

Supporting Information

**Adsorption as a Remediation Technology for Short-Chain Per- and Polyfluoroalkyl  
Substances (PFAS) from Water - A Critical Review**

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Table S1. List of Acronyms

AC	Activated carbon
ADONA	Dodecafluoro-3H-4,8-dioxanoate
AFFF	Aqueous film-forming foams
APANF	Animated polyacrylonitrile fiber
CDP	Cyclodextrin polymer
CMC	Critical micelle concentration
CNT	Carbon nanotube
CTAB	Cetyltrimethylammonium bromide
DOM	Dissolved organic matter
DWTP	Drinking water treatment plant
FASA	Perfluoroalkyl sulfonamides
GAC	Granular activated carbon
MAC	Magnetic activated carbon
MIEX	Magnetic ion-exchange
MIP	Molecularly imprinted polymer
MMFRS	Melamine-formaldehyde resin microspheres
MWCNT	Multiwalled carbon nanotube
N-EtFOSAA	N-Ethylperfluorooctanesulfonamidoacetic Acid
OF	Organic framework
PAC	Powdered activated carbon
PANT	Polyaniline nanotubes
PEI- <i>f</i> -CMC	Poly(ethylenimine)-functionalized cellulose microcrystals
PFBA	Perfluorobutanoic acid
PFBS	Perfluorobutane sulfonic acid
PFCA	Perfluoroalkyl carboxylic acid
PFDA	Perfluorodecanoic acid
PFDoDA	Perfluorododecanoic acid
PFECA	Perfluoroether carboxylic acid
PFESA	Perfluoroether sulfonic acid
PFHpA	Perfluoroheptanoic acid

PFHpS	Perfluoroheptanesulfonic acid
PFHxA	Perfluorohexanoic acid
PFHxS	Perfluorohexane sulfonic acid
PFNA	Perfluorononanoic acid
PFNS	Perfluorononane sulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonic acid
PFOSA	Perfluorooctane sulfonamide
PFPeA	Perfluoropentanoic acid
PFPeS	Perfluoropentane sulfonic acid
PFPHpA	Perfluoroheptanoic acid
PFPrA	Perfluoropropionic acid
PFPrS	Perfluoropropane sulfonic acid
PFSA	Perfluoroalkane sulfonic acid
PFTeDA	Perfluorotetradecanoic acid
PFTrDA	Perfluorotridecanoic acid
PFUnDA	Perfluoroundecanoic acid
RO	Reverse osmosis
TFMAA	Trifluoromethyl acrylic acid
ULS	University library system
USEPA	United States Environmental Protection Agency
WWTP	Wastewater treatment plant
$\beta$ -CD	$\beta$ -cyclodextrin

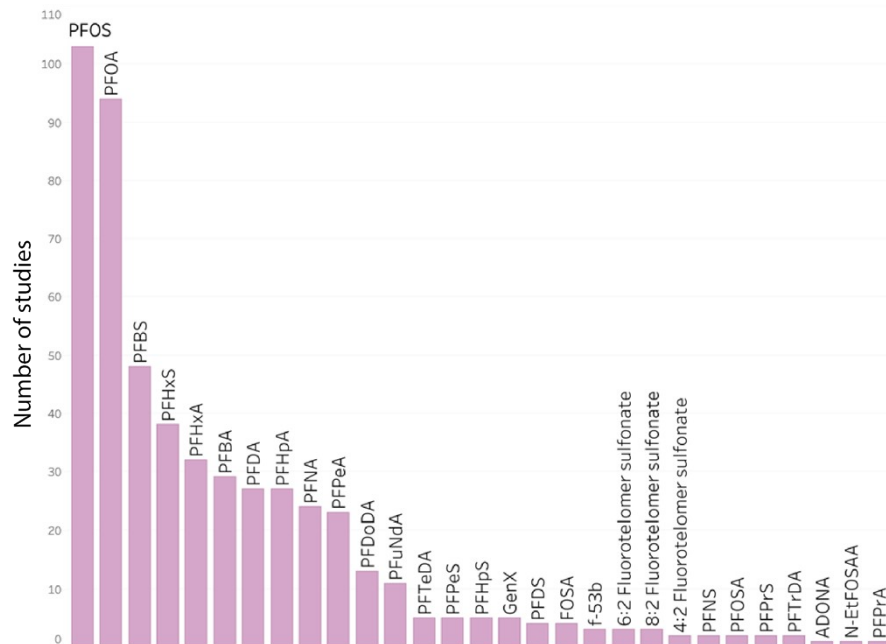


Fig S1. Distribution of all PFAS included in this review

**Table S2.** Summary of studies reporting metrics not convertible to percent removal (reference numbers refer to reference list in main text).

Treated PFAS	Studied sorbent	Reported metric	Reported value	Reference
PFOS	Alumina	Capacity in $\mu\text{g}/\text{m}^2$	0.252	Wang & Shih, 2011 (ref. 125)
PFOA	Alumina	Capacity in $\mu\text{g}/\text{m}^2$	0.157	
PFOS	Boehmite	Capacity in $\mu\text{g}/\text{m}^2$	0.877	Wang et al., 2012 (ref. 123)
PFOA	Boehmite	Capacity in $\mu\text{g}/\text{m}^2$	0.633	
TFA			1.91	
PFPrA			1.61	
PFBA			0.99	

PFPeA			1.10	
PFHxA			1.13	
PFHpA			1.26	
PFOA	Sludge	Freundlich sorption coefficient (log $K_f$ )	1.45	Zhang et al., 2013 (ref. 145)
PFNA			1.85	
PFDA			2.22	
PFUnA			2.60	
PFDoA			2.86	
PFTA			2.79	
PFBS			1.32	
PFHxS			1.59	
PFOS			2.06	
PFBA				
PFPeA			0.7	
PFHxA			1.2	
PFHpA			1.3	
PFOA			1.7	
PFNA			2.2	
PFDA	Soil	Partition coefficient (log $K_{oc}$ ) in mL/g	3.1	
PFUnDA			4.4	
PFDoDA			4.7	

PFTeDA		4.3	
FOSA		4.3	
PFBS		5.0	
PFHxS		1.2	
PFOS		2.5	
		4.5	
PFBS	GAC	2.97	Söregård et al. 2020 (ref. 119)
	PAC	4.88	
	Soil	0.64	
	Sludge	-0.77	
	Minerals	0.42	
	Sediment	0.25	
	Other	-1.05	
PFHxS	GAC	5.18	
	PAC	5.09	
	Soil	-0.63	
	Sludge	0.03	
	Minerals	-0.18	
	Sediment	-0.29	
	Other	-1.31	
PFOS	GAC	4.33	
	PAC	5.19	
	Soil	0.13	
	Sludge	0.74	
	Minerals	-0.13	
	Sediment	0.06	
	Other	-0.30	
	GAC	3.08	
PFBA	PAC	3.66	
	Soil	0.59	
	Sludge	-0.14	
	Minerals	-0.46	
	Sediment	-0.10	

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	Other	-0.46
PFPeA	GAC	3.51
	PAC	3.45
	Soil	0.75
	Sludge	-0.41
	Minerals	-0.92
	Sediment	-0.78
	Other	-0.56
PFHxA	GAC	4.10
	PAC	3.09
	Soil	3.71
	Sludge	-0.12
	Minerals	-0.35
	Sediment	-0.14
	Other	0.76
PFOA	GAC	3.43
	PAC	3.49
	Soil	0.732
	Sludge	-0.63
	Minerals	-0.14
	Sediment	-0.83
	Other	0.65
PFNA	GAC	3.98
	PAC	4.34
	Soil	-0.63
	Sludge	-0.61
	Minerals	-0.86
	Sediment	-0.77
	Other	-1.14
PFDA	GAC	4.34
	PAC	2.02
	Soil	-0.18
	Sludge	-0.59
	Minerals	-0.25
	Sediment	-4.66
	Other	-0.65

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PFUnDA	GAC	4.16
	PAC	4.41
	Soil	-0.18
	Sludge	-1.27
	Minerals	0.66
	Sediment	-0.24
	Other	-1.24
PFDoDa	GAC	4.36
	PAC	4.71
	Soil	0.14
	Sludge	0.68
	Minerals	-0.80
	Sediment	-0.24
	Other	-4.97
PFTeDA	GAC	4.06
	PAC	4.95
	Soil	0.35
	Sludge	-0.87
	Minerals	-0.16
	Sediment	-0.93
	Other	-7.45
PFHxDA	GAC	3.66
	PAC	4.56
	Soil	-0.87
	Sludge	-0.80
	Minerals	0.46
	Sediment	-0.40
	Other	0.19
PFDoDA	GAC	2.73
	PAC	2.97
	Soil	1.40
	Sludge	1.48
	Minerals	0.72
	Sediment	1.48
	Other	2.21
FOSA	GAC	2.87
	PAC	3.27
	Soil	1.77
	Sludge	1.96



	Minerals	1.75	
	Sediment	1.79	
	Other	2.52	
6:2 FTSA	GAC	2.92	
	PAC	2.79	
	Soil	0.86	
	Sludge	0.87	
	Minerals	0.76	
	Sediment	0.40	
	Other	0.24	
8:2 FTSA	GAC	3.68	
	PAC	3.60	
	Soil	-0.50	
	Sludge	0.41	
	Minerals	-1.27	
	Sediment	-0.23	
	Other	-0.44	
PFOS		5.81	Chen et al., 2012 (ref. 47)
		6.11	
	Sediment	6.4	
		6.67	
PFOA	Iron oxide surfaces	11.7	
		9.99	
		7.17	Gao & Chorover, 2012 (ref. 68)
PFOS	Iron oxide surfaces	5	

			7.41	
PFOA			5.81	Xiao et al., 2012 (ref. 133)
PFNA			6.11	
PFDA	Resins	Log $K_D$ in L/Kg	6.40	
PFOA			6.67	
PFOA	Montmorillonite-carnitine	Langmuir constant $K_D$	3.70E5	Wang et al., 2021 (ref. 127)
PFOA	Montmorillonite-choline	Langmuir constant $K_D$	4.76E5	
PFOS	Montmorillonite-carnitine	Langmuir constant $K_D$	5.25E5	
PFOS	Montmorillonite-choline	Langmuir constant $K_D$	3.92E5	
Gen X	Montmorillonite-carnitine	Freundlich constant $K_f$	2.12E4	
PFBS	Montmorillonite-choline	Freundlich constant $K_f$	9.04E4	

**Table S3.** List of all adsorbents included under “Other” category

**Sorbents under “Other” category**

Polyethylenimine-Functionalized Cellulose Microcrystals (PEI-f-CMC)

Oil derived black carbon

Biochar

Hexadecyltrimethylammonium bromide modified montmorillonite (HDTMAB-Mt)

Maize straw and willow-derived Chars (MSWDC)

Maize straw- origin ash (MA)

Permanently confined micelle arrays (PCMAs)

swellable organically modified silica (SOS)

Polyaniline nanotubes

Magnetic mesoporous carbon nitride

Quaternized cotton

Polyaniline emeraldine salt nanotubes

Hydrotalcite

Aminated rice husk

Nano starch-stabilized magnetite

Modified hexagonal mesoporous silicas (HMS)

Ash maize
Carboxymethyl- $\beta$ -cyclodextrin sodium salt (CMCDSS)
Nanofibrous membranes
Organic and inorganic waste products
Environmentally Friendly $\beta$ -Cyclodextrin-Ionic Liquid Polyurethane-Modified Magnetic Sorbent
Fe <sub>3</sub> O <sub>4</sub> /SiO <sub>2</sub> magnetic nanoparticles with C18/NH <sub>2</sub>
Poly ethylene glycol diacrylate
Polymer Supported Carbon
Chitosan-ethylene glycol hydrogel
Leaf biomass ( <i>Vitis vinifera</i> )
Few-layered porous graphite (FPG)