

## Durability of nano-enhanced textiles through the life cycle: releases from landfilling after washing

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### Supporting Information:

**Table S1:** Gold and silver concentration released during toxicity characteristic leaching procedure (TCLP)

Name	Total Ag (µg/L)	STDEV	Ultrafiltration (µg/L)	STDEV
<b>60 nm Au NPs fabrics</b>				
Wash with "Oxi" detergent				
Raw fabrics	79.19	5.41	0.29	0.2
1 Wash	4.47	0.65	0.05	0.01
10 Washes	7.7	3.25	0.39	0.16
Wash with "Color" detergent				
Raw Fabrics	79.19	5.41	0.29	0.20
1 Wash	3.50	0.17	0.05	0.03
10 Washes	3.57	1.10	0.14	0.05
<b>60 nm Ag NPs fabrics</b>				
Wash with "Oxi" detergent				
Raw Fabrics	69.73	4.74	24.51	0.59
1 Wash	12.73	2.66	6.57	3.43
10 Washes	0.93	0.29	0.24	0.17
Wash with "Color" detergent				
Raw Fabrics	69.73	4.74	24.51	0.59
1 Wash	6.03	0.93	2.68	2.15
10 Washes	2.13	0.57	0.87	0.39
<b>100 nm Ag NPs fabrics</b>				
Wash with "Oxi" detergent				
Raw Fabrics	56.57	1.72	14.64	0.34
1 Wash	10.90	4.64	5.57	3.02
10 Washes	1.57	0.57	0.57	0.34
Wash with "Color" detergent				
Raw Fabrics	56.57	1.72	14.64	0.34
1 Wash	1.97	0.49	2.03	1.61
10 Washes	2.07	0.81	0.96	0.07

**Table S2:** 60 nm Ag particle stability experiments, initial spiked Ag concentration 200 µg/L; 300 µg/L dissolved In standard and 1 g/L SDS surfactant

Total Ag (AgNPs + TCLP) With SDS Standing			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	161	2.4		Time begin	268	1.4
4 Hour	156	12.3				
8 Hour	154	8.4				
18 Hour	122	2.0	0.16	18 Hour	260	1.0

Total Ag (AgNPs + TCLP) Without SDS Standing			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	141	2.1		Time begin	275	6.6
4 Hour	137	4.6				
8 Hour	128	7.8				
18 Hour	128	8.3	19.4	18 Hour	334	7.3

Total Ag (AgNPs + TCLP) With SDS Stirring			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	165	3.2		Time begin	274	4.0
4 Hour	163	1.2				
8 Hour	159	1.2				
18 Hour	137	1.4	n.d.	18 Hour	274	8.2

Total Ag (AgNPs + TCLP) Without SDS Stirring			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	149	2.3		Time begin	290	1.7
4 Hour	63	3.4				
8 Hour	23	8.1				
18 Hour	6	0.1	100.9	18 Hour	327	2.3

Total Ag (AgNPs + TCLP) With SDS Shaking			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	161	6.8		Time begin	281	6.5
4 Hour	159	1.5				
8 Hour	159	5.9				
18 Hour	147	1.6	n.d.	18 Hour	283.9	8.5

Total Ag (AgNPs + TCLP) Without SDS Shaking			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	146	6.4		Time begin	282	3.2
4 Hour	110	18.4				
8 Hour	89	14.5				
18 Hour	39	16.0	74.35	18 Hour	283	15.0

Total Ag (AgNPs + DI) With SDS Standing			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	145	3.6		Time begin	270	1.2
4 Hour	154	3.5				
8 Hour	154	2.2				
18 Hour	159	4.8	0.37	18 Hour	267	2.5

Total Ag (AgNPs + DI) Without SDS Standing			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	165	2.3		Time begin	272	3.7
4 Hour	140	3.6				
8 Hour	143	0.8				
18 Hour	145	6.1	2.7	18 Hour	283	2.0

Total Ag (AgNPs + DI) With SDS Stirring			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	151	3.8		Time begin	270	1.4
4 Hour	144	2.9				
8 Hour	143	3.8				
18 Hour	130	13.9	1.21	18 Hour	278	1.7

Total Ag (AgNPs + DI) Without SDS Stirring			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	161	0.9		Time begin	289	1.3
4 Hour	147	9.5				
8 Hour	143	4.8				
18 Hour	136	2.3	7.0	18 Hour	291	1.3

Total Ag (AgNPs + DI) With SDS Shaking			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	183	37.9		Time begin	284	1.3
4 Hour	175	34.9				
8 Hour	173	31.3				
18 Hour	165	26.9	1.10	18 Hour	274	0.3

Total Ag (AgNPs + DI) Without SDS Shaking			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	142	3.2		Time begin	279	1.3
4 Hour	132	0.7				
8 Hour	96	2.7				
18 Hour	75	6.7	41.4	18 Hour	285	1.6

**Table S3:** 60 nm Au particle stability experiments, initial spiked Ag concentration 500 µg/L; 500 µg/L dissolved In standard and 1 g/L SDS surfactant

Total Au (AuNPs + TCLP) With SDS Standing			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	456	11.1		Time begin	495	4.9
4 Hour	437	5.5				
8 Hour	434	19.6				
18 Hour	373	7.8	17.00	18 Hour	492	4.3

Total Au (AuNPs + TCLP) Without SDS Standing			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	414	29.8		Time begin	480	8.7
4 Hour	378	12.8				
8 Hour	365	11.8				
18 Hour	296	7.8	84.90	18 Hour	477	1.2

Total Au (AuNPs + TCLP) With SDS Stirring			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	453	13.9		Time begin	491	6.7
4 Hour	451	18.4				
8 Hour	448	16.4				
18 Hour	372	14.1	15.2	18 Hour	488	3.5

Total Au (AuNPs + TCLP) Without SDS Stirring			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	398	14.7		Time begin	477	3.5
4 Hour	219	13.7				
8 Hour	79	23.8				
18 Hour	13	7.2	304.2	18 Hour	481	5.0

Total Au (AuNPs + TCLP) With SDS Shaking			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	466	3.8		Time begin	478	6.2
4 Hour	464	8.8				
8 Hour	453	5.0				
18 Hour	368	2.5	11.8	18 Hour	482	0.8

Total Au (AuNPs + TCLP) Without SDS Shaking			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	417	3.7		Time begin	477	2.3
4 Hour	375	16.3				
8 Hour	238	11.6				
18 Hour	92	8.4	219.2	18 Hour	479	4.4

Total Au (AuNPs + DI) With SDS Standing			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	452	3.8		Time begin	483	3.3
4 Hour	451	9.8				
8 Hour	426	40.6				
18 Hour	357	14.2	35.70	18 Hour	486	1.1

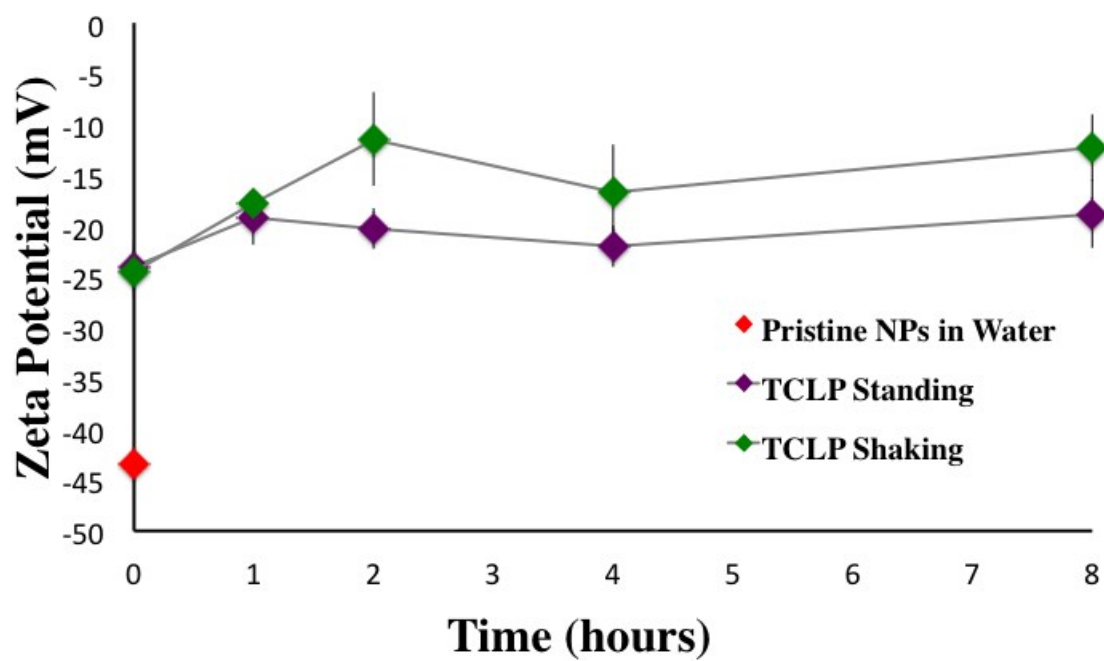
Total Au (AuNPs + DI) Without SDS Standing			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	476	12.6		Time begin	478	2.6
4 Hour	444	8.9				
8 Hour	441	3.0				
18 Hour	416	8.3	20.50	18 Hour	472	5.3

Total Au (AuNPs + DI) With SDS Stirring			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	445	13.5		Time begin	482	6.2
4 Hour	443	9.1				
8 Hour	437	9.7				
18 Hour	376	33.0	25.60	18 Hour	481	3.0

Total Au (AuNPs + DI) Without SDS Stirring			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	454	6.5		Time begin	477	3.8
4 Hour	445	15.7				
8 Hour	399	4.6				
18 Hour	337	8.5	39.60	18 Hour	472	6.4

Total Au (AuNPs + DI) With SDS Shaking			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	451	3.5		Time begin	479	4.9
4 Hour	448	1.4				
8 Hour	434	18.5				
18 Hour	365	10.5	10.40	18 Hour	478	4.2

Total Au (AuNPs + DI) Without SDS Shaking			Conc. recovery in bottle	Indium Concentration		
Time	Average	S.D.	(µg/L)	Time	Average	S.D.
Time begin	452	17.5		Time begin	469	6.4
4 Hour	437	2.1				
8 Hour	360	13.5				
18 Hour	306	11.9	70.80	18 Hour	465	5.0



**Figure S1:** Zeta potential measurements of 60 nm Au NPs over time. Pristine particles suspended in DI water (red diamond), and in the TCLP extraction media under standing and shaking conditions (purple and green diamonds, respectively).