

Supplementary Information

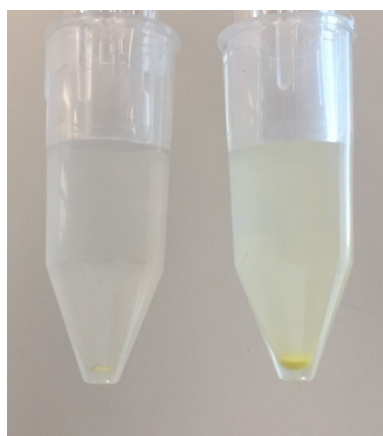


Figure S1. The recovered 20 nm PS-NPs at 100 mg L⁻¹ (left) and 500 nm PS-NPs at 1780 mg L⁻¹ (right) in the sorption experiment.

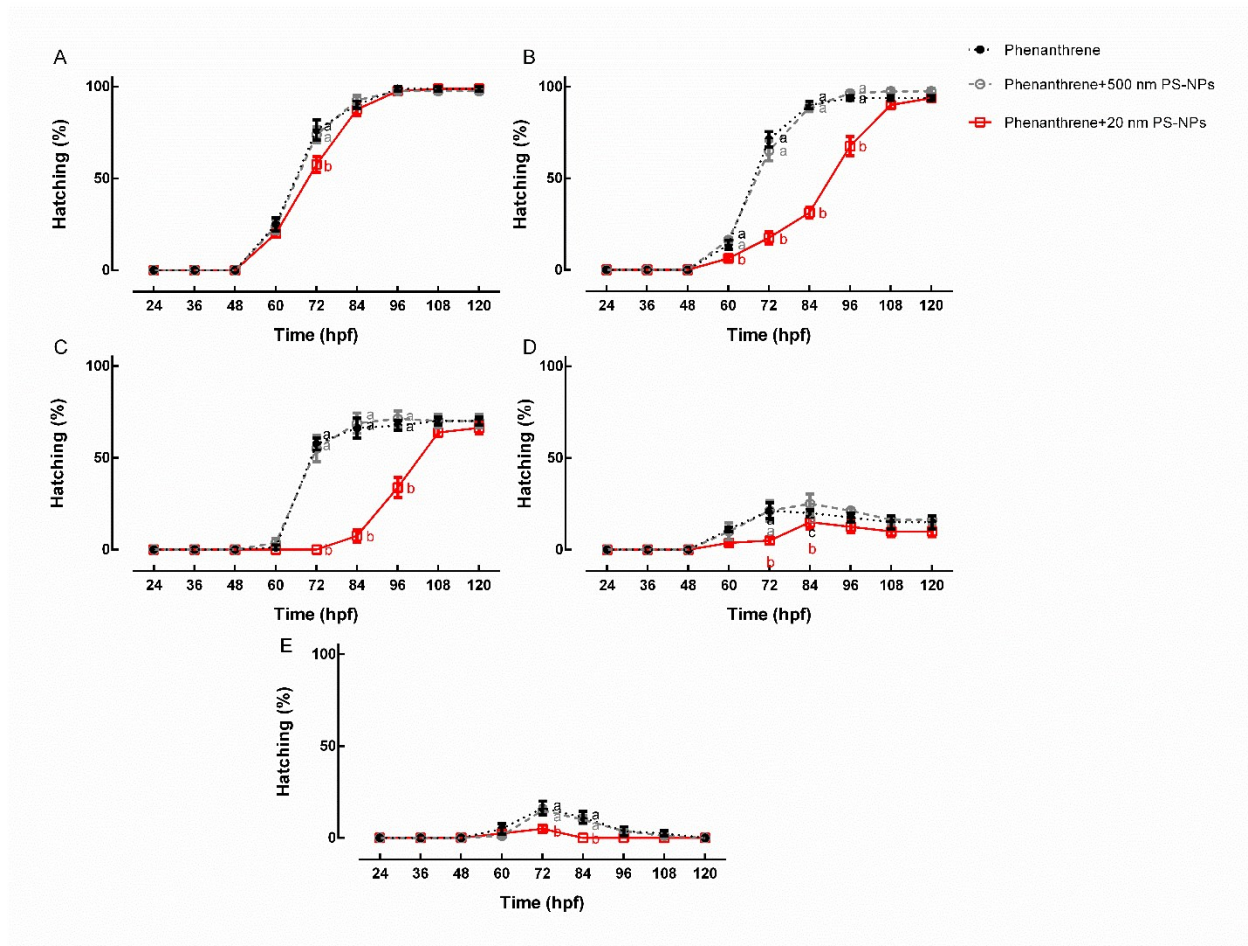


Figure S2. Hatching success of zebrafish embryos exposed to phenanthrene at various nominal concentrations including 0.156 mg L⁻¹ (A), 0.313 mg L⁻¹ (B), 0.625 mg L⁻¹ (C), 1.25 mg L⁻¹ (D) and 2.5 mg L⁻¹ (E), without any PS-NPs (black dots), in the presence of 10 mg L⁻¹ 500 nm PS-NPs (gray circles) or in the presence of 10 mg L⁻¹ 20 nm PS-NPs (red squares) from 24 hpf to 120 hpf. Means with different letters are significantly different from each other at given time point (p<0.05). Means without any letters indicates there was not significant difference at the time point (p>0.05). Values are mean $\pm$ SEM. n=4.

Table S1. Characteristics of microplastics and nanoplastics.

	Primary diameter (nm)	Theoretical surface area (nm ²)	Number of particles per mL at 100 mg L ⁻¹	Total theoretical surface area (nm ²)
20 nm PS-NPs	27	2290	2.25x10 ¹¹	5.15x10 ¹⁴
500 nm PS-NPs	480	7.24x10 ⁵	4.0x10 ⁷	2.89x10 ¹³

Table S2. The hydrodynamic diameters (HD), polydispersity index and zeta-potential of non-dialyzed and dialyzed PS-NPs. Values are mean $\pm$ SD. n=3.

PS-NPs	HD (nm)		PDI		Zeta-potential (mV)	
	0 h	96 h	0 h	96 h	0 h	96 h
Non-dialyzed 20 nm	35.5 $\pm$ 2	39.2 $\pm$ 7	0.154 $\pm$ 0.011	0.153 $\pm$ 0.006	-11.9 $\pm$ 0.2	-13.6 $\pm$ 1
Dialyzed 20nm	37.7 $\pm$ 4	40.3 $\pm$ 6	0.147 $\pm$ 0.006	0.163 $\pm$ 0.004	-11.8 $\pm$ 0.4	-13.0 $\pm$ 0.3
Non-dialyzed 500 nm	527.2 $\pm$ 10	542.7 $\pm$ 24	0.149 $\pm$ 0.014	0.226 $\pm$ 0.017	-11.9 $\pm$ 0.2	-12.4 $\pm$ 0.4
Dialyzed 500nm	522.6 $\pm$ 17	539.9 $\pm$ 11	0.147 $\pm$ 0.071	0.152 $\pm$ 0.014	-12.2 $\pm$ 0.3	-12.2 $\pm$ 0.4

Table S3. Mean values ($\pm$ S.D.) of wet weight of 10 intact zebrafish embryos and 10 dechorionated embryos exposed to 20 nm or 500 nm PS-NPs at 4 and 24 hpf (n=5).

		Wet weight (mg)	
		Intact embryo	Dechorionated embryo
No PS-NPs	4 hpf	11.3 $\pm$ 0.58	3.74 $\pm$ 0.52
	24 hpf	11.1 $\pm$ 0.67	3.66 $\pm$ 0.64
20 nm PS-NPs treated	4 hpf	10.9 $\pm$ 0.64	3.61 $\pm$ 0.55
	24 hpf	10.6 $\pm$ 0.52	3.57 $\pm$ 0.50
500 nm PS-NPs treated	4 hpf	11.0 $\pm$ 0.66	3.59 $\pm$ 0.48
	24 hpf	10.7 $\pm$ 0.59	3.62 $\pm$ 0.76