysts

The crystal structure of the samples was determined utilizing a D/Max 2500PC X-ray powder diffractometer employing Cu Kα radiation. Microstructural analyses were conducted using a TESCAN MIRA LMS field emission scanning electron microscope. Nitrogen adsorption-desorption isotherms were acquired employing a Micromeritics ASAP 2460 analyzer at 77 K, enabling the determination of specific surface area and pore size distribution. X-ray photoelectron spectroscopy (XPS) measurements were performed using a Thermo Scientific K-Alpha X-ray photoelectron spectrometer with Al Kα radiation. UV-visible diffuse reflectance spectra were recorded using a UH4150 spectrophotometer (Hitachi) with $BaSO_4$ serving as the reference. Furthermore, free radicals generated during catalysis were identified utilizing a Bruker EMX PLUS electron paramagnetic resonance spectrometer.

2.3. Photo-electrochemical measurement

The photoelectrochemical measurements were conducted utilizing a three-electrode cell configuration, with the counter electrode comprising a platinum electrode, the reference electrode

being an Ag/AgCl electrode, and the working electrode consisting of ITO glass coated with a catalyst. The electrolyte employed for these experiments was a 0.5 M Na_2SO_4 solution, and a Xe lamp served as the illumination source. The preparation of the working electrode involved the dispersion of 10 mg of as-prepared samples in a 1 mL water/ethanol solution through ultrasonication. Subsequently, 50 μL of Nafion ethanol solution was added to the dispersion. The resulting slurry was then applied onto the ITO glass substrate and dried at room temperature in preparation for the photoelectrochemical testing.

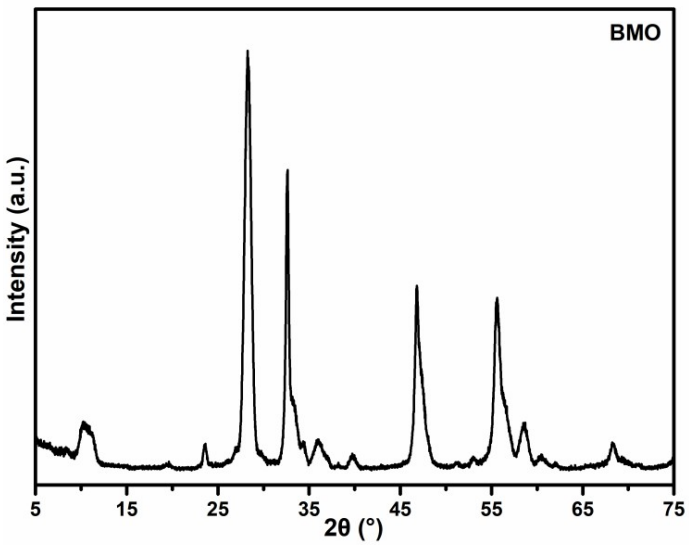

Fig. S1. XRD pattern of BMO.

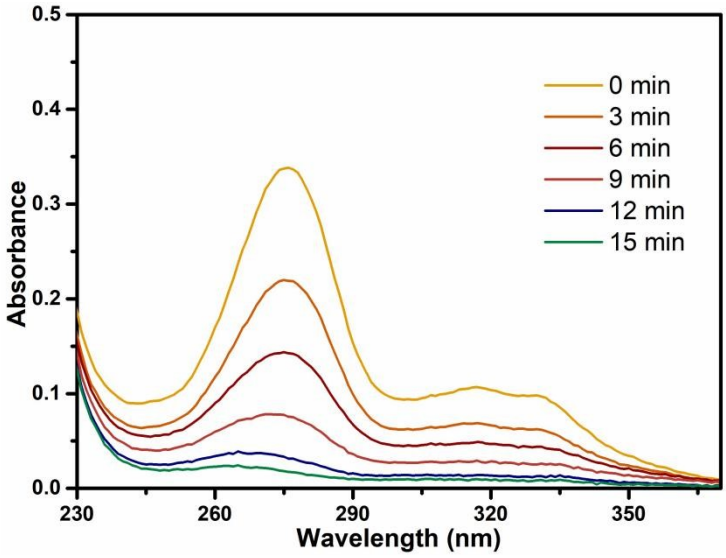

Fig. S2. Temporal UV-vis absorption spectrum of CIP under visible light Irradiation.

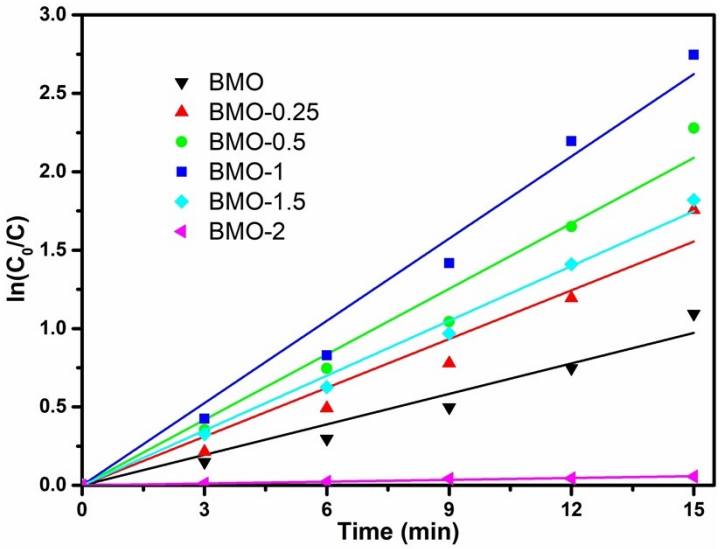

Fig. S3. Kinetic fitting of CIP degradation.