

Pollutants Analysis and Life Cycle Assessment of a Photovoltaic Powered Textile Electro-Fenton Wastewater Treatment System

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S1: Experimental instruments for the EF system

Table S1. The equipment and parameters

Equipment	Function	Accuracy/Sensitivity
Current controller	Control current	0-1 A
Magnetic stirrer	Stir up the sewage	10W
Battery	Stored electricity	40Ah
Air pump	Provide reaction	0-1 L/min
Spectrophotometer	Removal rate testing	Wavelength range 325~1000 nm \pm 2nm
PV panel	Generate electricity	500X500X25(mm)

S2: Experimental materials for the EF system

Table S2. The materials and parameters

Material	Function	Original concentration/Dimension
Nickel foam	Cathode	40X20(mm)
Graphite	Anode	40X20(mm)
Acid orange 7	Raw material for degradation	4g/L
Methylene blue	Raw material for degradation	4g/L
Malachite green	Raw material for degradation	4g/L
FeSO ₄	Catalyze the reaction	4mmol/L
Na ₂ SO ₄	Increase solution conductivity	100mmol/L
Na ₂ S ₂ O ₃	Stop the reaction	100mmol/L

S3: Relevant parameters of the PV model

Table S3. The parameters of the PV model

Parameters	
Short circuit current, I_{sc} (A)	2.69
Current at the maximum power point, I_{mp} (A)	2.93
Open circuit voltage, V_{oc} (V)	21.7
Voltage at the maximum power point, V_{mp} (V)	18
Absorptivity (%)	90

S4: Life cycle inventory

Table S4. The main production raw material parameters of the system equipment in a textile factory

Component	Quantity (kg)	Material	Amount(kg)
PV Panels	280.80	Si	36.20
		Al	86.20
		Glass	89.60
		EVA	19.00
		TPT	9.80
Battery	300.00	Pb	30.00
		H ₂ SO ₄	5.20
		ABS	3.20
		Ca	0.01
		Sn	0.09
Inverter	4.86	PCB	40.00
Current Controller	4.00	PCB	8.00
		FD-309	0.16
Air pump	10.00	Steel	0.05
Magnetic stirrer	25.00	Ti	3.40
		Steel	0.90
Cathode	0.16	TP270	0.16
Anode	0.05	Powdered Licorice	0.15