

Supporting Information for:
Sonochemical Degradation of Per- and Polyfluoroalkyl Substances (PFAS):
Mechanisms, Efficacy, and Future Directions

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Introduction

This Supporting Information (SI) document provides supplementary data to accompany the main manuscript, "Sonochemical Degradation of Per- and Polyfluoroalkyl Substances (PFAS): Mechanisms, Efficacy, and Future Directions." The following tables (S1-S7) compile and synthesize detailed data from the cited literature. The purpose of this document is to provide a granular reference for researchers and practitioners, summarizing:

- Key operational parameters and their mechanistic effects (Table S1).
- Effects of common water matrix components on ultrasonic PFAS degradation efficiency. (Table S2).
- Qualitative comparison of emerging hybrid ultrasonic systems for PFAS degradation (Table S3)
- Quantitative performance comparison of hybrid ultrasonic systems for PFOA and PFOS degradation (Table S4)
- Overview of documented pilot and demonstration-scale ultrasonic systems for PFAS treatment (Table S5)
- Comparative assessment of PFAS treatment technologies. (Table S6)
- A raw data compilation of PFAS degradation kinetics (Table S7).
- PFAS Sonolysis: Identified Products and Intermediates (Table S8)

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Table S1: Effects of key operational parameters on ultrasonic PFAS degradation efficiency.

Parameter	Optimal Range	Effect on Degradation	Primary Mechanism
Frequency	300 - 600 kHz [40, 15]	Non-linear. Peak efficiency in this range. Lower (20-100 kHz) is ineffective for destruction [49].	Balances bubble count (favored by high freq.) with collapse intensity (favored by low freq.) [40].
Power Density	High (e.g., >200 W/L)	Generally increases rate, but EE/O may decrease if excessive [35].	Increases number and intensity of cavitation events, creating more reaction sites [17].
Initial Conc.	> Saturation (>15-40 μM) [40]	Follows L-H kinetics. Rate becomes zero-order (fastest) above saturation [17].	Saturates the bubble interface reaction sites, maximizing pyrolytic degradation per bubble collapse.
pH	Acidic (pH 2-4) [43]	Significantly increases degradation rate, especially for PFCAs.	Protonates the headgroup (e.g., $-\text{COO}^-$ to $-\text{COOH}$), increasing hydrophobicity and enhancing partitioning to the interface [43].
Temperature	Elevated (40-50 $^{\circ}\text{C}$)	Increases degradation rate [36].	Enhances PFAS partitioning (volatility / surface activity) to the interface, which outweighs the slight reduction in collapse intensity [5].
Sparging Gas	Argon (Ar)	Dramatically increases rate (2-5x) compared to air [40].	High polytropic ratio (γ) and low thermal conductivity of Ar leads to a more adiabatic collapse and higher peak pyrolysis temperatures [44].

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Table S1 – *Continued from previous page*

Parameter	Optimal Range	Effect on Degradation	Primary Mechanism
Matrix (NOM, Salts)	Low	Inhibitory.	NOM and other surfactants compete for limited sites at the bubble interface [6]. Salts can have complex salting-in or salting-out effects [16].

Table S2: Effects of common water matrix components on ultrasonic PFAS degradation efficiency.

Matrix Component	Typical Conc.	Effect Magnitude	Primary Mechanism	Mitigation Strategy
Volatile Organic Compounds (VOCs)	mg/L	Strongly Inhibitory	1. Competition for bubble interface. 2. Quenching of bubble collapse temperature (pyrolysis of VOCs) [40].	Pre-treatment (e.g., air stripping) to remove VOCs.
Natural Organic Matter (NOM)	mg/L	Inhibitory	1. Competition for bubble interface. 2. Scavenging of any supplemental $\cdot\text{OH}$ radicals [6].	Pre-treatment (e.g., GAC, coagulation, foam fractionation) to remove NOM.
Bicarbonate (HCO_3^-)	1-10 mM	Slightly Inhibitory	1. $\cdot\text{OH}$ radical scavenger. 2. Minor competition for interface [15].	pH adjustment to <4 converts HCO_3^- to $\text{CO}_2(g)$, removing it from solution [43].
Chloride (Cl^-), Sulfate (SO_4^{2-})	1-10 mM	Neutral to Slightly Inhibitory	1. Minor competition for interface. 2. Can alter bubble dynamics or salting-in effects [16, 6].	Generally not significant enough to require mitigation at low levels.
Dissolved Salts (TDS)	g/L	Variable	Low TDS (< 1 g/L) can be enhancing for short-chains/sulfonates [16]. High TDS (> 10 g/L) is inhibitory [16].	Minimal. Process is tolerant to low salts, but high-salinity brines may be inhibitory.

Table S3: Qualitative comparison of emerging hybrid ultrasonic systems for PFAS degradation.

Hybrid System	Synergistic Mechanisms	Key Advantages	Synergy	Best Application
Sono-Piezocatalysis (e.g., PTFE, FMC) [48, 25]	US vibration induces strain in piezoelectric material, generating surface charges (h^+) and reductive electrons (e^-).	Reductive e^- pathway is highly effective for C-F bonds. Can use waste (PTFE) or hydraulic flow energy.	High	Concentrated Waste, In-situ Flow-through
Sono-Electrochemical (e.g., Ti_4O_7) [24]	<ol style="list-style-type: none"> US cavitation cleans/activates electrode surface. Enhanced mass transfer of PFAS to anode. Additive degradation ($\cdot OH$ + Pyrolysis). 	Prevents electrode fouling/passivation. Increases reaction rate and defluorination efficiency.	Yes (~ 1.1 - $1.3x$)	AFFF, Concentrated Waste
Sono-Persulfate (in slurry) [23, 7]	<ol style="list-style-type: none"> US physically desorbs PFAS from solids. Cavitation heat activates persulfate ($S_2O_8^{2-}$) to $SO_4^{\cdot -}$. Additive degradation ($SO_4^{\cdot -}$ + Pyrolysis). 	Highly effective in complex soil/sorbent matrices. Can regenerate spent adsorbents in-situ.	High (e.g., $\sim 5.9x$)	Contaminated Soil, Sorbent Regeneration

Table S4: Quantitative performance comparison of hybrid ultrasonic systems for PFOA and PFOS degradation.

System	Rate (h^{-1})	Synergy Factor	Defluorination (%)	Optimal Conditions	PFAS Target
Sono-Piezocatalysis (PTFE) [48]	2.41 (PFOA) 0.52 (PFOS)	High	91.5% (1h)	68 kHz, low freq.	PFOA, PFNA, PFOS, GenX
Sono-Piezocatalysis (FMC, flow-driven) [25]	N/A (flow)	High	99% (5 min)	1.68 L/min flow	PFOA
Sono-Electrochemical (Ti ₄ O ₇) [24]	1.74 (PFOA, Hybrid) 1.50 (PFOA, EO only)	~1.15x	63.5% (6h)	130 kHz, 50 mA/cm ²	PFOA, AFFF
Sono-Persulfate (in water) [23]	~1.9 (PFOA, Hybrid) ~0.31 (US only)	~5.9x	100% (6h)	20/43 kHz, pH 3.7	PFOA, FTS, PFOS
Sono-Persulfate (on biochar) [7]	N/A	High	99.6% (10h)	500 W, 20 mM PS, pH 3	Adsorbed PFOA

Table S5: Overview of documented pilot and demonstration-scale ultrasonic systems for PFAS treatment.

Application	Capacity	System Configuration	Influent PFAS Conc.	PFAS Removal	Key Performance Metrics
AFFF Treatment [12]	91 L (Batch)	Dual-frequency (500/1000 kHz), 12-transducer, 12 kW	3M & Ansul AFFF (25x-900x dilution)	90.6% reduction of PFSA>C6 (3M AFFF, 13h)	Cost: \$0.015 - \$0.019 / L (at 500x dilution).
Groundwater / IDW [16]	2 L (Batch)	700 kHz, 1040 W, Closed System	GW (low/high TDS), IDW (mg/L levels)	>90% for most PFAS in IDW (4h). Rates varied with TDS.	E_{EM} : 3-76 kWh/g (for IDW) vs. \sim 5900 kWh/g (for dilute AFFF).
In-situ Groundwater [21]	12 L (Batch)	430/1300 kHz, 600 W	GW (S3: \sim 100 μ g/L PFOS)	Theoretical 90% removal (HRT-dependent).	E_{EO} : High (1000s kWh/m ³). LSA showed potential vs. P&T in low-flow.

Table S6: Comparative assessment of PFAS treatment technologies.

Technology	Operating Cost	PFAS Fate	Typical (kWh/m ³)	EE/O	Key Advantages	Key Limitations
Sonolysis (High Freq.)	High (Energy)	Mineralization	10 - 10,000 [27, 20, 15]		No additives required. Complete mineralization (no short-chain intermediates) [26]. Effective for various PFAS.	High E_{EO} for dilute solutions [20]. Complex acoustic field in large reactors.
Electrochemical Oxidation (EO)	High (Energy, Electrode)	Mineralization	10 - 500 [24]		High degradation rates. Effective for many PFAS.	Electrode fouling/passivation [24]. Potential byproducts (e.g., ClO ₄ ⁻) in brines. High cost of BDD electrodes.
Plasma	High (Energy)	Destruction	100 - 1000s		Very rapid degradation rates. Effective in various matrices.	Often produces short-chain fluorinated byproducts [40]. Complex equipment.
Hydrothermal (SCWO)	Very High (Energy, Pressure)	Destruction	N/A (Energy intensive)		Rapidly destroys high concentrations.	Extreme temperature (>374 °C) and pressure (>221 bar). Corrosion and salt precipitation issues.
Adsorption (GAC / IX)	Low (OpEx), High (CapEx / Disposal)	Separation (Transfer)	N/A (Non-destructive)	(Non-)	Mature, well-understood technology. Relatively low operational cost. Effective for dilute streams [46].	Non-destructive. Generates concentrated waste requiring further treatment or disposal [46].
Sono-Piezocatalysis	Low to Medium	Destruction	Emerging (<100 reported) [48]		Novel pathway (e- reduction). Can use "waste" energy (hydraulic flow [25]) or waste catalyst (PTFE).	Nascent technology. Scalability and long-term catalyst stability are unknown.

Table S7: Compilation of PFAS degradation data from various literature sources.

PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOA	49.7	40	166.7	O ₂	Sol-gel TiO ₂ + UV	pseudo-1st	$2.20 \times 10^{-3} \text{ min}^{-1}$	[30]
PFOA	70.4	40	500	N ₂	None	pseudo-1st	$2.40 \times 10^{-3} \text{ min}^{-1}$	[22]
PFOA	70.4	40	500	N ₂	IO ₄	pseudo-1st	$2.22 \times 10^{-2} \text{ min}^{-1}$	[22]
PFOA	70.4	40	500	O ₂	IO ₄	pseudo-1st	$3.70 \times 10^{-3} \text{ min}^{-1}$	[22]
PFOA	70.4	40	500	Air	IO ₄	pseudo-1st	$5.30 \times 10^{-3} \text{ min}^{-1}$	[22]
PFOA	70.4	40	500	N ₂	IO ₄	pseudo-1st	$9.20 \times 10^{-3} \text{ min}^{-1}$	[22]
PFOA	50.0	40	150	Air	None	pseudo-1st	$1.20 \times 10^{-3} \text{ min}^{-1}$	[42]
PFOA	50.0	40	150	N ₂	NaHCO ₃	pseudo-1st	$2.40 \times 10^{-2} \text{ min}^{-1}$	[42]
PFOA	10.0	200	-	Air	None	pseudo-1st	$1.55 \times 10^{-2} \text{ min}^{-1}$	[29]
PFOA	10.0	200	-	Ar	None	pseudo-1st	$3.20 \times 10^{-2} \text{ min}^{-1}$	[29]
PFOS	10.0	200	-	Ar	None	pseudo-1st	$1.60 \times 10^{-2} \text{ min}^{-1}$	[29]
PFOS	10.0	200	-	Air	None	pseudo-1st	$6.80 \times 10^{-3} \text{ min}^{-1}$	[29]
PFOA	0.0083	354	250	Ar	None	pseudo-1st	0.044 min^{-1}	[43]
PFOA	0.8281	354	250	Ar	None	pseudo-1st	0.047 min^{-1}	[43]

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PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOA	5.4	354	250	Ar	None	pseudo-1st	0.026 min ⁻¹	[43]
PFOA	12.42	354	250	Ar	None	pseudo-1st	0.0088 min ⁻¹	[43]
PFOA	17.59	354	250	Ar	None	0th	156 M/min	[43]
PFOA	60.04	354	250	Ar	None	0th	314 M/min	[43]
PFOA	91.50	354	250	Ar	None	0th	1022M/min	[43]
PFOS	0.01	354	250	Ar	None	pseudo-1st	0.024 min ⁻¹	[43]
PFOS	0.1	354	250	Ar	None	pseudo-1st	0.028 min ⁻¹	[43]
PFOS	1	354	250	Ar	None	pseudo-1st	0.028 min ⁻¹	[43]
PFOS	3.6	354	250	Ar	None	pseudo-1st	0.023min ⁻¹	[43]
PFOS	7	354	250	Ar	None	pseudo-1st	0.019 min ⁻¹	[43]
PFOS	8	354	250	Ar	None	pseudo-1st	0.019 min ⁻¹	[43]
PFOS	13	354	250	Ar	None	0th	56 M/min	[43]
PFOS	15	354	250	Ar	None	0th	69M/min	[43]
PFOS	19	354	250	Ar	None	0th	152 M/min	[43]
PFOS	33	354	250	Ar	None	0th	170 M/min	[43]
PFOS	58	354	250	Ar	None	0th	250 M/min	[43]
PFOS	101	354	250	Ar	None	0th	1150 M/min	[43]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOA	4.97	618	250	Ar	None	pseudo-1st	$3.60 \times 10^{-2} \text{ min}^{-1}$	[44]
PFOA	0.103	354	250	Ar	None	pseudo-1st	$4.10 \times 10^{-2} \text{ min}^{-1}$	[44]
PFOS	5.38	618	250	Ar	None	pseudo-1st	$2.60 \times 10^{-2} \text{ min}^{-1}$	[44]
PFOS	0.104	354	250	Ar	None	pseudo-1st	$2.70 \times 10^{-2} \text{ min}^{-1}$	[44]
PFOS	5.0	500		Ar	None	0th_F	$7.4 \times 10^{-4} \text{ mM/min}$	[33]
PFOS	50	500		Ar	None	0th_F	$3.6 \times 10^{-3} \text{ mM/min}$	[33]
PFOS	230	500		Ar	None	0th_F	$6.1 \times 10^{-3} \text{ mM/min}$	[33]
PFOS	5.0	1000		Ar	None	0th_F	$9.5 \times 10^{-4} \text{ mM/min}$	[33]
PFOS	50	1000		Ar	None	0th_F	$6 \times 10^{-3} \text{ mM/min}$	[33]
PFOS	230	1000		Ar	None	0th_F	$5.1 \times 10^{-3} \text{ mM/min}$	[33]
PFOS	10.0	400	100	Air	None	0th	$66.5 \mu\text{g L}^{-1}\text{min}^{-1}$	[45]
PFOS	10.0	400	100	Air	None	0th_F	$42.7 \mu\text{g L}^{-1}\text{min}^{-1}$	[45]
PFOS	10.0	500	100	Air	None	0th	$54.2 \mu\text{g L}^{-1}\text{min}^{-1}$	[45]
PFOS	10.0	500	100	Air	None	0th_F	$39.8 \mu\text{g L}^{-1}\text{min}^{-1}$	[45]
PFOS	10.0	1000	100	Air	None	0th	$53.1 \mu\text{g L}^{-1}\text{min}^{-1}$	[45]
PFOS	10.0	1000	100	Air	None	0th_F	$38.5 \mu\text{g L}^{-1}\text{min}^{-1}$	[45]
PFOA	0.1	612	250	Ar	None	pseudo-1st	0.0366 min^{-1}	[6]

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PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOA	0.1	612	250	Ar	Groundwater	pseudo-1st	0.0291 min ⁻¹	[6]
PFOS	0.1	612	250	Ar	None	pseudo-1st	0.0192 min ⁻¹	[6]
PFOS	0.1	612	250	Ar	Groundwater	pseudo-1st	0.0135 min ⁻¹	[6]
PFOA	0.0994	358	83.3	Ar	None	pseudo-1st	0.0063 min ⁻¹	[3]
PFOA	0.0994	358	166.7	Ar	None	pseudo-1st	0.022 min ⁻¹	[3]
PFOA	0.0994	358	250.0	Ar	None	pseudo-1st	0.048 min ⁻¹	[3]
PFOA	0.0994	358	333.3	Ar	None	pseudo-1st	0.057 min ⁻¹	[3]
PFOA	0.0994	610	83.3	Ar	None	pseudo-1st	0.008 min ⁻¹	[3]
PFOA	0.0994	610	166.7	Ar	None	pseudo-1st	0.023 min ⁻¹	[3]
PFOA	0.0994	610	250.0	Ar	None	pseudo-1st	0.034 min ⁻¹	[3]
PFOA	0.0994	610	333.3	Ar	None	pseudo-1st	0.043 min ⁻¹	[3]
PFOS	0.1000	358	83.3	Ar	None	pseudo-1st	0.007 min ⁻¹	[3]
PFOS	0.1000	358	166.7	Ar	None	pseudo-1st	0.017 min ⁻¹	[3]
PFOS	0.1000	358	250.0	Ar	None	pseudo-1st	0.028 min ⁻¹	[3]
PFOS	0.1000	358	333.3	Ar	None	pseudo-1st	0.040 min ⁻¹	[3]
PFOS	0.1000	610	83.3	Ar	None	pseudo-1st	0.005 min ⁻¹	[3]
PFOS	0.1000	610	166.7	Ar	None	pseudo-1st	0.018 min ⁻¹	[3]

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PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOS	0.1000	610	250.0	Ar	None	pseudo-1st	0.022 min ⁻¹	[3]
PFOS	0.1000	610	333.3	Ar	None	pseudo-1st	0.029 min ⁻¹	[3]
PFHxA	0.1005	202	83.3	Ar	None	pseudo-1st	0.007 min ⁻¹	[3]
PFHxA	0.1005	202	166.7	Ar	None	pseudo-1st	0.016 min ⁻¹	[3]
PFHxA	0.1005	202	250.0	Ar	None	pseudo-1st	0.019 min ⁻¹	[3]
PFHxA	0.1005	202	333.3	Ar	None	pseudo-1st	0.025 min ⁻¹	[3]
PFHxA	0.1005	610	83.3	Ar	None	pseudo-1st	0.010 min ⁻¹	[3]
PFHxA	0.1005	610	166.7	Ar	None	pseudo-1st	0.021 min ⁻¹	[3]
PFHxA	0.1005	610	250.0	Ar	None	pseudo-1st	0.036 min ⁻¹	[3]
PFHxA	0.1005	610	333.3	Ar	None	pseudo-1st	0.034 min ⁻¹	[3]
PFHxS	0.0920	202	83.3	Ar	None	pseudo-1st	0.005 min ⁻¹	[3]
PFHxS	0.0920	202	166.7	Ar	None	pseudo-1st	0.012 min ⁻¹	[3]
PFHxS	0.0920	202	250.0	Ar	None	pseudo-1st	0.012 min ⁻¹	[3]
PFHxS	0.0920	202	333.3	Ar	None	pseudo-1st	0.016 min ⁻¹	[3]
PFHxS	0.0920	610	83.3	Ar	None	pseudo-1st	0.007 min ⁻¹	[3]
PFHxS	0.0920	610	166.7	Ar	None	pseudo-1st	0.014 min ⁻¹	[3]
PFHxS	0.0920	610	250.0	Ar	None	pseudo-1st	0.022 min ⁻¹	[3]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFHxS	0.0920	610	333.3	Ar	None	pseudo-1st	0.027 min ⁻¹	[3]
PFBA	0.1006	202	83.3	Ar	None	pseudo-1st	0.0044 min ⁻¹	[3]
PFBA	0.1006	202	166.7	Ar	None	pseudo-1st	0.0064 min ⁻¹	[3]
PFBA	0.1006	202	250.0	Ar	None	pseudo-1st	0.0072 min ⁻¹	[3]
PFBA	0.1006	202	333.3	Ar	None	pseudo-1st	0.0065 min ⁻¹	[3]
PFBA	0.1006	610	83.3	Ar	None	pseudo-1st	0.0037 min ⁻¹	[3]
PFBA	0.1006	610	166.7	Ar	None	pseudo-1st	0.0061 min ⁻¹	[3]
PFBA	0.1006	610	250.0	Ar	None	pseudo-1st	0.017 min ⁻¹	[3]
PFBA	0.1006	610	333.3	Ar	None	pseudo-1st	0.021 min ⁻¹	[3]
PFBS	0.0900	202	83.3	Ar	None	pseudo-1st	0.0048 min ⁻¹	[3]
PFBS	0.0900	202	166.7	Ar	None	pseudo-1st	0.009 min ⁻¹	[3]
PFBS	0.0900	202	250.0	Ar	None	pseudo-1st	0.013 min ⁻¹	[3]
PFBS	0.0900	202	333.3	Ar	None	pseudo-1st	0.013 min ⁻¹	[3]
PFBS	0.0900	610	83.3	Ar	None	pseudo-1st	0.004 min ⁻¹	[3]
PFBS	0.0900	610	166.7	Ar	None	pseudo-1st	0.006 min ⁻¹	[3]
PFBS	0.0900	610	250.0	Ar	None	pseudo-1st	0.017 min ⁻¹	[3]
PFBS	0.0900	610	333.3	Ar	None	pseudo-1st	0.021 min ⁻¹	[3]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFHxA	0.1005	202	250	Ar	None	pseudo-1st	0.019 min ⁻¹	[4]
PFHxS	0.0920	202	250	Ar	None	pseudo-1st	0.012 min ⁻¹	[4]
PFBA	0.1006	202	250	Ar	None	pseudo-1st	0.007 min ⁻¹	[4]
PFBS	0.0900	202	250	Ar	None	pseudo-1st	0.013 min ⁻¹	[4]
PFHxA	0.1005	358	250	Ar	None	pseudo-1st	0.039 min ⁻¹	[4]
PFHxS	0.0920	358	250	Ar	None	pseudo-1st	0.030 min ⁻¹	[4]
PFBA	0.1006	358	250	Ar	None	pseudo-1st	0.012 min ⁻¹	[4]
PFBS	0.0900	358	250	Ar	None	pseudo-1st	0.018 min ⁻¹	[4]
PFHxA	0.1005	610	250	Ar	None	pseudo-1st	0.036 min ⁻¹	[4]
PFHxS	0.0920	610	250	Ar	None	pseudo-1st	0.022 min ⁻¹	[4]
PFBA	0.1006	610	250	Ar	None	pseudo-1st	0.017 min ⁻¹	[4]
PFBS	0.0900	610	250	Ar	None	pseudo-1st	0.023 min ⁻¹	[4]
PFHxA	0.1005	1060	250	Ar	None	pseudo-1st	0.022 min ⁻¹	[4]
PFHxS	0.0920	1060	250	Ar	None	pseudo-1st	0.012 min ⁻¹	[4]
PFBA	0.1006	1060	250	Ar	None	pseudo-1st	0.008 min ⁻¹	[4]
PFBS	0.0900	1060	250	Ar	None	pseudo-1st	0.009 min ⁻¹	[4]
PFOA	0.0352	575	262	Air	None	pseudo-1st	0.0860 min ⁻¹	[35]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOS	0.0510	575	262	Air	None	pseudo-1st	0.0680 min ⁻¹	[35]
PFOA	0.0402	575	147	Air	None	pseudo-1st	0.0240 min ⁻¹	[35]
PFOS	0.0545	575	147	Air	None	pseudo-1st	0.0370 min ⁻¹	[35]
PFOA	0.0431	575	77	Air	None	pseudo-1st	0.0100 min ⁻¹	[35]
PFOS	0.0600	575	77	Air	None	pseudo-1st	0.0050 min ⁻¹	[35]
PFOA	0.0418	575	52	Air	None	pseudo-1st	0.0030 min ⁻¹	[35]
PFOS	0.0590	575	52	Air	None	pseudo-1st	0.0025 min ⁻¹	[35]
PFOA	0.0402	575	30	Air	None	pseudo-1st	0.0025 min ⁻¹	[35]
PFOS	0.0570	575	30	Air	None	pseudo-1st	0.0020 min ⁻¹	[35]
PFOA	0.0580	575	262	Argon	None	pseudo-1st	0.0820 min ⁻¹	[35]
PFOS	0.0595	575	262	Argon	None	pseudo-1st	0.0710 min ⁻¹	[35]
PFOA	0.0576	575	147	Argon	None	pseudo-1st	0.0520 min ⁻¹	[35]
PFOS	0.0640	575	147	Argon	None	pseudo-1st	0.0450 min ⁻¹	[35]
PFOA	0.0497	575	77	Argon	None	pseudo-1st	0.0150 min ⁻¹	[35]
PFOS	0.0595	575	77	Argon	None	pseudo-1st	0.0120 min ⁻¹	[35]
PFOA	0.0634	575	52	Argon	None	pseudo-1st	0.0080 min ⁻¹	[35]
PFOS	0.0785	575	52	Argon	None	pseudo-1st	0.0070 min ⁻¹	[35]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOA	0.0571	575	30	Argon	None	pseudo-1st	0.0040 min ⁻¹	[35]
PFOS	0.0760	575	30	Argon	None	pseudo-1st	0.0050 min ⁻¹	[35]
PFOA	0.0083	575	30	Air	None	0th	9.48E-06 mol L ⁻¹ min ⁻¹	[34]
PFOS	0.0100	575	30	Air	None	0th	4.66E-06 mol L ⁻¹ min ⁻¹	[34]
PFOA	0.0083	860	50	Air	None	0th	7.15E-06 mol L ⁻¹ min ⁻¹	[34]
PFOS	0.0100	860	50	Air	None	0th	4.00E-06 mol L ⁻¹ min ⁻¹	[34]
PFOA	0.0083	1140	62.8	Air	None	0th	7.32E-06 mol L ⁻¹ min ⁻¹	[34]
PFOS	0.0100	1140	62.8	Air	None	0th	6.00E-06 mol L ⁻¹ min ⁻¹	[34]
PFOA	0.0414	575	77	Air	None	pseudo-1st	0.0235 min ⁻¹	[34]
PFOS	0.0500	575	77	Air	None	pseudo-1st	0.0060 min ⁻¹	[34]
PFOA	0.0414	860	113	Air	None	pseudo-1st	0.0230 min ⁻¹	[34]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOS	0.0500	860	113	Air	None	pseudo-1st	0.0070 min ⁻¹	[34]
PFOA	0.0414	1140	148	Air	None	pseudo-1st	0.0225 min ⁻¹	[34]
PFOS	0.0500	1140	148	Air	None	pseudo-1st	0.0065 min ⁻¹	[34]
PFOA	0.0414	575	77	He	None	pseudo-1st	0.0380 min ⁻¹	[34]
PFOA	0.0414	575	77	N2	None	pseudo-1st	0.0210 min ⁻¹	[34]
PFOA	0.0414	575	77	Ar	None	pseudo-1st	0.0145 min ⁻¹	[34]
PFOA	0.0414	575	77	O2	None	pseudo-1st	0.0050 min ⁻¹	[34]
PFOA	0.0414	575	77	O3	None	pseudo-1st	0.0035 min ⁻¹	[34]
PFOS	1.3	1000	10.9	Ar	None	0th _F	0.30 μmol L ⁻¹ h ⁻¹	[11]
PFOS	1.3	1000	10.9	Ar	None	0th _S O4	0.19 μmol L ⁻¹ h ⁻¹	[11]
PFOS	1.3	500	13.2	Ar	None	0th _F	0.32 μmol L ⁻¹ h ⁻¹	[11]
PFOS	1.3	500	13.2	Ar	None	0th _S O4	0.32 μmol L ⁻¹ h ⁻¹	[11]
PFOS	1.3	500+1000	24.1	Ar	None	0th _F	0.82 μmol L ⁻¹ h ⁻¹	[11]
PFOS	1.3	500+1000	24.1	Ar	None	0th _S O4	0.61 μmol L ⁻¹ h ⁻¹	[11]
PFOA	54.7	40	180	Air	None	pseudo-1st	0.0035 min ⁻¹	[14]
PFOA	54.7	40	180	Air	MnO4 (2mM)	pseudo-1st	0.0061 min ⁻¹	[14]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOA	54.7	40	180	Air	MnO4 (6mM)	pseudo-1st	0.0130 min ⁻¹	[14]
PFOA	54.7	40	180	Air	MnO4 (10mM)	pseudo-1st	0.0125 min ⁻¹	[14]
PFOA	54.7	40	180	O2	MnO4 (6mM)	pseudo-1st	0.0095 min ⁻¹	[14]
PFOA	54.7	40	180	Ar	MnO4 (6mM)	pseudo-1st	0.0140 min ⁻¹	[14]
PFOA	54.7	40	180	Air	None	0th _F	0.0015 mmol L ⁻¹ min ⁻¹	[14]
PFOA	54.7	40	180	Air	MnO4 (6mM)	0th _F	0.0079 mmol L ⁻¹ min ⁻¹	[14]
PFOA	54.7	40	60	Air	None	pseudo-1st	0.0025 min ⁻¹	[14]
PFOA	54.7	40	120	Air	None	pseudo-1st	0.0031 min ⁻¹	[14]
PFEEs	62.4	500	250	Ar	-	0th _F	3.9E-03 mmol L ⁻¹ min ⁻¹	[9]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFBS	56.7	500	250	Ar	-	0th _F	1.8E-03 mmol L ⁻¹ min ⁻¹	[9]
PFHxS	48.2	500	250	Ar	-	0th _F	2.6E-03 mmol L ⁻¹ min ⁻¹	[9]
PFOS	42.5	500	250	Ar	-	0th _F	3.5E-03 mmol L ⁻¹ min ⁻¹	[9]
6:2 FTS	55.9	500	250	Ar	-	0th _F	1.5E-03 mmol L ⁻¹ min ⁻¹	[9]
PFPrA	55.8	500	250	Ar	-	0th _F	1.6E-03 mmol L ⁻¹ min ⁻¹	[9]
PFPeA	49.8	500	250	Ar	-	0th _F	2.5E-03 mmol L ⁻¹ min ⁻¹	[9]
PFHxA	47.3	500	250	Ar	-	0th _F	3.5E-03 mmol L ⁻¹ min ⁻¹	[9]
PFOA	46.9	500	250	Ar	-	0th _F	3.7E-03 mmol L ⁻¹ min ⁻¹	[9]
PFEEs	62.4	500	250	Ar	-	pseudo-1st	0.055 min ⁻¹	[9]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFBS	56.7	500	250	Ar	-	pseudo-1st	0.019 min ⁻¹	[9]
PFHxS	48.2	500	250	Ar	-	pseudo-1st	0.034 min ⁻¹	[9]
PFOS	42.5	500	250	Ar	-	pseudo-1st	0.051 min ⁻¹	[9]
PFOA	46.9	500	250	Ar	-	pseudo-1st	0.046 min ⁻¹	[9]
PFOA	20.70	640	792	Ar	None	0th _F	0.62 μmol L ⁻¹ min ⁻¹	[13]
HFPO-DA	16.50	640	792	Ar	None	0th _F	0.65 μmol L ⁻¹ min ⁻¹	[13]
PFHpA	18.20	640	792	Ar	None	0th _F	0.60 μmol L ⁻¹ min ⁻¹	[13]
PFHxA	15.70	640	792	Ar	None	0th _F	0.44 μmol L ⁻¹ min ⁻¹	[13]
PFPeA	13.20	640	792	Ar	None	0th _F	0.23 μmol L ⁻¹ min ⁻¹	[13]
PFBA	10.70	640	792	Ar	None	0th _F	0.08 μmol L ⁻¹ min ⁻¹	[13]
PFOS	25.01	640	792	Ar	None	0th _F	0.61 μmol L ⁻¹ min ⁻¹	[13]
HFPO-TrA	24.81	640	792	Ar	None	0th _F	0.81 μmol L ⁻¹ min ⁻¹	[13]
HFPO- TeA	33.11	640	792	Ar	None	0th _F	0.94 μmol L ⁻¹ min ⁻¹	[13]
PFECA-B	14.80	640	792	Ar	None	0th _F	0.17 μmol L ⁻¹ min ⁻¹	[13]
PFOA	20.70	640	792	He	None	0th _F	0.44 μmol L ⁻¹ min ⁻¹	[13]
PFOA	20.70	640	792	Air	None	0th _F	0.35 μmol L ⁻¹ min ⁻¹	[13]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOS	5.0	500	400	Air	None	pseudo-1st	0.0310 min ⁻¹	[31]
PFOS	5.0	500	267	Air	None	pseudo-1st	0.0180 min ⁻¹	[31]
PFOS	3.0	500	267	Air	None	pseudo-1st	0.0220 min ⁻¹	[31]
PFOS	1.0	500	267	Air	None	pseudo-1st	0.0200 min ⁻¹	[31]
PFOS	0.1	500	267	Air	None	pseudo-1st	0.0110 min ⁻¹	[31]
PFOS	0.002	500	267	Air	None	pseudo-1st	0.0100 min ⁻¹	[31]
PFOS	5.0	22	400	Air	None	pseudo-1st	0.0001 min ⁻¹	[31]
PFOS	5.0	500	400	Air	None	0th _F	0.0034	[31]
							mmol L ⁻¹ min ⁻¹	
PFOA	10.0	20	375	Air	None	pseudo-1st	0.0460 min ⁻¹	[32]
PFOS	10.0	20	375	Air	None	pseudo-1st	0.0520 min ⁻¹	[32]
PFOA	10.0	20	300	Air	None	pseudo-1st	0.0380 min ⁻¹	[32]
PFOS	10.0	20	300	Air	None	pseudo-1st	0.0430 min ⁻¹	[32]
PFOA	10.0	20	225	Air	None	pseudo-1st	0.0260 min ⁻¹	[32]
PFOS	10.0	20	225	Air	None	pseudo-1st	0.0310 min ⁻¹	[32]
PFOA	10.0	20	150	Air	None	pseudo-1st	0.0150 min ⁻¹	[32]
PFOS	10.0	20	150	Air	None	pseudo-1st	0.0210 min ⁻¹	[32]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOA	20.0	20	3750	Air	None	pseudo-1st	0.0230 min ⁻¹	[32]
PFOS	20.0	20	375	Air	None	pseudo-1st	0.0290 min ⁻¹	[32]
PFOA	5.0	20	375	Air	None	pseudo-1st	0.0510 min ⁻¹	[32]
PFOS	5.0	20	375	Air	None	pseudo-1st	0.0590 min ⁻¹	[32]
PFOA	0.5	20	18000	Air	None	0th_F	0.14 μmin ⁻¹	[47]
PFOA	1.0	580	750	Air	None	pseudo-1st	4.20 × 10 ⁻² min ⁻¹	[1]
PFOS	1.0	580	750	Air	None	pseudo-1st	2.40 × 10 ⁻² min ⁻¹	[1]
PFOA	1.0	575	77	Air	None	pseudo-1st	7.63 × 10 ⁻³ min ⁻¹	[37]
PFOS	1.25	575	77	Air	None	pseudo-1st	5.17 × 10 ⁻³ min ⁻¹	[37]
PFOA	20.0	575	77	Air	None	0th	0.050 μmol L ⁻¹ min ⁻¹	[37]
PFOS	20.0	575	77	Air	None	0th	0.076 μmol L ⁻¹ min ⁻¹	[37]
PFOA	10.0	575	77	Air	None	0th	0.021 μmol L ⁻¹ min ⁻¹	[37]
(Mixture)								
PFOS	10.0	575	77	Air	None	0th _F	0.052 μmol L ⁻¹ min ⁻¹	[37]
(Mixture)								
PFOS	3.0	700+950	78.4	Air	None	pseudo-1st	1.4 × 10 ⁻³ min ⁻¹	[18]
PFOA	3.0	700+950	78.4	Air	None	pseudo-1st	1.2 × 10 ⁻³ min ⁻¹	[18]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFAS (Mixture) ^b	18.0	700	78.4	Air	None	0th_F	0.24 μmol L ⁻¹ min ⁻¹	[18]
PFAS (Mixture) ^b	18.0	950	78.4	Air	None	0th_F	0.23 μmol L ⁻¹ min ⁻¹	[18]
PFAS (Mixture) ^b	18.0	700+950	78.4	Air	None	0th_F	0.36 μmol L ⁻¹ min ⁻¹	[18]
PFOS	10.0	410	200	Air	None (No Flow)	0th_F	2.20 μmol L ⁻¹ min ⁻¹	[38]
PFOS	10.0	410	200	Air	-	0th_F	2.45 μmol L ⁻¹ min ⁻¹	[38]
PFOS	10.0	410	200	Air	-	0th_F	2.51 μmol L ⁻¹ min ⁻¹	[38]
PFOS	10.0	410	200	Air	-	0th_F	2.20 μmol L ⁻¹ min ⁻¹	[38]
PFOS	10.0	410	200	Air	-	0th_F	2.35 μmol L ⁻¹ min ⁻¹	[38]
PFOS	10.0	410	100	Air	- Flow	0th_F	1.137 μmol L ⁻¹ min ⁻¹	[39]
PFOS	10.0	410	200	Air	-	0th_F	3.402 μmol L ⁻¹ min ⁻¹	[39]
PFOS	10.0	410	300	Air	-	0th_F	2.715 μmol L ⁻¹ min ⁻¹	[39]
AFFF (Mixture) ^a	20x Dil.	410	270	Air	-	0th_F	4.280 μmol L ⁻¹ min ⁻¹	[39]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOA	1.0	130	51.1	Air	Glass Reactor	pseudo-1st	0.98 h ⁻¹	[19]
PFOA	1.0	130	55.1	Air	PP Reactor	pseudo-1st	0.22 h ⁻¹	[19]
PFOA	1.0	130	51.1	Air	Glass Reactor	0th_F	2.6 h ⁻¹	[19]
PFOA	1.0	130	55.1	Air	PP Reactor	0th_F	1.4 h ⁻¹	[19]
PFOS	1.0	130	51.1	Air	Glass Reactor	0th_F	1.2 h ⁻¹	[19]
6:2 FTS	1.0	130	51.1	Air	Glass Reactor	0th_F	2.1 h ⁻¹	[19]
AFFF (Mixture) ^a	1000x Dil.	130	51.1	Air	Glass Reactor	% Defluor.	100% (3.0 h)	[19]
PFOA	10.0	130	51.1	Air	MQ Water	pseudo-1st	0.0160 min ⁻¹	[2]
PFOA	10.0	130	51.1	Air	Creek Water	pseudo-1st	0.0084 min ⁻¹	[2]

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PFAS Compound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOA	10.0	130	51.1	Air	Seawater	pseudo-1st	0.0062 min ⁻¹	[2]
PFOS	10.0	130	51.1	Air	MQ Water	pseudo-1st	0.0275 min ⁻¹	[2]
PFOS	10.0	130	51.1	Air	Creek Water	pseudo-1st	0.0232 min ⁻¹	[2]
PFOS	10.0	130	51.1	Air	Seawater	pseudo-1st	0.0162 min ⁻¹	[2]
PFOA	10.0	130	51.1	Air	MQ Water	pseudo-1st_F	0.0160 min ⁻¹	[2]
PFOA	10.0	130	51.1	Air	Seawater	pseudo-1st_F	0.0030 min ⁻¹	[2]
PFOS	10.0	130	51.1	Air	MQ Water	pseudo-1st_F	0.0080 min ⁻¹	[2]
PFOS	10.0	130	51.1	Air	Seawater	pseudo-1st_F	0.0004 min ⁻¹	[2]
PFBA (C4)	0.05	575	144	Air	Mixture, pH 5.6	pseudo-1st	0.003 min ⁻¹	[36]
PFPeA (C5)	0.05	575	144	Air	Mixture, pH 5.6	pseudo-1st	0.008 min ⁻¹	[36]

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PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFHxA (C6)	0.04	575	144	Air	Mixture, pH 5.6	pseudo-1st	0.010 min ⁻¹	[36]
PFHpA (C7)	0.04	575	144	Air	Mixture, pH 5.6	pseudo-1st	0.006 min ⁻¹	[36]
PFOA (C8)	0.05	575	144	Air	Mixture, pH 5.6	pseudo-1st	0.019 min ⁻¹	[36]
PFNA (C9)	0.05	575	144	Air	Mixture, pH 5.6	pseudo-1st	0.022 min ⁻¹	[36]
PFDA (C10)	0.05	575	144	Air	Mixture, pH 5.6	pseudo-1st	0.021 min ⁻¹	[36]
PFUnDA (C11)	0.025	575	144	Air	Mixture, pH 5.6	pseudo-1st	0.018 min ⁻¹	[36]
PFDoDA (C12)	0.018	575	144	Air	Mixture, pH 5.6	pseudo-1st	0.011 min ⁻¹	[36]
PFTTrDA (C13)	0.019	575	144	Air	Mixture, pH 5.6	pseudo-1st	0.010 min ⁻¹	[36]

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PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFTeDA (C14)	0.03	575	144	Air	Mixture, pH 5.6	pseudo-1st	0.011 min ⁻¹	[36]
PFHxS (C6S)	0.03	575	144	Air	Mixture, pH 5.6	pseudo-1st	0.007 min ⁻¹	[36]
PFOS (C8S)	0.05	575	144	Air	Mixture, pH 5.6	pseudo-1st	0.007 min ⁻¹	[36]
PFBA (C4)	0.05	853	144	Air	None	pseudo-1st	0.0020 min ⁻¹	[36]
PFPeA (C5)	0.05	853	144	Air	None	pseudo-1st	0.0040 min ⁻¹	[36]
PFHxA (C6)	0.05	853	144	Air	None	pseudo-1st	0.0075 min ⁻¹	[36]
PFHpA (C7)	0.05	853	144	Air	None	pseudo-1st	0.0050 min ⁻¹	[36]
PFOA (C8)	0.05	853	144	Air	None	pseudo-1st	0.0090 min ⁻¹	[36]

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PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFNA (C9)	0.05	853	144	Air	None	pseudo-1st	0.0105 min ⁻¹	[36]
PFDA (C10)	0.05	853	144	Air	None	pseudo-1st	0.0090 min ⁻¹	[36]
PFUnDA (C11)	0.05	853	144	Air	None	pseudo-1st	0.0105 min ⁻¹	[36]
PFDDA (C12)	0.05	853	144	Air	None	pseudo-1st	0.0055 min ⁻¹	[36]
PFTTrDA (C13)	0.05	853	144	Air	None	pseudo-1st	0.0030 min ⁻¹	[36]
PFTeDA (C14)	0.05	853	144	Air	None	pseudo-1st	0.0030 min ⁻¹	[36]
PFHxS (CS6)	0.05	853	144	Air	None	pseudo-1st	0.0065 min ⁻¹	[36]
PFOS (CS8)	0.05	853	144	Air	None	pseudo-1st	0.0040 min ⁻¹	[36]

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PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFBA (C4)	0.05	1132	144	Air	None	pseudo-1st	0.0015 min ⁻¹	[36]
PFPeA (C5)	0.05	1132	144	Air	None	pseudo-1st	0.0030 min ⁻¹	[36]
PFHxA (C6)	0.05	1132	144	Air	None	pseudo-1st	0.0035 min ⁻¹	[36]
PFHpA (C7)	0.05	1132	144	Air	None	pseudo-1st	0.0025 min ⁻¹	[36]
PFOA (C8)	0.05	1132	144	Air	None	pseudo-1st	0.0080 min ⁻¹	[36]
PFNA (C9)	0.05	1132	144	Air	None	pseudo-1st	0.0120 min ⁻¹	[36]
PFDA (C10)	0.05	1132	144	Air	None	pseudo-1st	0.0115 min ⁻¹	[36]
PFUnDA (C11)	0.05	1132	144	Air	None	pseudo-1st	0.0130 min ⁻¹	[36]

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PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFDDA (C12)	0.05	1132	144	Air	None	pseudo-1st	0.0095 min ⁻¹	[36]
PFTTrDA (C13)	0.05	1132	144	Air	None	pseudo-1st	0.0065 min ⁻¹	[36]
PFTeDA (C14)	0.05	1132	144	Air	None	pseudo-1st	0.0065 min ⁻¹	[36]
PFHxS (CS6)	0.05	1132	144	Air	None	pseudo-1st	0.0025 min ⁻¹	[36]
PFOS (CS8)	0.05	1132	144	Air	None	pseudo-1st	0.0035 min ⁻¹	[36]
PFBA (C4)	0.05	575	50	Air	None	pseudo-1st	0.0020 min ⁻¹	[36]
PFPeA (C5)	0.05	575	50	Air	None	pseudo-1st	0.0040 min ⁻¹	[36]
PFHxA (C6)	0.04	575	50	Air	None	pseudo-1st	0.0030 min ⁻¹	[36]

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Table S7 – *Continued from previous page*

PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFHpA (C7)	0.04	575	50	Air	None	pseudo-1st	0.0080 min ⁻¹	[36]
PFOA (C8)	0.05	575	50	Air	None	pseudo-1st	0.0070 min ⁻¹	[36]
PFNA (C9)	0.05	575	50	Air	None	pseudo-1st	0.0055 min ⁻¹	[36]
PFDA (C10)	0.05	575	50	Air	None	pseudo-1st	0.0060 min ⁻¹	[36]
PFUnDA (C11)	0.025	575	50	Air	None	pseudo-1st	0.0065 min ⁻¹	[36]
PFDDA (C12)	0.018	575	50	Air	None	pseudo-1st	0.0035 min ⁻¹	[36]
PFTTrDA (C13)	0.019	575	50	Air	None	pseudo-1st	0.0010 min ⁻¹	[36]
PFTeDA (C14)	0.031	575	50	Air	None	pseudo-1st	0.0010 min ⁻¹	[36]

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Table S7 – *Continued from previous page*

PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFHxS (C6)	0.03	575	50	Air	None	pseudo-1st	0.0080 min ⁻¹	[36]
PFOS (C8)	0.05	575	50	Air	None	pseudo-1st	0.0030 min ⁻¹	[36]
PFBA (C4)	0.050	575	252	Air	None	pseudo-1st	0.0110 min ⁻¹	[36]
PFPeA (C5)	0.050	575	252	Air	None	pseudo-1st	0.0240 min ⁻¹	[36]
PFHxA (C6)	0.040	575	252	Air	None	pseudo-1st	0.0270 min ⁻¹	[36]
PFHpA (C7)	0.041	575	252	Air	None	pseudo-1st	0.0190 min ⁻¹	[36]
PFOA (C8)	0.051	575	252	Air	None	pseudo-1st	0.0320 min ⁻¹	[36]
PFNA (C9)	0.053	575	252	Air	None	pseudo-1st	0.0330 min ⁻¹	[36]

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Table S7 – *Continued from previous page*

PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFDA (C10)	0.052	575	252	Air	None	pseudo-1st	0.0310 min ⁻¹	[36]
PFUnDA (C11)	0.025	575	252	Air	None	pseudo-1st	0.0240 min ⁻¹	[36]
PFDDA (C12)	0.018	575	252	Air	None	pseudo-1st	0.0200 min ⁻¹	[36]
PFTriDA (C13)	0.019	575	252	Air	None	pseudo-1st	0.0200 min ⁻¹	[36]
PFTeDA (C14)	0.031	575	252	Air	None	pseudo-1st	0.0170 min ⁻¹	[36]
PFHxS (CS6)	0.030	575	252	Air	None	pseudo-1st	0.0195 min ⁻¹	[36]
PFOS (CS8)	0.051	575	252	Air	None	pseudo-1st	0.0215 min ⁻¹	[36]
PFBA (C4)	0.050	575	144	Air	None	pseudo-1st	0.0100 min ⁻¹	[36]

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Table S7 – *Continued from previous page*

PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFPeA (C5)	0.050	575	144	Air	None	pseudo-1st	0.0260 min ⁻¹	[36]
PFHxA (C6)	0.040	575	144	Air	None	pseudo-1st	0.0270 min ⁻¹	[36]
PFHpA (C7)	0.041	575	144	Air	None	pseudo-1st	0.0180 min ⁻¹	[36]
PFOA (C8)	0.051	575	144	Air	None	pseudo-1st	0.0310 min ⁻¹	[36]
PFNA (C9)	0.053	575	144	Air	None	pseudo-1st	0.0400 min ⁻¹	[36]
PFDA (C10)	0.052	575	144	Air	None	pseudo-1st	0.0350 min ⁻¹	[36]
PFUnDA (C11)	0.025	575	144	Air	None	pseudo-1st	0.0225 min ⁻¹	[36]
PFDDA (C12)	0.018	575	144	Air	None	pseudo-1st	0.0100 min ⁻¹	[36]

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Table S7 – Continued from previous page

PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFTTrDA (C13)	0.019	575	144	Air	None	pseudo-1st	0.0060 min ⁻¹	[36]
PFTeDA (C14)	0.031	575	144	Air	None	pseudo-1st	0.0035 min ⁻¹	[36]
PFHxS (CS6)	0.030	575	144	Air	None	pseudo-1st	0.0180 min ⁻¹	[36]
PFOS (CS8)	0.051	575	144	Air	None	pseudo-1st	0.0130 min ⁻¹	[36]
6:2 FTS	0.5	850/950	118	Air	Groundwater	pseudo-1st	0.1682 min ⁻¹	[28]
PFBA	0.5	850/950	118	Air	Groundwater	pseudo-1st	0.1698 min ⁻¹	[28]
PFBS	0.5	850/950	118	Air	Groundwater	pseudo-1st	0.3727 min ⁻¹	[28]
PFHpA	0.5	850/950	118	Air	Groundwater	pseudo-1st	0.3186 min ⁻¹	[28]
PFHxS	0.5	850/950	118	Air	Groundwater	pseudo-1st	0.5518 min ⁻¹	[28]
PFOA	0.5	850/950	118	Air	Groundwater	pseudo-1st	0.4289 min ⁻¹	[28]
PFPeA	0.5	850/950	118	Air	Groundwater	pseudo-1st	0.4524 min ⁻¹	[28]
PFPeS	0.5	850/950	118	Air	Groundwater	pseudo-1st	0.4110 min ⁻¹	[28]
PFBS	42.0	850/950	118	Air	AFFF	pseudo-1st	0.0187 min ⁻¹	[28]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFHpS	42.0	850/950	118	Air	AFFF	pseudo-1st	0.0231 min ⁻¹	[28]
PFHxA	42.0	850/950	118	Air	AFFF	pseudo-1st	0.0013 min ⁻¹	[28]
PFHxS	42.0	850/950	118	Air	AFFF	pseudo-1st	0.0090 min ⁻¹	[28]
PFOS	42.0	850/950	118	Air	AFFF	pseudo-1st	0.0130 min ⁻¹	[28]
PFPeS	42.0	850/950	118	Air	AFFF	pseudo-1st	0.0192 min ⁻¹	[28]
PFBS	18.0	850/950	118	Air	Still Bottom	pseudo-1st	0.0896 min ⁻¹	[28]
PFHpA	18.0	850/950	118	Air	Still Bottom	pseudo-1st	0.0628 min ⁻¹	[28]
PFHxA	18.0	850/950	118	Air	Still Bottom	pseudo-1st	0.1358 min ⁻¹	[28]
PFHxS	18.0	850/950	118	Air	Still Bottom	pseudo-1st	0.0457 min ⁻¹	[28]
PFOA	18.0	850/950	118	Air	Still Bottom	pseudo-1st	0.0959 min ⁻¹	[28]
PFOS	18.0	850/950	118	Air	Still Bottom	pseudo-1st	0.1254 min ⁻¹	[28]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFPeS	18.0	850/950	118	Air	Still Bottom	pseudo-1st	0.0738 min ⁻¹	[28]
4:2 FTS	4.54	20	120	Argon	5mM Phosphate	pseudo-1st	0.0152 min ⁻¹	[8]
6:2 FTS	5.54	20	120	Argon	5mM Phosphate	pseudo-1st	0.0336 min ⁻¹	[8]
8:2 FTS	6.54	20	120	Argon	5mM Phosphate	pseudo-1st	0.0528 min ⁻¹	[8]
PFOA	14.0	700	100	Air	None	pseudo-1st	9×10^{-3} min ⁻¹	[17]
PFOS	11.4	700	100	Air	None	pseudo-1st	4×10^{-3} min ⁻¹	[17]
PFOA	24.0	700	100	Air	None	pseudo-1st	1.2×10^{-3} min ⁻¹	[17]
PFOA	24.0	700	150	Air	None	pseudo-1st	2.1×10^{-3} min ⁻¹	[17]
PFOA	24.0	700	200	Air	None	pseudo-1st	3.1×10^{-3} min ⁻¹	[17]
PFOS	20.0	700	100	Air	None	pseudo-1st	1.1×10^{-3} min ⁻¹	[17]
PFOS	20.0	700	150	Air	None	pseudo-1st	2.4×10^{-3} min ⁻¹	[17]
PFOS	20.0	700	200	Air	None	pseudo-1st	3.2×10^{-3} min ⁻¹	[17]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOA	10	20 + 43	800	N/A	Persulfate (1.0 g/L)	pseudo-1st	22.2 h ⁻¹ min ⁻¹	[23]
PFOS	5.79	20 + 43	800	N/A	Persulfate (1.0 g/L)	pseudo-1st	19.2 h ⁻¹ min ⁻¹	[23]
6:2 FTS	10	20 + 43	800	N/A	Persulfate (1.0 g/L)	pseudo-1st	20.8 h ⁻¹ min ⁻¹	[23]
PFOA (HFUS)	10	43	250	N/A	None	pseudo-1st	0.71 h ⁻¹ min ⁻¹	[23]
PFOA (HFUS/PS)	10	43	250	N/A	Persulfate (1.0 g/L)	pseudo-1st	0.86 h ⁻¹ min ⁻¹	[23]
GenX	1.0	375	400	N/A	None	pseudo-1st	0.0280 min ⁻¹	[15]
GenX	1.0	580	400	N/A	None	pseudo-1st	0.0501 min ⁻¹	[15]
GenX	1.0	860	400	N/A	None	pseudo-1st	0.0175 min ⁻¹	[15]
GenX	1.0	1140	400	N/A	None	pseudo-1st	0.0075 min ⁻¹	[15]
PFOA	1.0	375	400	N/A	None	pseudo-1st	0.0155 min ⁻¹	[15]
PFOA	1.0	580	400	N/A	None	pseudo-1st	0.0444 min ⁻¹	[15]
PFOA	1.0	860	400	N/A	None	pseudo-1st	0.0163 min ⁻¹	[15]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOA	1.0	1140	400	N/A	None	pseudo-1st	0.0102 min ⁻¹	[15]
PFOS	1.0	375	400	N/A	None	pseudo-1st	0.0113 min ⁻¹	[15]
PFOS	1.0	580	400	N/A	None	pseudo-1st	0.0153 min ⁻¹	[15]
PFOS	1.0	860	400	N/A	None	pseudo-1st	0.0051 min ⁻¹	[15]
PFOS	1.0	1140	400	N/A	None	pseudo-1st	0.0039 min ⁻¹	[15]
PFOA	140	700	1250	Argon	DI Water	pseudo-1st	37 × 10 ⁻³ min ⁻¹	[16]
PFOA	12.3	700	1040	Argon	Low TDS GW	pseudo-1st	35 × 10 ⁻³ min ⁻¹	[16]
PFOS	2.9	700	1250	Argon	DI Water	pseudo-1st	16 × 10 ⁻³ min ⁻¹	[16]
PFOS	10.4	700	1250	Argon	Low TDS GW	pseudo-1st	7.2 × 10 ⁻³ min ⁻¹	[16]
PFBS	10.5	700	1250	Argon	DI Water	pseudo-1st	10 × 10 ⁻³ min ⁻¹	[16]
PFBS	7.5	700	1250	Argon	Low TDS GW	pseudo-1st	21 × 10 ⁻³ min ⁻¹	[16]
6:2 FTS	5.1	700	1250	Argon	DI Water	pseudo-1st	18 × 10 ⁻³ min ⁻¹	[16]
6:2 FTS	6.1	700	1250	Argon	Low TDS GW	pseudo-1st	32 × 10 ⁻³ min ⁻¹	[16]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
HFPO-DA	867	700	1250	Argon	DI Water	pseudo-1st	$32 \times 10^{-3} \text{ min}^{-1}$	[16]
6:2 FTAB	7.2	700	1250	Argon	DI Water	pseudo-1st	$27 \times 10^{-3} \text{ min}^{-1}$	[16]
FOSA	0.2	700	1250	Argon	DI Water	pseudo-1st	$15 \times 10^{-3} \text{ min}^{-1}$	[16]
PFOA	0.7	700 + 950	145	N/A	None	Pseudo-1st	$8.9 \times 10^{-3} \text{ min}^{-1}$	[26]
PFOS	0.5	700 + 950	145	N/A	None	Pseudo-1st	$1.0 \times 10^{-3} \text{ min}^{-1}$	[26]
PFHxA	0.8	700 + 950	145	N/A	None	Pseudo-1st	$5.6 \times 10^{-3} \text{ min}^{-1}$	[26]
PFHxS	1.1	700 + 950	145	N/A	None	Pseudo-1st	$5.9 \times 10^{-3} \text{ min}^{-1}$	[26]
PFBA	2.0	700 + 950	145	N/A	None	Pseudo-1st	$3.9 \times 10^{-3} \text{ min}^{-1}$	[26]
PFBS	1.6	700 + 950	145	N/A	None	Pseudo-1st	$5.8 \times 10^{-3} \text{ min}^{-1}$	[26]
PFOA	19.0	700 + 950	145	N/A	None	Pseudo-1st	$0.6 \times 10^{-3} \text{ min}^{-1}$	[26]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOS	23.0	700 + 950	145	N/A	None	Pseudo-1st	$0.5 \times 10^{-3} \text{min}^{-1}$	[26]
PFHpA	10.0	1000	70	Air	None	pseudo-1st	$5.35 \times 10^{-3} \text{min}^{-1}$	[10]
PFOA	10.0	1000	70	Air	None	pseudo-1st	$5.80 \times 10^{-3} \text{min}^{-1}$	[10]
PFNA	10.0	1000	70	Air	None	pseudo-1st	$7.20 \times 10^{-3} \text{min}^{-1}$	[10]
PFHxS	10.0	1000	70	Air	None	pseudo-1st	$9.83 \times 10^{-4} \text{min}^{-1}$	[10]
PFOS	10.0	1000	70	Air	None	pseudo-1st	$2.22 \times 10^{-3} \text{min}^{-1}$	[10]
PFHpA	10.0	500/1000	70	Air	None	pseudo-1st	$2.95 \times 10^{-3} \text{min}^{-1}$	[10]
PFOA	10.0	500/1000	70	Air	None	pseudo-1st	$2.77 \times 10^{-3} \text{min}^{-1}$	[10]
PFNA	10.0	500/1000	70	Air	None	pseudo-1st	$3.43 \times 10^{-3} \text{min}^{-1}$	[10]
PFHpA	10.0	500	70	Air	None	pseudo-1st	$7.67 \times 10^{-4} \text{min}^{-1}$	[10]
PFOA	10.0	500	70	Air	None	pseudo-1st	$6.83 \times 10^{-4} \text{min}^{-1}$	[10]
PFNA	10.0	500	70	Air	None	pseudo-1st	$7.50 \times 10^{-4} \text{min}^{-1}$	[10]
PFHxS	10.0	500	70	Air	None	pseudo-1st	$2.83 \times 10^{-4} \text{min}^{-1}$	[10]
PFOS	10.0	500	70	Air	None	pseudo-1st	$2.50 \times 10^{-4} \text{min}^{-1}$	[10]
PFCA Mix	10.0	1000	70	Air	None	pseudo-1st	$6.07 \times 10^{-3} \text{min}^{-1}$	[10]

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PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFCA Mix	10.0	1000	70	Air	NH ₄ Cl (10 g/L)	pseudo-1st	$4.50 \times 10^{-4} \text{ min}^{-1}$	[10]
PFCA Mix	10.0	1000	70	Air	NaCl (10 g/L)	pseudo-1st	$1.47 \times 10^{-3} \text{ min}^{-1}$	[10]
PFCA Mix	10.0	1000	70	Air	NaOH (5 g/L)	pseudo-1st	$1.33 \times 10^{-3} \text{ min}^{-1}$	[10]
PFCA Mix	10.0	500/1000	70	Air	None	pseudo-1st	$3.03 \times 10^{-3} \text{ min}^{-1}$	[10]
PFCA Mix	10.0	500/1000	70	Air	NH ₄ Cl (10 g/L)	pseudo-1st	$4.00 \times 10^{-4} \text{ min}^{-1}$	[10]
PFCA Mix	10.0	500/1000	70	Air	NaCl (10 g/L)	pseudo-1st	$1.65 \times 10^{-3} \text{ min}^{-1}$	[10]
PFCA Mix	10.0	500/1000	70	Air	NaOH (5 g/L)	pseudo-1st	$8.67 \times 10^{-4} \text{ min}^{-1}$	[10]
PFCA Mix	10.0	500	70	Air	None	pseudo-1st	$7.17 \times 10^{-4} \text{ min}^{-1}$	[10]
PFCA Mix	10.0	500	70	Air	NH ₄ Cl (10 g/L)	pseudo-1st	$4.00 \times 10^{-4} \text{ min}^{-1}$	[10]

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PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFCA Mix	10.0	500	70	Air	NaCl (10 g/L)	pseudo-1st	$1.05 \times 10^{-3} \text{ min}^{-1}$	[10]
PFCA Mix	10.0	500	70	Air	NaOH (5 g/L)	pseudo-1st	$8.17 \times 10^{-4} \text{ min}^{-1}$	[10]
PFSA Mix	10.0	1000	70	Air	None	pseudo-1st	$1.48 \times 10^{-3} \text{ min}^{-1}$	[10]
PFSA Mix	10.0	1000	70	Air	NH ₄ Cl (10 g/L)	pseudo-1st	$6.50 \times 10^{-4} \text{ min}^{-1}$	[10]
PFSA Mix	10.0	1000	70	Air	NaCl (10 g/L)	pseudo-1st	$8.50 \times 10^{-4} \text{ min}^{-1}$	[10]
PFSA Mix	10.0	1000	70	Air	NaOH (5 g/L)	pseudo-1st	$3.50 \times 10^{-4} \text{ min}^{-1}$	[10]
PFSA Mix	10.0	500	70	Air	None	pseudo-1st	$2.67 \times 10^{-4} \text{ min}^{-1}$	[10]
PFSA Mix	10.0	500	70	Air	NH ₄ Cl (10 g/L)	pseudo-1st	$5.50 \times 10^{-4} \text{ min}^{-1}$	[10]
PFSA Mix	10.0	500	70	Air	NaCl (10 g/L)	pseudo-1st	$5.33 \times 10^{-4} \text{ min}^{-1}$	[10]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFSA Mix	10.0	500	70	Air	NaOH (5 g/L)	pseudo-1st	$5.67 \times 10^{-4} \text{ min}^{-1}$	[10]
PFHpA	10.0	1000	70	Air	Artif. spent brine (AXB)	pseudo-1st	$1.97 \times 10^{-3} \text{ min}^{-1}$	[10]
PFOA	10.0	1000	70	Air	Artif. spent brine (AXB)	pseudo-1st	$1.22 \times 10^{-3} \text{ min}^{-1}$	[10]
PFNA	10.0	1000	70	Air	Artif. spent brine (AXB)	pseudo-1st	$9.83 \times 10^{-4} \text{ min}^{-1}$	[10]
PFHxS	10.0	1000	70	Air	Artif. spent brine (AXB)	pseudo-1st	$6.17 \times 10^{-4} \text{ min}^{-1}$	[10]
PFOS	10.0	1000	70	Air	Artif. spent brine (AXB)	pseudo-1st	$3.83 \times 10^{-4} \text{ min}^{-1}$	[10]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFHpA	10.0	1000	70	Air	Artif. still bottoms (SB)	pseudo-1st	$2.33 \times 10^{-3} \text{ min}^{-1}$	[10]
PFOA	10.0	1000	70	Air	Artif. still bottoms (SB)	pseudo-1st	$1.45 \times 10^{-3} \text{ min}^{-1}$	[10]
PFNA	10.0	1000	70	Air	Artif. still bottoms (SB)	pseudo-1st	$1.25 \times 10^{-3} \text{ min}^{-1}$	[10]
PFHxS	10.0	1000	70	Air	Artif. still bottoms (SB)	pseudo-1st	$7.00 \times 10^{-4} \text{ min}^{-1}$	[10]
PFOS	10.0	1000	70	Air	Artif. still bottoms (SB)	pseudo-1st	$4.83 \times 10^{-4} \text{ min}^{-1}$	[10]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFHpA	10.0	1000	70	Air	SB + MeOH (50 g/kg)	pseudo-1st	$1.27 \times 10^{-3} \text{ min}^{-1}$	[10]
PFOA	10.0	1000	70	Air	SB + MeOH (50 g/kg)	pseudo-1st	$8.83 \times 10^{-4} \text{ min}^{-1}$	[10]
PFNA	10.0	1000	70	Air	SB + MeOH (50 g/kg)	pseudo-1st	$7.67 \times 10^{-4} \text{ min}^{-1}$	[10]
PFHxS	10.0	1000	70	Air	SB + MeOH (50 g/kg)	pseudo-1st	$3.00 \times 10^{-4} \text{ min}^{-1}$	[10]
PFOS	10.0	1000	70	Air	SB + MeOH (50 g/kg)	pseudo-1st	$2.33 \times 10^{-4} \text{ min}^{-1}$	[10]
PFHpA	10.0	1000	70	Air	SB (3.6 g/L Cl ⁻)	pseudo-1st	$1.47 \times 10^{-3} \text{ min}^{-1}$	[10]

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Table S7 – Continued from previous page

PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOA	10.0	1000	70	Air	SB (3.6 g/L Cl ⁻)	pseudo-1st	$9.33 \times 10^{-4} \text{ min}^{-1}$	[10]
PFNA	10.0	1000	70	Air	SB (3.6 g/L Cl ⁻)	pseudo-1st	$8.00 \times 10^{-4} \text{ min}^{-1}$	[10]
PFHxS	10.0	1000	70	Air	SB (3.6 g/L Cl ⁻)	pseudo-1st	$3.67 \times 10^{-4} \text{ min}^{-1}$	[10]
PFOS	10.0	1000	70	Air	SB (3.6 g/L Cl ⁻)	pseudo-1st	$2.50 \times 10^{-4} \text{ min}^{-1}$	[10]
PFHpA	10.0	1000	70	Air	SB (36 g/L Cl ⁻)	pseudo-1st	$1.70 \times 10^{-3} \text{ min}^{-1}$	[10]
PFOA	10.0	1000	70	Air	SB (36 g/L Cl ⁻)	pseudo-1st	$1.33 \times 10^{-3} \text{ min}^{-1}$	[10]
PFNA	10.0	1000	70	Air	SB (36 g/L Cl ⁻)	pseudo-1st	$1.30 \times 10^{-3} \text{ min}^{-1}$	[10]
PFHxS	10.0	1000	70	Air	SB (36 g/L Cl ⁻)	pseudo-1st	$5.00 \times 10^{-4} \text{ min}^{-1}$	[10]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFOS	10.0	1000	70	Air	SB (36 g/L Cl ⁻)	pseudo-1st	$6.83 \times 10^{-4} \text{ min}^{-1}$	[10]
PFHpA	10.0	1000	70	Air	SB (72 g/L Cl ⁻)	pseudo-1st	$2.90 \times 10^{-3} \text{ min}^{-1}$	[10]
PFOA	10.0	1000	70	Air	SB (72 g/L Cl ⁻)	pseudo-1st	$1.83 \times 10^{-3} \text{ min}^{-1}$	[10]
PFHxS	10.0	1000	70	Air	SB (72 g/L Cl ⁻)	pseudo-1st	$5.67 \times 10^{-4} \text{ min}^{-1}$	[10]
PFOS	10.0	1000	70	Air	SB (72 g/L Cl ⁻)	pseudo-1st	$6.50 \times 10^{-4} \text{ min}^{-1}$	[10]
4:2 FTS	0.003	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$2.58 \times 10^{-3} \text{ min}^{-1}$	[10]
6:2 FTS	0.25	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$8.83 \times 10^{-4} \text{ min}^{-1}$	[10]
8:2 FTS	0.045	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$5.17 \times 10^{-4} \text{ min}^{-1}$	[10]

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PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFBS	0.088	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$1.07 \times 10^{-3} \text{ min}^{-1}$	[10]
PFPeS	0.079	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$1.05 \times 10^{-3} \text{ min}^{-1}$	[10]
PFHxS	0.70	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$7.67 \times 10^{-4} \text{ min}^{-1}$	[10]
PFHpS	0.029	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$5.83 \times 10^{-4} \text{ min}^{-1}$	[10]
PFOS	1.54	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$5.67 \times 10^{-4} \text{ min}^{-1}$	[10]
PFOSAm	0.001	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$3.50 \times 10^{-4} \text{ min}^{-1}$	[10]
PFBA	0.019	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$5.67 \times 10^{-4} \text{ min}^{-1}$	[10]
PFPeA	0.104	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$1.73 \times 10^{-3} \text{ min}^{-1}$	[10]

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PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFHxA	0.196	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$1.40 \times 10^{-3} \text{ min}^{-1}$	[10]
PFHpA	0.102	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$1.25 \times 10^{-3} \text{ min}^{-1}$	[10]
PFOA	0.534	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$1.25 \times 10^{-3} \text{ min}^{-1}$	[10]
PFNA	0.025	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$9.17 \times 10^{-4} \text{ min}^{-1}$	[10]
PFDA	0.003	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$1.98 \times 10^{-3} \text{ min}^{-1}$	[10]
PFUnDA	0.001	1000	70	Air	Real IX SB (Aptim)	pseudo-1st	$2.00 \times 10^{-4} \text{ min}^{-1}$	[10]
8:2 FTS	0.167	1000	70	Air	Real IX SB (1:10 Navy)	pseudo-1st	$2.00 \times 10^{-4} \text{ min}^{-1}$	[10]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFBS	1.343	1000	70	Air	Real IX SB (1:10 Navy)	pseudo-1st	$4.00 \times 10^{-4} \text{ min}^{-1}$	[10]
PFPeS	1.526	1000	70	Air	Real IX SB (1:10 Navy)	pseudo-1st	$3.83 \times 10^{-4} \text{ min}^{-1}$	[10]
PFHxS	7.155	1000	70	Air	Real IX SB (1:10 Navy)	pseudo-1st	$4.17 \times 10^{-4} \text{ min}^{-1}$	[10]
PFOS	9.51	1000	70	Air	Real IX SB (1:10 Navy)	pseudo-1st	$3.17 \times 10^{-4} \text{ min}^{-1}$	[10]
PFPeA	0.690	1000	70	Air	Real IX SB (1:10 Navy)	pseudo-1st	$7.83 \times 10^{-4} \text{ min}^{-1}$	[10]

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PFAS Com- pound	Initial Conc. (mg L⁻¹)	Frequency (kHz)	Power Density (W L⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFHxA	2.378	1000	70	Air	Real IX SB (1:10 Navy)	pseudo-1st	$8.83 \times 10^{-4} \text{ min}^{-1}$	[10]
PFHpA	1.787	1000	70	Air	Real IX SB (1:10 Navy)	pseudo-1st	$6.17 \times 10^{-4} \text{ min}^{-1}$	[10]
PFOA	46.35	1000	70	Air	Real IX SB (1:10 Navy)	pseudo-1st	$1.07 \times 10^{-3} \text{ min}^{-1}$	[10]
PFNA	0.244	1000	70	Air	Real IX SB (1:10 Navy)	pseudo-1st	$4.50 \times 10^{-4} \text{ min}^{-1}$	[10]
PFDA	0.120	1000	70	Air	Real IX SB (1:10 Navy)	pseudo-1st	$8.17 \times 10^{-4} \text{ min}^{-1}$	[10]

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PFAS Compound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
Total PFAS	71.8	1000	70	Air	Real IX SB (1:10 Navy)	0th	19.2 μg L ⁻¹ min ⁻¹	[10]
Total PFCA	51.7	1000	70	Air	Real IX SB (1:10 Navy)	0th	14.9 μg L ⁻¹ min ⁻¹	[10]
Total PFSA	18.7	1000	70	Air	Real IX SB (1:10 Navy)	0th	4.25 μg L ⁻¹ min ⁻¹	[10]
Total FTS	0.167	1000	70	Air	Real IX SB (1:10 Navy)	0th	3.83 × 10 ⁻² μg L ⁻¹ min ⁻¹	[10]
8:2 FTS	0.167	1000	70	Air	Real IX SB (1:10 Navy)	0th	3.83 × 10 ⁻² μg L ⁻¹ min ⁻¹	[10]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFBS	1.343	1000	70	Air	Real IX SB (1:10 Navy)	0th	0.282 μg L ⁻¹ min ⁻¹	[10]
PFPeS	1.526	1000	70	Air	Real IX SB (1:10 Navy)	0th	0.323 μg L ⁻¹ min ⁻¹	[10]
PFHxS	7.155	1000	70	Air	Real IX SB (1:10 Navy)	0th	1.56 μg L ⁻¹ min ⁻¹	[10]
PFHpS	0.091	1000	70	Air	Real IX SB (1:10 Navy)	0th	2.42 × 10 ⁻² μg L ⁻¹ min ⁻¹	[10]
PFOS	9.51	1000	70	Air	Real IX SB (1:10 Navy)	0th	1.99 μg L ⁻¹ min ⁻¹	[10]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFPeA	0.690	1000	70	Air	Real IX SB (1:10 Navy)	0th	0.164 μg L ⁻¹ min ⁻¹	[10]
PFHxA	2.378	1000	70	Air	Real IX SB (1:10 Navy)	0th	0.697 μg L ⁻¹ min ⁻¹	[10]
PFHpA	1.787	1000	70	Air	Real IX SB (1:10 Navy)	0th	0.479 μg L ⁻¹ min ⁻¹	[10]
PFOA	46.35	1000	70	Air	Real IX SB (1:10 Navy)	0th	13.5 μg L ⁻¹ min ⁻¹	[10]
PFNA	0.244	1000	70	Air	Real IX SB (1:10 Navy)	0th	6.62 × 10 ⁻² μg L ⁻¹ min ⁻¹	[10]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFDA	0.120	1000	70	Air	Real IX SB (1:10 Navy)	0th	$4.45 \times 10^{-2} \mu\text{g}$ $\text{L}^{-1}\text{min}^{-1}$	[10]
Total PFAS	4.0	1000	70	Air	Real IX SB (Aptim)	0th	$1.076 \mu\text{g L}^{-1}\text{min}^{-1}$	[10]
Total PFCA	1.06	1000	70	Air	Real IX SB (Aptim)	0th	$0.302 \mu\text{g L}^{-1}\text{min}^{-1}$	[10]
Total PFSA	2.38	1000	70	Air	Real IX SB (Aptim)	0th	$0.692 \mu\text{g L}^{-1}\text{min}^{-1}$	[10]
Total FTS	0.296	1000	70	Air	Real IX SB (Aptim)	0th	$8.27 \times 10^{-2} \mu\text{g}$ $\text{L}^{-1}\text{min}^{-1}$	[10]
4:2 FTS	0.003	1000	70	Air	Real IX SB (Aptim)	0th	$8.33 \times 10^{-4} \mu\text{g}$ $\text{L}^{-1}\text{min}^{-1}$	[10]
6:2 FTS	0.25	1000	70	Air	Real IX SB (Aptim)	0th	$7.03 \times 10^{-2} \mu\text{g}$ $\text{L}^{-1}\text{min}^{-1}$	[10]
8:2 FTS	0.045	1000	70	Air	Real IX SB (Aptim)	0th	$1.15 \times 10^{-2} \mu\text{g}$ $\text{L}^{-1}\text{min}^{-1}$	[10]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFBS	0.088	1000	70	Air	Real IX SB (Aptim)	0th	$2.27 \times 10^{-2} \mu\text{g}$ $\text{L}^{-1}\text{min}^{-1}$	[10]
PFPeS	0.079	1000	70	Air	Real IX SB (Aptim)	0th	$2.18 \times 10^{-2} \mu\text{g}$ $\text{L}^{-1}\text{min}^{-1}$	[10]
PFHxS	0.70	1000	70	Air	Real IX SB (Aptim)	0th	$0.201 \mu\text{g L}^{-1}\text{min}^{-1}$	[10]
PFHpS	0.029	1000	70	Air	Real IX SB (Aptim)	0th	$7.50 \times 10^{-3} \mu\text{g}$ $\text{L}^{-1}\text{min}^{-1}$	[10]
PFOS	1.54	1000	70	Air	Real IX SB (Aptim)	0th	$0.439 \mu\text{g L}^{-1}\text{min}^{-1}$	[10]
PFOSAm	0.001	1000	70	Air	Real IX SB (Aptim)	0th	$3.33 \times 10^{-4} \mu\text{g}$ $\text{L}^{-1}\text{min}^{-1}$	[10]
PFBA	0.019	1000	70	Air	Real IX SB (Aptim)	0th	$4.67 \times 10^{-3} \mu\text{g}$ $\text{L}^{-1}\text{min}^{-1}$	[10]
PFPeA	0.104	1000	70	Air	Real IX SB (Aptim)	0th	$2.92 \times 10^{-2} \mu\text{g}$ $\text{L}^{-1}\text{min}^{-1}$	[10]

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PFAS Com- pound	Initial Conc. (mg L ⁻¹)	Frequency (kHz)	Power Density (W L ⁻¹)	Dissolved Gas	Additive	Rate Const. Type	Rate Const.	Reference
PFHxA	0.196	1000	70	Air	Real IX SB (Aptim)	0th	$5.62 \times 10^{-2} \mu\text{g}$ $\text{L}^{-1}\text{min}^{-1}$	[10]
PFHpA	0.102	1000	70	Air	Real IX SB (Aptim)	0th	$2.93 \times 10^{-2} \mu\text{g}$ $\text{L}^{-1}\text{min}^{-1}$	[10]
PFOA	0.534	1000	70	Air	Real IX SB (Aptim)	0th	$0.175 \mu\text{g L}^{-1}\text{min}^{-1}$	[10]
PFNA	0.025	1000	70	Air	Real IX SB (Aptim)	0th	$7.00 \times 10^{-3} \mu\text{g}$ $\text{L}^{-1}\text{min}^{-1}$	[10]

Identified Transformation Products

The following table summarizes the transformation products and intermediates identified across legacy and emerging PFAS species under ultrasonic irradiation.

Table S8: PFAS Sonolysis: Identified Products and Intermediates

Category		Identified Species	Significance / Observations
Inorganic Products	End-	F^- , SO_4^{2-} , CO , CO_2	Primary indicators of complete mineralization. High fluoride recovery (>90%) confirms effective defluorination in optimized systems [26].
Sulfur Species		Sulfate (SO_4^{2-})	Primary sulfur product from PFOS sonolysis. Monitored as a proxy for C-S bond cleavage and mineralization extent.
Carbon Species		CO , CO_2	$[CO]/[CO_2]$ ratios: 2.0 (PFOA), 5.1 (PFOS), reflecting the degree of pyrolytic oxidation within the bubble.
Reactive Intermediates	Vapor	$\cdot CF_3$, $\cdot CHF_2$, $:CF_2$ (difluorocarbene), CF_2	Short-lived C_1 species formed at temperatures >4000 K within or immediately at the bubble interface. $:CF_2$ is a carbene; it reacts rapidly with water/radicals to form CO , CO_2 , and F^- .
Volatile Organic Fluorine (VOF) — Perfluoroalkenes		Hexafluoropropylene (HFP, C_3F_6), perfluorohexene-1 (C_6F_{12}), perfluoroheptene-1 (C_7F_{14}), perfluorooctene-1 (C_8F_{16}); tetrafluoroethylene (TFE, C_2F_4) expected but unquantified (below short-chain detection limit)	Generated by thermal decomposition of the perfluoroalkyl chain at the bubble interface or within the bubble gas phase. Specifically identified by GC/MS (by retention time and ion fragmentation) in the headspace after 40 h sonolysis of PFOA and PFOS in IX regeneration brine [10]. VOF represented ~1% of initial PFOA fluorine and ~0.05% of initial PFOS fluorine.

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Category	Identified Species	Significance / Observations
Volatile Organic (VOF) Perfluoroalkanes	Or-Fluorine — 1H- 1H-perfluorohexane (C ₆ HF ₁₃), 1H-perfluoroheptane (C ₇ HF ₁₅), 1H-perfluorooctane (C ₈ HF ₁₇); shorter-chain homologues (C ₁ –C ₅) likely present but undetected	Partially fluorinated, saturated alkanes formed via H-abstraction reactions in the interfacial zone or by reaction with H· radicals generated from water pyrolysis. Specifically identified by GC/MS in PFOA and PFOS sonolysis headspace by Fuller et al. [10].
Ether Bond Fragments	PFPrA (perfluoropropanoic acid), TFPA (trifluoropyruvic acid)	Major aqueous-phase products from the sonolysis of GenX (HFPO-DA) and its homologues. Formed by C-O ether bond homolysis, not C-C cleavage [13].
HFPO-TeA Specific	HFPD (<i>m/z</i> 182.98)	Identified as a major C ₃ diol intermediate during HFPO-TeA sonolysis [13].
Trace Gas-Phase Species	CHF ₃ , CH ₂ F ₂ , C ₃ F ₆ , C ₂ F ₄	Trace gas-phase fluorinated species with yields typically <0.1% of total fluorine under standard conditions; yields may be higher at elevated power densities or with specific PFAS.
Minor Organics	Aqueous Short-chain PFCAs (PFBA, PFPeA), trace fluorinated ethers	Detected at trace levels; generally not the primary degradation pathway for long-chain PFAS, in contrast to other AOPs [26, 41].

Mechanism Overview

Transformation is driven by interfacial and vapor-phase pyrolysis. Legacy PFAS undergo headgroup cleavage (C-S or C-C bonds), while emerging ether-PFAS favor C-O ether bond homolysis. The high-energy environment of the cavitating bubble ensures that fluoro-organic intermediates are rapidly converted to inorganic constituents, achieving high defluorination efficiency.

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