Supplementary Information (SI) for Environmental Science: Nano.

Supplementary Information

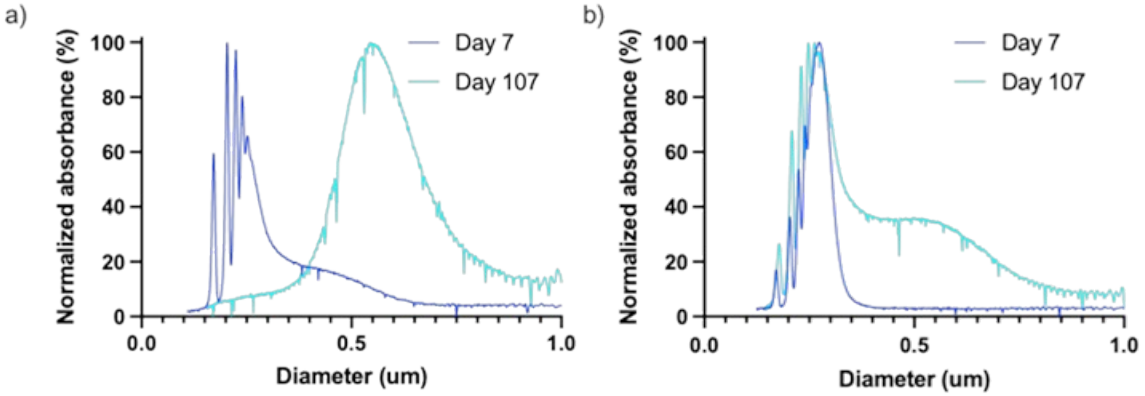

Figure S1. DCS analyses of195 nm polystyrene nanoparticles. A. UVB treated nanoparticles, B. Non UVB treated nanoparticles.

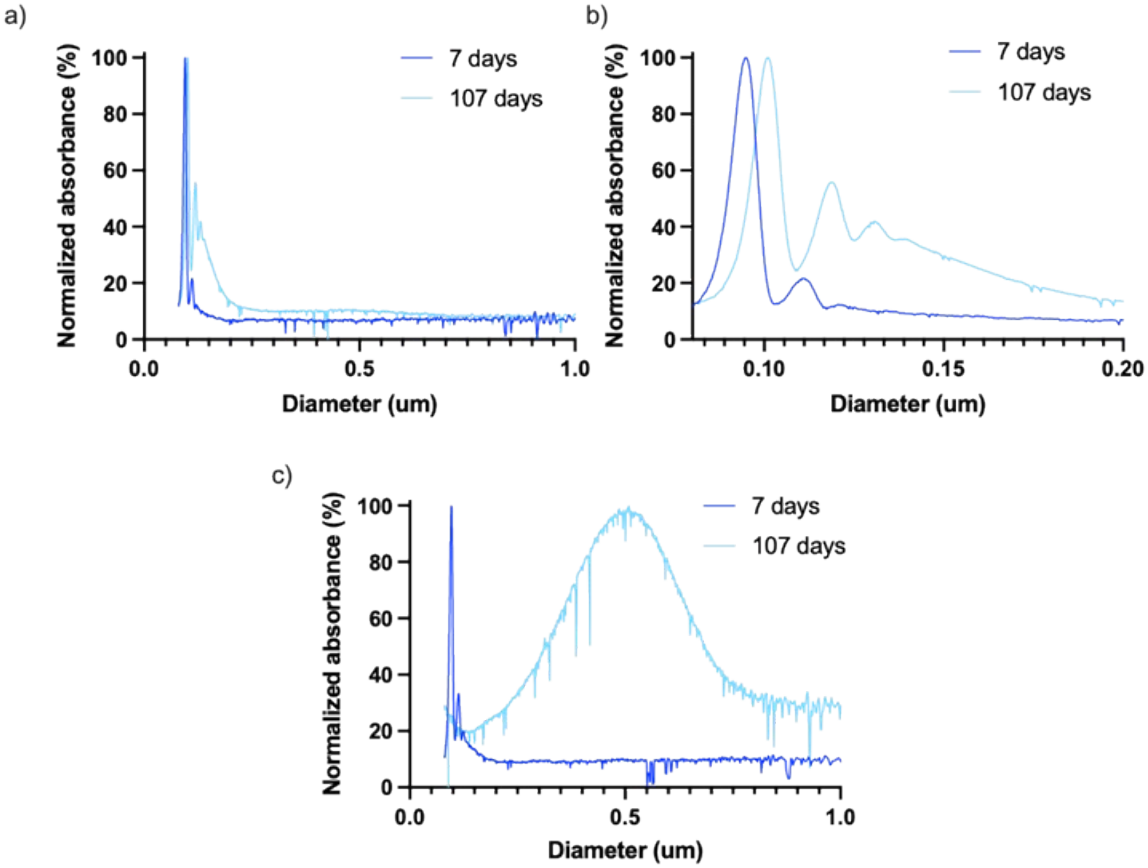

Figure S2. DSC analyses of 99 nm polystyrene nanoparticles. A. UVB treated nanoparticles, B: magnified UVB treated nanoparticles, C: UVB treated nanoparticles together with iron oxide nanoparticles

Supplementary Table 1. DLS data and statistics. Each sample was measured 15 times. After degradation the data quality of the data became progressively worse. When the data quality did not allow for size determination but still gave intensity data the number of used data readings are indicated by subscript numbers. The data on day 0 for 195 nm particles are divided into three separate samples showing an increase in size over time, that is not observed in any other samples. These data are not used in Figure 4C.

Day	C195			195		
	Intensity (10^8)	Radius (nm)	PD (%)	Intensity (10^8)	Radius (nm)	PD (%)
0 1st	3.50±0.41	149±11	9.3±5.5	2.95±0.27	214±22	26.5
2nd	4.46±0.58	216±11	21.9±12.2	2.55	330	33.1
3rd	4.27±0.81	292±32	43.2±24.1	2.56±0.25	400±76	57.1
7	3.43±0.42	195±14	12.6±10.7	3.38±0.03	162±15	27.5±7.4
21	3.02±0.30	191±14	19.7±13,3	2.76±0.25	158±10	36.0±14,3
42	3.42±0.38	191±14	31.6±16.0	2.17±0.30	143±7	10,5±12.0
63	2.68±0.19	194±12	20.1±12.2	$0.74±0.17_3$	-	-
107	3.05±0.32	178±14	17.9±10.7	$0.47±0.37_5$	-	-
	C99			99		
0	1.29±0.05	44.7±0.7	4.7±4.8	1.27±0.03	45.4±0.5	4.7±3.4
7	1.09±0.08	44.8±0.7	7.3±4.7	1.47±0.04	45.3±0.8	9.9±3.1
21	1.50±0.06	45.6±0.5	3.9±3.6	1.48±0.05	45.4±0.6	6.5±3.0
42	1.25±0.04	46.2±1.0	5.6±5.0	1.14±0.04	45.5±1.0	7.5±6.4
63	1.29±0.05	47.2±0.8	6.6±5.5	1.62±0.01	46.0±1.0	11.9±3.8
107	1.30±0.05	44.7±0.7	8.0±5.6	1.52±0.06	44.7±0.8	9.1±4.6
	C99+IO			99+IO		
0	1.51±0.13	51.5±3.6	24.8±16.1	1,66±0.12	48.4±2.1	12.2±6.5
7	1.29±0.06	47.0±1.4	10.0±6.1	1.93±0.12	86.3±2.4	15.8±9.9
21	1.71±0.17	53.9±4.2	24.6±8.4	$0.86±0.30_{15}$	$249±23_4$	$35±28_4$
42	1.51±0.11	51.2±3.8	17.3±13.9	$0.09±0.03_5$	-	-
63	1.64±0.06	50.2±2.2	17.5±13.7	$0.04±0.03_{15}$	-	-
107	2.1±0.12	49.4±2.8	14.6±10.4	$0.03±0.03_{15}$	-	-

Supplemtary Table 2 Size and the total weight estimated from DSC data from 2 µm or 99nm polystyrene particles subjected to mechanical breakdown

Time (minutes)	Diameter (nm)	Peak width at 50% height (nm)	Total weight (µg)
2 µm			
0 min	1780	83	2.25
5 min	1770	80	1.15
10 min	1750	78	0.75

15 min	1760	66	0.64
20 min	1760 (2100)	66	0.48
25 min	1780 (2300)	75	0.38
99 nm			
0 min	103	8	1.71
5 min	99	11	2.23
10 min	97	10	1.34
15 min	95	10	1.86
20 min	98	10	1.57
25 min	98	10	1.68
99 nm Filtered 0.8 µm			
0 min	105	10	1.97
5 min	105	9	1.85
10 min	104	9	2.28
15 min	104	9	1.68
20 min	104	9	1.67
25 min	102	9	0.96

Supplementary Table 3. Size and the total weight estimated from NTA data from 2 µm or 99 nm polystyrene particles subjected to mechanical breakdown. The reported number is the average of 5 measurements on each of the samples.

Time (minutes)	**Concentration (particles/ml)**	**Mean diameter (nm)**
Filtered 2 µm		
0	$6.9 \times 10^7 \pm 2.0 \times 10^7$	288
5	$6.1 \times 10^8 \pm 5.6 \times 10^7$	110
10	$6.1 \times 10^8 \pm 3.7 \times 10^7$	119
15	$1.5 \times 10^9 \pm 6.4 \times 10^7$	104
20	$1.8 \times 10^9 \pm 2.0 \times 10^7$	104
25	$2.2 \times 10^9 \pm 3.5 \times 10^7$	78
Filtered 100 nm		
0	$1.8 \times 12^{12} \pm 9.5 \times 10^{10}$	80
5	$2.3 \times 10^{12} \pm 1.7 \times 10^{11}$	81
10	$1.9 \times 10^{12} \pm 1.2 \times 10^{11}$	81
15	$1.7 \times 10^{12} \pm 4.1 \times 10^{10}$	82
20	$2.0 \times 10^{12} \pm 7.1 \times 10^{10}$	83
25	$1.3 \times 10^{12} \pm 6.8 \times 10^{10}$	82

Supplementary Table 4. Size and the total weight estimated from DLS data from 2 µm or 99 nm polystyrene particles subjected to mechanical breakdown. Each sample were measured 20 times.

Time (minutes)	**Diameter (nm)**	**Acquis Nr/30**	**PD (%)**
2 µm			

0 min	---		
5 min	---		
10 min	---		
15 min	---		
20 min	---		
25 min	---		
2 µm Filtered 0.8 µm			
0 min	-		
5 min	65 ± 6	12	16.5±8.9
10 min	64 ± 8	6	23.5±12.4
15 min	65 ± 8	9	9.5±3.3
20 min	66 ± 8	8	12.3±12.2
25 min	62 ± 3	5	21.9±16.4
99 nm			
0 min	95±1.6	30	7.1±4.8
5 min	95.6±1.5	30	6.4±4.4
10 min	95.4±1.9	30	7.1±5.0
15 min	94.5±2.1	30	8.3±4.4
20 min	96.6±2.7	29	6.1±5.3
25 min	95.7±2.1	30	10.7±5.9
99 nm Filtered 0.8 µm			
0 min	92	30	8.0
5 min	91.2±1.8	30	6.5±4.3
10 min	91.1±2.0	30	8.2±4.5
15 min	89.9±2.0	30	10±3.3
20 min	92.4±1.3	30	8.6±4.6
25 min	92.0±1.9	30	10±4.7

Figure S3. Experimental setup for UVC treatment. **Panel 1** shows the UVC lamp submerged in 385 mL of Milli-Q H_2O (green arrow). **Panel 2** depicts the UVC lamp immersed in the liquid and connected via tubing and glass rods to a peristaltic pump for solution circulation. The red arrow indicates the valve used for sample withdrawal during UVC treatment. **Panel 3** presents the complete setup. Aluminum foil was used to prevent UVC light from escaping the system. A thermometer, with its sensor taped beneath the aluminum foil to the glass rod guiding the circulating solution out of the beaker, is indicated by orange arrows.

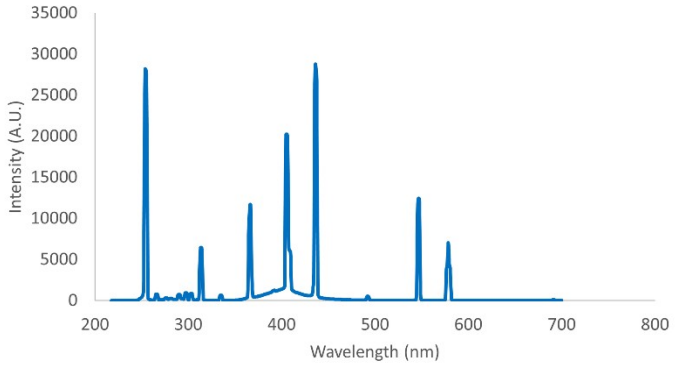

Figure S4. Emission spectra from the UVC lamp used in the breakdown experiments.