

Supplementary materials

Removal of Crotamiton from Reverse Osmosis Concentrate by a TiO₂/Zeolite Composite Sheet

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Quantitative analysis

The crotamiton concentrations in the aqueous solution were determined using liquid chromatography tandem mass spectrometry (Acquity UPLC-Xevo TQ; Waters, Milford, MA). Separation was achieved using a BEH C18 column (2.1 mm i.d., 150 mm long; Waters). A linear gradient elution was used, starting at 10 % acetonitrile in 0.05 % formic acid (isocratic for 0.5 min) and increasing to 90 % acetonitrile in 0.05 % formic acid at 7 min. The mobile phase flow rate was 0.3 mL/min. A photodiode array detector between the analytical column and the tandem mass spectrometer was operated at a wavelength of 254 nm.

The total organic carbon concentration in each treated solution was determined using a Sievers 900 Laboratory total organic carbon analyzer (GE, Boston, MA). Ion concentrations were determined using a DX-120 ion chromatography system (Dionex, Sunnyvale, CA). The cation analyses were performed using a CS12A column (4 mm i.d., 250 mm length; Dionex) and a mobile phase of 20 mM methanesulfonic acid at a flow rate of 1 mL/min. The anion analyses were performed using an AS12A anionic column (4 mm i.d., 200 mm length; Dionex) and a mobile phase of 2.7 mM Na₂CO₃ and 0.3 mM NaHCO₃ at a flow rate of 1.5 mL/min.

Conductivity and pH were measured using a portable electrical conductivity meter (CM-31P, DKK-TOA Corporation, Tokyo, Japan) and a portable pH meter (D-51, Horiba; Tokyo, Japan), respectively. Chemical oxygen demand was measured using a chemical oxygen demand analyzer (Hach, Loveland, Colorado). A V-530 ultraviolet-visible spectrophotometer (Jasco. Co., Tokyo, Japan) was used to determine UV absorbance. Alkalinity was measured using a titration method.

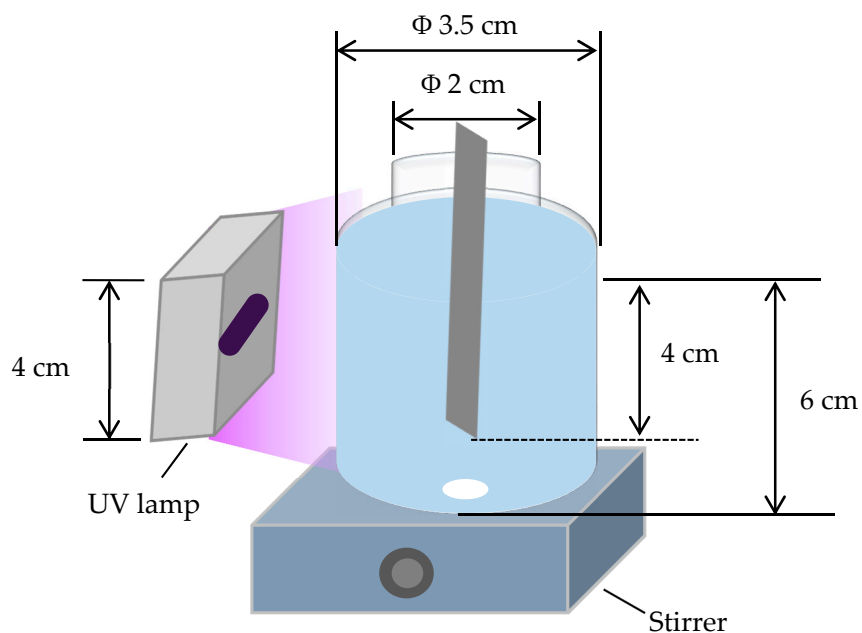


Figure S1. The experimental set-up of the adsorption and photocatalytic degradation of crotamiton using the TiO₂/zeolite composite sheet. The symbol Φ refers to the diameter of the vial.

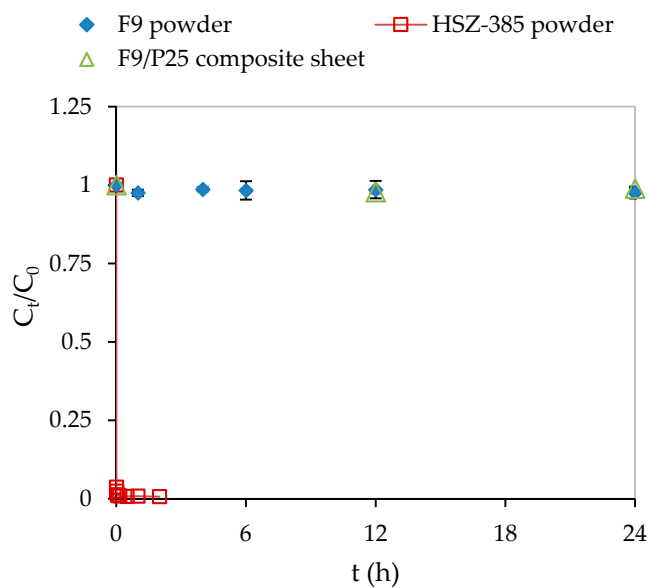


Figure S2. Removal of crotamiton from ultrapure water by adsorption using F9 powder, HSZ-385 powder and the F9/P25 composite sheet ($C_0 = 10$ mg/L, $V = 50$ mL). The dosage for the powder adsorbent was 0.1 g/L. The F9/P25 composite sheet was 2×5.5 cm² and submerged at a depth of 4 cm. The composite sheet contained 4 mg F9/cm².

