

## Supporting Information

### A simple construction strategy for fabrication of sulfur-doped silicate material from attapulgite

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#### S1. Materials and reagents.

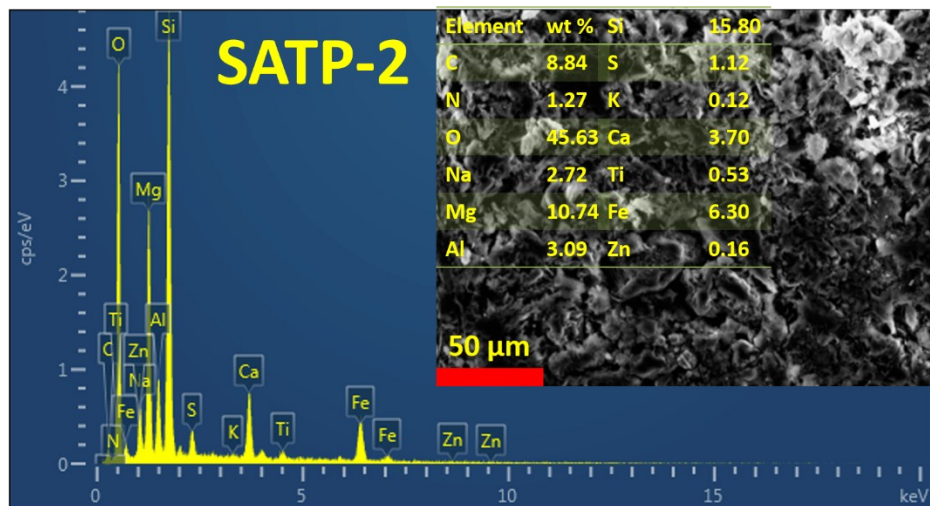
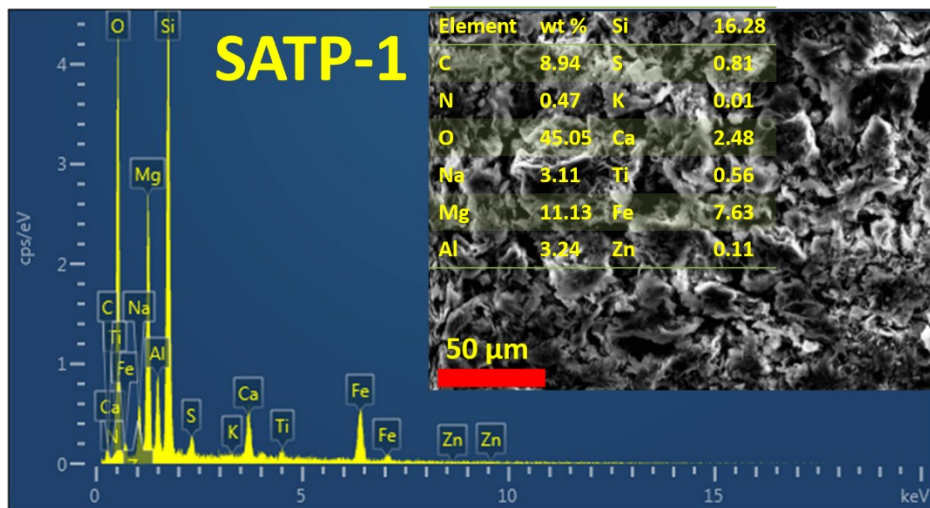
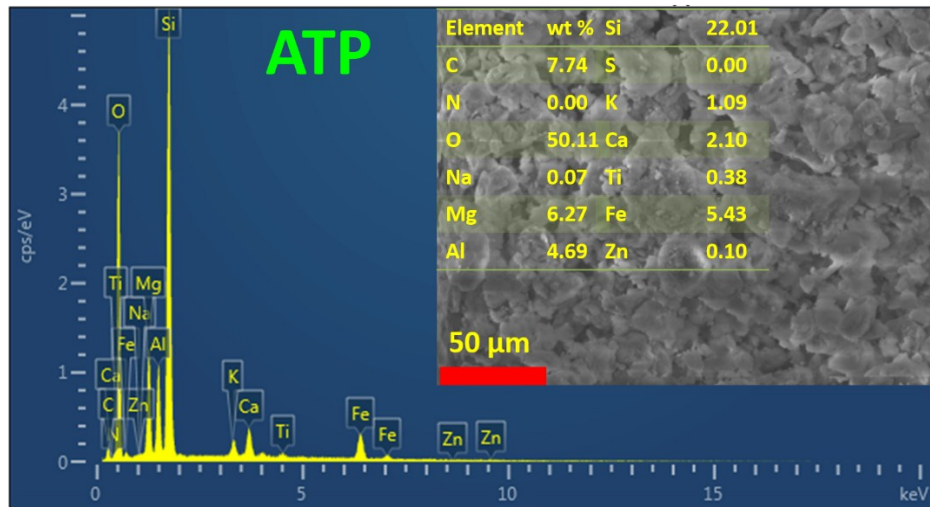
Attapulgite (ATP) was obtained from Jiangsu Huixin Atta Co., Ltd.(Jiangsu, China). Sodium sulfide was provided by Tianjin Fu chen Chemical Reagent Factory. Methylene blue (MB), with the molecular formula of  $C_{16}H_{18}N_3S$ , was purchased from Shanghai Maclean Biochemical Technology Co., Ltd., China. Lead nitrate and copper nitrate trihydrate were supplied by Xi long Chemical Co., Ltd.(Guangdong, China). All other solvents and chemicals were obtained commercially and were used as received.

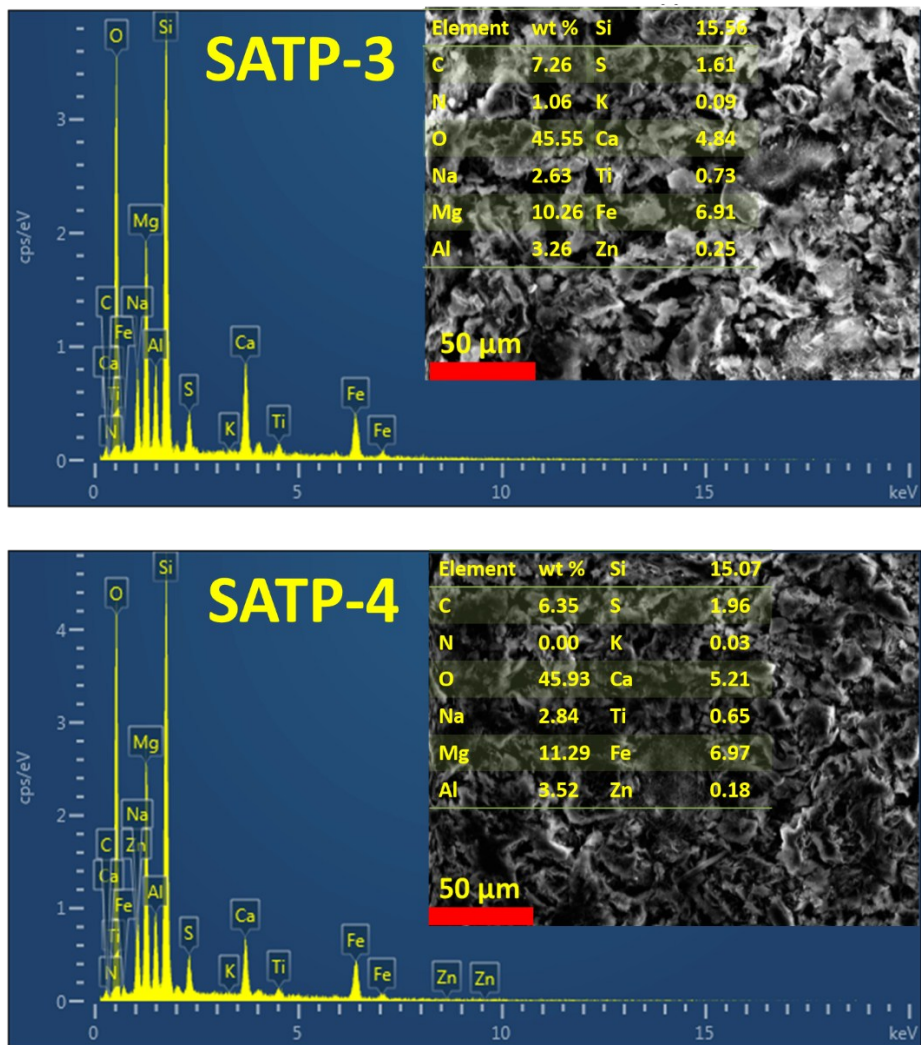
#### S2. Characterization methods.

The structures of as-prepared samples were observed by FE-SEM. SEM was performed with a JEOL JSM-6701F equipped with a cold FEG (Field Emission Gun). The elemental analysis was carried out with a multichannel EDS device XFlash Detector 5010 125 eV, Quantax Bruker (Germany). EDS measurements were carried

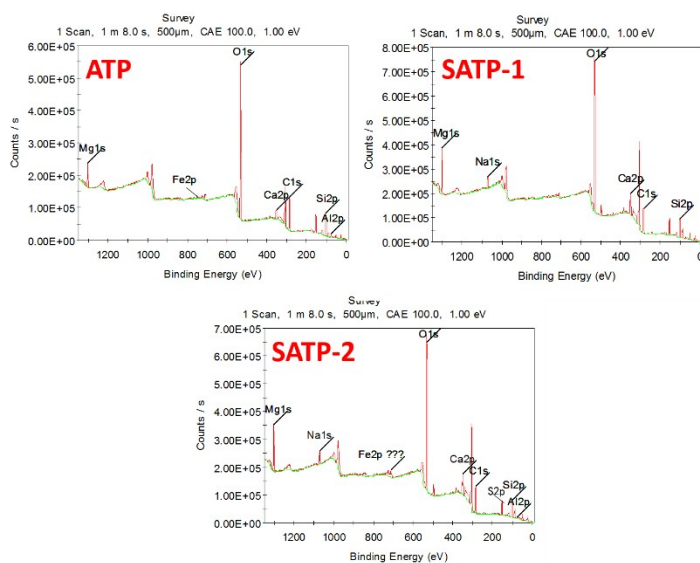
out with relatively low voltage too. The S content of the samples were measured by using inductively coupled plasma atomic emission spectrometry (ICP-AES), by using an Iris advantage Thermo Jarrel Ash device. XRD measurements were performed by using a STADIP automated transmission diffractometer (STOE) equipped with an incident beam curved germanium monochromator with CuK $\alpha$ 1 radiation. The XRD patterns were scanned in the  $2\theta$  range of 5-85°. For data interpretation, WinXpow software (STOE) and the database of powder diffraction files (PDF) of the International Centre of Diffraction Data (ICDD) were used. Raman spectra were measured with a 532nm edge by using a LabRAM HR Evolution (HORIBA Jobin Yvon S.A.S.). FT-IR spectra were registered in the 500-4000 cm<sup>-1</sup> region with a resolution of 1 cm<sup>-1</sup> by a Nicolet 5700 spectrometer. For each FT-IR spectrum, the 0.5 mg of sample was uniformly mixed with 100 mg of potassium bromide, and then the mixture was laminated with a tablet press for further analysis. The X-ray photoelectron spectroscopy (XPS) measurements were performed by using a VG ESCALAB 210 instrument equipped with a dual Mg/Al anode X-ray source, a hemispherical capacitor analyzer, and a 5 keV Ar<sup>+</sup> ion gun. All spectra were registered by using nonmonochromatic MgK $\alpha$  (1253.6 eV) radiation. The samples were attached to a stainless steel sample holder by using double-sided adhesive carbon tape. The electron binding energy was referenced to the C1s peak at 284.8 eV. The peaks were fitted by Gaussian-Lorentzian curves after Shirley background subtraction. For quantitative analysis, the peak area was shared by the element-specific Scofield factor and the transmission function of the analyzer. The background pressure in the chamber was less than 10<sup>-7</sup> Pa. The mixtures of the adsorbent and dye solution were shaken in a thermostatic shaker water bath (SHA-BA). The shake amplitude was 20mm. In order to make the mixtures contact uniformly, the shake speed was adjusted at 140 rpm with back and forth oscillating form. The temperature was set at 25°C. The concentration of MB was measured with a T6 New Century UV/Vis Spectrometer. In order to get the maximum absorption wavelength of MB solution, the standard solutions of 0.25, 0.5, 1 and 2 mol/L MB were selected to measure and the optimal absorption wavelength was 662nm. A cuvette filled with

deionized water was scanned as a blank control.

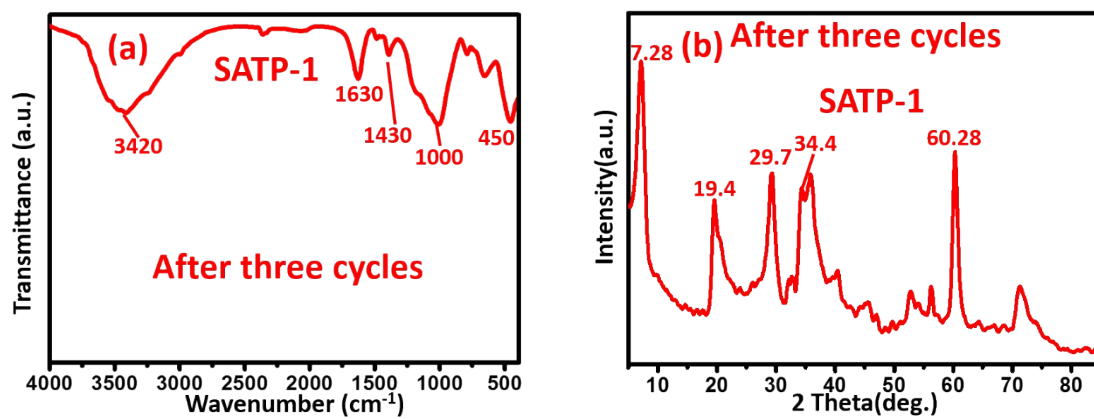




**Figure S1** Detailed information on the elemental composition of ATP and SATP was provided by electron microscopy combined with energy-dispersive X-ray spectroscopy (SEM-EDS).



**Figure S2** XPS spectra of prepared ATP, SATP-1 and SATP-2.



**Figure S3** FT-IR spectra (a) and X-ray diffraction pattern (b) of SATP-1 after three cycles.