## **Supporting Information**

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# "Photochemical Oxidation of Arsenic (III) to Arsenic (V) using Peroxydisulfate Ions as an Oxidizing Agent"

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#### **Experimental Section**

### Figure S1



FIGURE S1. A schematic diagram of a reactor with a lamp mounted at the centre of the reactor using a quartz jacket.

## **Experimental Section**

Figure S2



FIGURE S2. A schematic diagram of a reactor for the Oriel lamp, the Xe arc lamp is mounted 10 cm away from the reactor.

#### **Results and discussion**

Figure S3



FIGURE S3. Oxidation of As (III) to As (V) without oxygen-equilibrated, with oxygen-equilibrated, continuous purging of oxygen and continuous purging of nitrogen. The experimental conditions were  $[S_2O_8^{2^-}] = 0.1 \text{ mM}$ , [As (III)] = 0.135 mM, pH=3, irradiation time =30 min.

#### **Results and discussion**

Figure S4



FIGURE S4. Effect of different humic acid concentrations on the oxidation of As (III) to (V). The experimental conditions were  $[S_2O_8^{2^-}] = 0.1 \text{ mM}$ , [As (III)] = 0.135 mM, pH=3.

#### **Results and discussion**

Table S1

## Table S1. Characterization data of a lake water obtained from the Yeongsan reservoir, South Korea

Name of the parameters	(units)	name of the parameters	(units)	trace metals	(ppb)
Temperature	15.53 °C	Total Nitrogen	5.46 mg/L	Al	105.4
Sp. conductivity	1193 uS/cm	Total phosphate	0.14 mg/L	As	1.016
	4	Chemical	4.13 mg/L	Co	0.09
рН	7.74	oxygen demand (COD)		Cr	0.095
Dissolved Oxygen	8.09 mg/L	Dissolved	3.3 mg/L	Cu	2.658
Turbidity	7.8 NTU	organic contents		Fe	65.54
Chlorophyll	0.9 ug/L	Total suspended solids	7.0 mg/L	Mn	11.09
Salinity	0.6 ppt (‰)	Bacteria (total	5794 MPN/100mL	Ni	2.076
Total		comornij		Pb	0.193
Dissolved solids	776 mg/L	E.Coli	9 MPN/100mL	Zn	4.327
		Enterrococci	9 MPN/100mL		