

Supporting Information

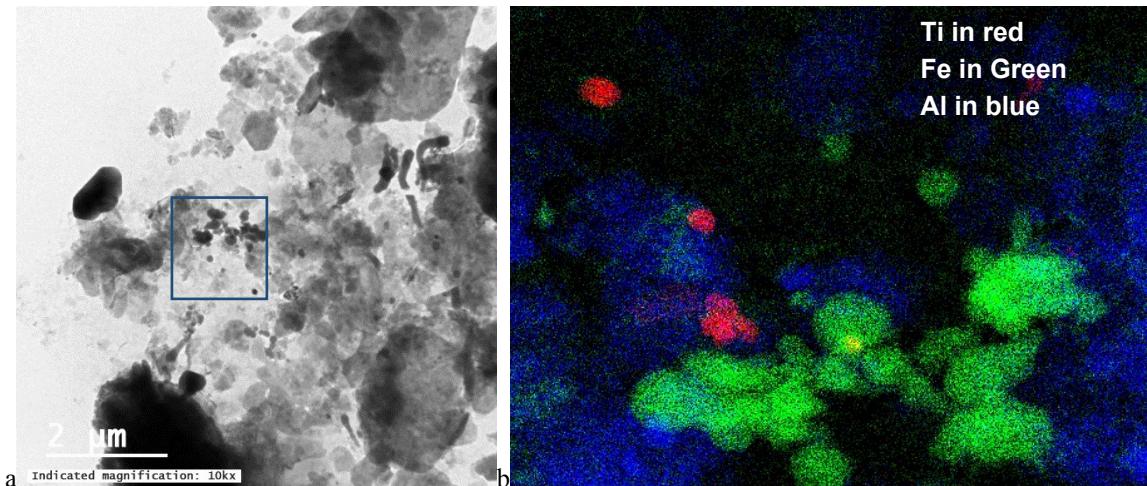
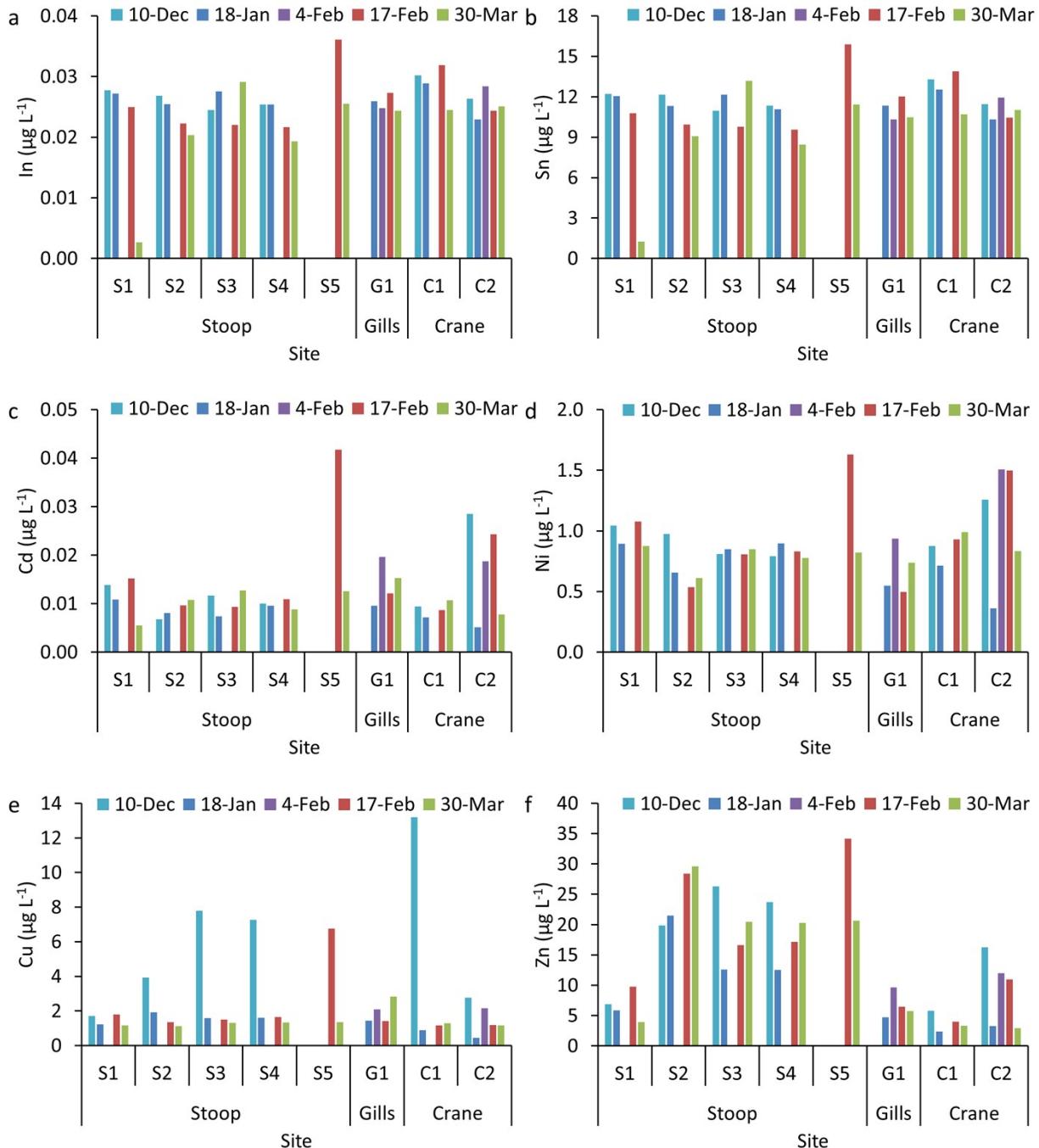


Figure S1. Morphological and chemical analysis of heteroaggregates of natural and engineered nanomaterials observed in Crane creek sample (C1) collected on December 10th 2015. (a) Transmission electron microscopy micrograph, and (b) the corresponding energy dispersive spectroscopy map of the aggregate marked in the blue box in Figure S1a.



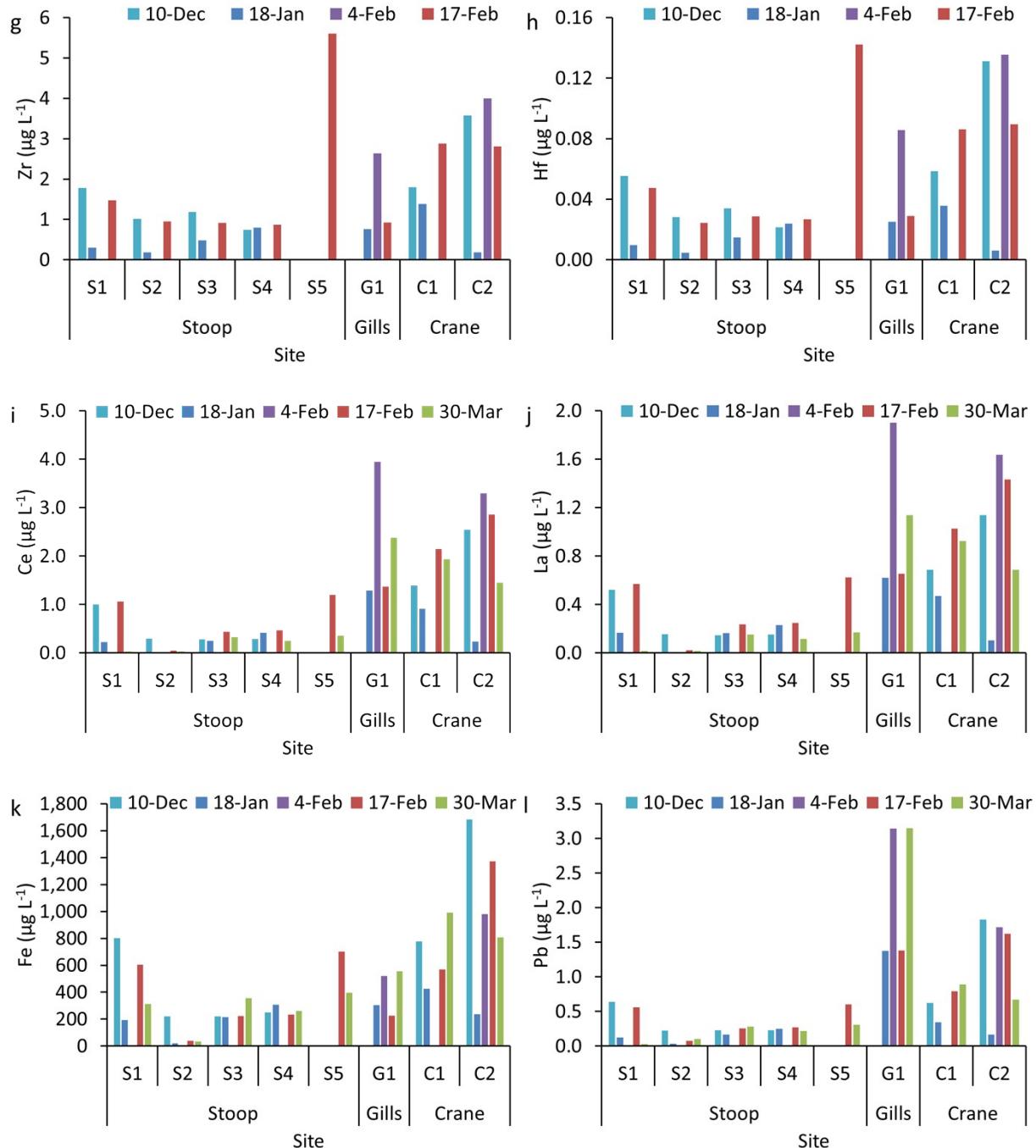


Figure S2. Total elemental concentrations of a range of elements in the collected water samples (a) In, (b) Sn, (c) Cd, (d) Ni, (e) Cu, (f) Zr, (g) Hf, (i) Ce, (j) La, (k) Fe, (l) Pb

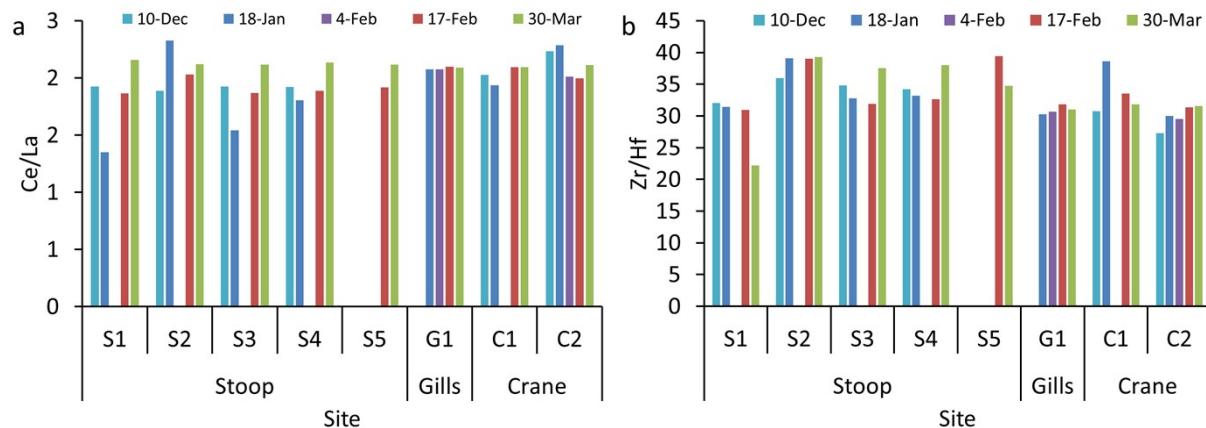


Figure S3. Elemental ratio analysis of elements known to co-exist in natural nanomaterials (a) Ce/La, and (b) Zr/Hf.

Table S1. Elemental analysis of Concentration of USGS reference materials BCR-2 and BIR -1 basalts.

	BCR-2				BIR-1			
	Mean	Stranded deviation	Recommended values (GOREM)	Difference (%)	Mean	Stranded deviation	Recommended values	Difference (%)
Rb	50.54	0.8%	48	5%	0.39	3.1%	0.21	46%
Sr	330.97	0.4%	346	-5%	104.49	0.2%	108.6	-4%
Y	35.37	1.6%	37	-5%	15.30	0.2%	15.6	-2%
Zr	184.55	1.3%	188	-2%	14.16	0.3%	14.8	-5%
Nb	11.95	1.5%	12.44	-4%	0.52	0.3%	0.553	-6%
Ag	0.34	2.1%	0.09	73%	0.046	7.8%	0.041	11%
Cd	1.36	1.9%	0.69	49%	0.103	1.0%	0.077	26%
Cs	1.06	1.3%	1.16	-9%	0.0052	2.3%	0.006	-15%
Ba	671.21	1.6%	683	-2%	6.25	0.1%	6.75	-8%
La	24.61	0.6%	25	-2%	0.57	0.5%	0.63	-10%
Ce	52.97	0.7%	53	0%	1.84	1.4%	1.9	-3%
Pr	6.66	0.8%	6.8	-2%	0.36	0.8%	0.373	-3%
Nd	29.04	1.4%	28.2	3%	2.39	0.3%	2.397	0%
Sm	6.62	0.9%	6.57	1%	1.10	0.3%	1.11	-1%
Eu	1.97	1.1%	2	-1%	0.51	0.1%	0.52	-3%
Gd	6.88	1.6%	6.8	1%	1.65	1.2%	1.8	-9%
Tb	1.01	1.4%	1.07	-6%	0.33	0.4%	0.36	-10%
Dy	6.28	0.9%	6.4	-2%	2.52	0.1%	2.54	-1%
Ho	1.35	1.6%	1.31	3%	0.60	0.7%	0.57	5%
Er	3.61	1.0%	3.67	-2%	1.71	0.2%	1.68	2%
Tm	0.51	1.0%	0.534	-4%	0.25	1.0%	0.255	-1%
Yb	3.32	1.2%	3.38	-2%	1.63	0.9%	1.63	0%
Lu	0.50	1.5%	0.505	-1%	0.25	0.4%	0.248	-1%
Hf	4.53	1.7%	4.9	-8%	0.55	0.2%	0.58	-6%
Ta	0.92	1.0%	0.78	15%	0.051	4.0%	0.041	20%
Pb	9.89	2.1%	11	-11%	3.39	0.4%	3.03	11%
Th	5.93	2.0%	5.83	2%	0.032	1.3%	0.0328	-2%
U	1.64	0.7%	1.69	-3%	0.0099	0.0204	0.0100	-1%
Li	9.6	0.0	9.1	5%	3.3	0.0	3.6	-10%
Mg	21565	1.1%	21600	0%	57952	0.5%	58495	-1%
Al	69917	2.3%	71400	-2%	81668	1.0%	82035	0%
Sc	34	1.5%	33	4%	45	0.5%	44	3%
Ti	13260	1.7%	13500	-2%	5519	0.4%	5754	-4%
V5	410	1.3%	417	-2%	318	0.6%	310	3%
Cr	14	1.7%	16	-13%	380	0.1%	370	3%
Mn	1454	1.6%	1520	-5%	1302	0.4%	1355	-4%
Fe	92216	2.7%	96500	-5%	77638	0.6%	79236	-2%
Co	38	1.5%	37	3%	54	0.2%	52	4%
Ni	11	0.7%	13	-12%	171	0.6%	170	0%
Cu	16	1.3%	19	-17%	120	0.5%	125	-4%
Zn	136	1.3%	127	7%	73	0.4%	70	5%
Ga	22	1.4%	23	-5%	16	0.6%	16	-2%

Table S2. The total volume of sewage spilled during the sampling timeframe (November 18, 2015 through March 30, 2016).

	Crane Creek (gallons)	Gills Creek (& Lake Katherine) (gallons)	Stoop Creek (gallons)
Sampling sites	C1 and C2	G1	S1, S2, S3, S4, and S5
November, 2015	390,700	574,146	0
December, 2015	3,000,751	204,496	0
January, 2016	0	0	0
February, 2016	0	0	530,991
March, 2016	3000	129	0
Total	3,394,451	651,025	530,991

Table S3. Elemental ratios of Ti to Al, Fe, Ce, Zr, Nb, Ba, Pb calculated on individual particles from ME-SP-ICP-MS, the average of 8 reference water samples, elemental composition of the upper centennial crust, and elemental composition riverine particulates. *Data were taken from¹

	ME-SP-ICP-MS average values	Background ratio, total water digestion	Crustal average composition*	Riverine particulate*
Ti/Al	0.36	0.049±0.003	0.049	0.06
Ti/Si	0.19	--	0.013	0.019
Ti/Fe	1.1	0.04±0.01	0.11	0.16
Ti/Ce	60	13.0±1.5	61	64
Ti/Zr	54	57.5±7.0	21	--
Ti/Nb	287	266±8.9	312	--
Ti/Ba	9	1.4±0.2	7	9
Ti/Pb	75	11.3±1.5	244	37

Reference List

1. Taylor, S. R.; McLennan, S. M. Chemical composition and element distribution in the Earth's crust. *Encyclop. Phys. Sci. Technol.* **2001**.