CORRECTION

[View Article Online](#)
[View Journal](#) | [View Issue](#)

Cite this: *Environ. Sci.: Water Res. Technol.*, 2021, 7, 1146

Correction: Adsorption of short-chain perfluoroalkyl acids (PFAAs) from water/wastewater

Chi Thanh Vu and Tingting Wu*

DOI: 10.1039/d1ew90014e

rsc.li/es-water

Correction for 'Adsorption of short-chain perfluoroalkyl acids (PFAAs) from water/wastewater' by Chi Thanh Vu et al., *Environ. Sci.: Water Res. Technol.*, 2020, 6, 2958–2972, 10.1039/D0EW00468E.

The authors regret that there are a few errors in Table 1. The correct table is given below.

Table 1 Summary of adsorbents for short-chained PFAA removal

Adsorbents	PFAAs	Adsorption capacity ^a (mmol g ⁻¹)	Time ^a (hour)	Temp. ^b (°C)	pH	Speed ^b (rpm)	Initial conc. ^b (mM)	Matrix	Adsorbent dosage (g L ⁻¹)	Ref. ^b
Fe ₃ O ₄ /PAC	PFBS	0.21	24	28		180	0.05–0.72	DI	0.14	1
GAC	PFBA	0.08	240	20		30	0.23	DI	0.4	2
	PFBS	0.16					0.17			
GAC	PFBS	0.30	48	22	4.4–5.8	200	0.083–0.83	DI	1.5–15	3
GAC	PFBS	0.33	48	30	7.2	150	0.05–0.5	3 mM phosphate	1	4
Microporous AC	PFHxA	0.75	72	Room temp.	6		0.023–0.695	DI	0.25	5
	PFBS	0.17					0.018–0.737			
	PFBA	0.24					0.03–0.955			
PAC	GenX	0.79	96	27	4	165	0.06–0.91	DI	0.1	6
GAC										
AER (IRA67)		3.217								
AER (IRA400)		2.78								
BAC	PFHpA	0.18	48	25	4	170	0.11	Perfluorooctanesulfonyl fluoride (PFOSF) wastewater	0.05–1.9	7
	PFHxA	0.06					0.1			
AER (IRA67)	PFHpA	0.53					0.11		0.05–1.5	
	PFHxA	0.12					0.1			
AER (IRA910)	PFBS	3.41	240	25	6	160	0.17–1.33	DI	0.1	8
	PFBA	2.97					0.23–1.87			
	PFHxA	3.47					0.16–1.27			
AER (A600E)	PFBA	0.09	120	20	7.5		4.67	DI	1	9
	PFBS	0.12					3.33			
AER (A520E)	PFBA	0.14					4.67			
	PFBS	0.18					3.33			
AER (A532E)	PFBA	0.24					4.67			
	PFBS	0.36					3.33			
AER (IRA410)	PFBS	3.40	48	25	3	150	0.67	DI	0.05	10
AER (IRA400)	PFBS	3.50								
ACF	PFHxA	3.18 × 10 ⁻⁵	6		7	120	0.0032	2 mM NaH ₂ PO ₄ of a mixture of PFHxA, PFHpA, PFOA, PFNA, and PFDA	0.05	11
	PFHpA	0.016					0.0027			
PANF-PACFs	PFBS	0.38		25	5	180	0.33	DI	0.1	12
SWCNTs	PFBA	0.02	24	25	7	200	2 × 10 ⁻⁵ – 0.4	10.01 mM NaCl and 3.08 mM NaN ₃	0.25	13
	PFHxA	0.05								
	PFBS	0.15								
Poly-SOMS	PFBA	0.028	14	25	6.6	170	0.001–0.009	DI	0.04	14
	PFPeA	0.13					0.001–0.008			

Civil and Environmental Engineering Department, The University of Alabama in Huntsville, Huntsville, AL 35899, USA. E-mail: Tingting.Wu@uah.edu; Fax: +1 256 824 6724; Tel: +1 256 824 6423

Table 1 (continued)

Adsorbents	PFAAs	Adsorption capacity ^a (mmol g ⁻¹)	Time ^a (hour)	Temp. ^b (°C)	pH	Speed ^b (rpm)	Initial conc. ^b (mM)	Matrix	Adsorbent dosage (g L ⁻¹)	Ref. ^b
PCMAAs NH ₂ -COFs	PFHxA	0.13	4	25	7	150	0.0008–0.006	1 M NaCl and CaCl ₂	0.5	15
	PFHpA	0.11					0.0007–0.005			
	PFBS	0.097					0.0008–0.007			
	PFBA	2.71 × 10 ⁻⁴					0.0017–0.17			
	PFHxA	2.64 × 10 ⁻⁴					4.67 × 10 ⁻⁶			
	PFHpA	2.47 × 10 ⁻⁴					3.18 × 10 ⁻⁶			
CTF	PFBS	2.77 × 10 ⁻⁴	72	Room temp.	6	460	2.75 × 10 ⁻⁶	DI (mixture of 13 PFAAs)	0.01	16
	GenX	2.76 × 10 ⁻⁴					3.33 × 10 ⁻⁶			
	PFHxA	1.2					3.03 × 10 ⁻⁶			
	PFBS	0.47					0.023–0.695			
	PFBA	0.43					0.018–0.737			
	GenX	0.0867					0.03–0.955			
PEGDA/MTAC	PFBA	0.1995	12	Room temp.		150	0.5	DI	2	17
	PFBS	0.1906					0.3715			
	GenX	0.0867					0.193			
PEGDA/13FOMA/MTAC	PFBA	0.158					0.5			
	PFBS	0.1689					0.3715			
	GenX	0.0987					0.193			
Ionic fluorogels (IFs)	PFBA	2.80 × 10 ⁻⁵	2		6.2	500	4.67 × 10 ⁻⁶	Settled water from water treatment plant (mixture of 11 PFAAs)	0.1	18
	PFPeA	3.22 × 10 ⁻⁵					3.79 × 10 ⁻⁶			
	PFHxA	3.02 × 10 ⁻⁵					3.18 × 10 ⁻⁶			
	PFHpA	2.72 × 10 ⁻⁵					2.75 × 10 ⁻⁶			
	PFBS	3.27 × 10 ⁻⁵					3.33 × 10 ⁻⁶			
	GenX	2.91 × 10 ⁻⁵					3.03 × 10 ⁻⁶			
Reduced TFN-CDP	PFBA	3.74 × 10 ⁻⁴	0.5	23		500	4.67 × 10 ⁻⁶	DI (mixture of 10 PFAAs)	0.01	19
	PFHxA	2.96 × 10 ⁻⁴					3.18 × 10 ⁻⁶			
	PFHpA	2.58 × 10 ⁻⁴					2.75 × 10 ⁻⁶			
	PFBS	3.13 × 10 ⁻⁴					3.33 × 10 ⁻⁶			
	GenX	2.70 × 10 ⁻⁴					3.03 × 10 ⁻⁶			
	PFBA						4.67 × 10 ⁻⁴			
PACs, GACs, other mineral and biomaterial adsorbents	PFPeA		168		7.5	100	3.79 × 10 ⁻⁴	6 mM phosphate	2.5	20
	PFHxA						3.18 × 10 ⁻⁴			
	PFHpA						2.75 × 10 ⁻⁴			
	PFBS						3.33 × 10 ⁻⁴			

^a The adsorption capacity and time summarized here represent the highest capacity and the time needed to achieve such capacity for a specific PFAA using a specific adsorbent under specific conditions as described. Data were reported in the paper or retrieved from the isotherm/kinetics graphs. ^b Abbreviations (temp.: temperature; rpm: round per minute; conc.: concentration; Ref.: References).

The ranges of initial concentrations (mostly in isotherm experiments) were added and the adsorption capacity/adsorbent dosages were corrected. Also, the water matrices of the PFAA adsorption tests were provided. Further, more short-chained PFAAs tested at environmentally relevant concentrations for NH₂-COFs, IFs, and reduced TFN-CDP were included. The table was re-formatted to make it easier to read and the updated reference list is provided with this corrigendum as well.

The Royal Society of Chemistry apologises for these errors and any consequent inconvenience to authors and readers.

References

- P. Meng, X. Fang, A. Maimaiti, G. Yu and S. Deng, Efficient removal of perfluorinated compounds from water using a regenerable magnetic activated carbon, *Chemosphere*, 2019, **224**, 187–194.
- D. Zhao, J. Cheng, C. D. Vecitis and M. R. Hoffmann, Sorption of Perfluorochemicals to Granular Activated Carbon in the Presence of Ultrasound, *J. Phys. Chem. A*, 2011, **115**(11), 2250–2257.
- K. E. Carter and J. Farrell, Removal of perfluorooctane and perfluorobutane sulfonate from water via carbon adsorption and ion exchange, *Sep. Sci. Technol.*, 2010, **45**(6), 762–767.
- V. Ochoa-Herrera and R. Sierra-Alvarez, Removal of perfluorinated surfactants by sorption onto granular activated carbon, zeolite and sludge, *Chemosphere*, 2008, **72**(10), 1588–1593 Available from: <http://www.sciencedirect.com/science/article/pii/S0045653508005080>.
- B. Wang, L. S. Lee, C. Wei, H. Fu, S. Zheng and Z. Xu, *et al.* Covalent triazine-based framework: A promising adsorbent for removal of perfluoroalkyl acids from aqueous solution, *Environ. Pollut.*, 2016, **216**, 884–892.
- W. Wang, A. Maimaiti, H. Shi, R. Wu, R. Wang and Z. Li, *et al.* Adsorption behavior and mechanism of emerging perfluoro-2-propoxypropanoic acid (GenX) on activated carbons and resins, *Chem. Eng. J.*, 2019, **364**, 132–138.

- 7 Z. Du, S. Deng, Y. Chen, B. Wang, J. Huang and Y. Wang, *et al.* Removal of perfluorinated carboxylates from washing wastewater of perfluorooctanesulfonyl fluoride using activated carbons and resins, *J. Hazard. Mater.*, 2015, **286**, 136–143.
- 8 A. Maimaiti, S. Deng, P. Meng, W. Wang, B. Wang and J. Huang, *et al.* Competitive adsorption of perfluoroalkyl substances on anion exchange resins in simulated AFFF-impacted groundwater, *Chem. Eng. J.*, 2018, **348**, 494–502.
- 9 A. Zaggia, L. Conte, L. Falletti, M. Fant and A. Chiorboli, Use of strong anion exchange resins for the removal of perfluoroalkylated substances from contaminated drinking water in batch and continuous pilot plants, *Water Res.*, 2016, **91**, 137–146.
- 10 S. Deng, Q. Yu, J. Huang and G. Yu, Removal of perfluorooctane sulfonate from wastewater by anion exchange resins: Effects of resin properties and solution chemistry, *Water Res.*, 2010, **44**(18), 5188–5195.
- 11 Y. Wang, J. Niu, Y. Li, T. Zheng, Y. Xu and Y. Liu, Performance and mechanisms for removal of perfluorooctanoate (PFOA) from aqueous solution by activated carbon fiber, *RSC Adv.*, 2015, **5**(106), 86927–86933.
- 12 W. Chen, X. Zhang, M. Mamadiev and Z. Wang, Sorption of perfluorooctane sulfonate and perfluorooctanoate on polyacrylonitrile fiber-derived activated carbon fibers: In comparison with activated carbon, *RSC Adv.*, 2017, **7**(2), 927–938.
- 13 S. Deng, Q. Zhang, Y. Nie, H. Wei, B. Wang and J. Huang, *et al.* Sorption mechanisms of perfluorinated compounds on carbon nanotubes, *Environ. Pollut.*, 2012, **168**, 138–144.
- 14 E. K. Stebel, K. A. Pike, H. Nguyen, H. A. Hartmann, M. J. Klonowski and M. G. Lawrence, *et al.* Absorption of short-chain to long-chain perfluoroalkyl substances using swellable organically modified silica, *Environ. Sci.: Water Res. Technol.*, 2019, 1854–1866.
- 15 F. Wang, X. Lu, K. M. Shih, P. Wang and X. Li, Removal of perfluoroalkyl sulfonates (PFAS) from aqueous solution using permanently confined micelle arrays (PCMAS), *Sep. Purif. Technol.*, 2014, **138**, 7–12.
- 16 W. Ji, L. Xiao, Y. Ling, C. Ching, M. Matsumoto and R. P. Bisbey, *et al.* Removal of GenX and Perfluorinated Alkyl Substances from Water by Amine-Functionalized Covalent Organic Frameworks, *J. Am. Chem. Soc.*, 2018, **140**(40), 12677–12681.
- 17 P. J. Huang, M. Hwangbo, Z. Chen, Y. Liu, J. Kameoka and K. H. Chu, Reusable Functionalized Hydrogel Sorbents for Removing Long- and Short-Chain Perfluoroalkyl Acids (PFAAs) and GenX from Aqueous Solution, *ACS Omega*, 2018, **3**(12), 17447–17455.
- 18 E. Kumarasamy, I. M. Manning, L. B. Collins, O. Coronell and F. A. Leibfarth, Ionic Fluorogels for Remediation of Per- and Polyfluorinated Alkyl Substances from Water, *ACS Cent. Sci.*, 2020, 487–492.
- 19 M. J. Klemes, Y. Ling, C. Ching, C. Wu, L. Xiao and D. E. Helbling, *et al.* Reduction of a Tetrafluoroterephthalonitrile- β -Cyclodextrin Polymer to Remove Anionic Micropollutants and Perfluorinated Alkyl Substances from Water, *Angew. Chem., Int. Ed.*, 2019, 12177–12181.
- 20 M. Söregård, E. Östblom, S. Köhler and L. Ahrens, Adsorption behavior of per- and polyfluoroalkyl substances (PFASs) to 44 inorganic and organic sorbents and use of dyes as proxies for PFAS sorption, *J. Environ. Chem. Eng.*, 2020, 103744.