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1Supplementary information2Fate of polystyrene and polyethylene nanoplastics exposed to UV in water3Gireeshkumar Balakrishnan*, Fabienne Lagarde, Christophe Chassenieux, Arnaud Martel,4Elise Deniau, Taco Nicolai5IMMM UMR-CNRS6283, Le Mans Université, 72085 Le Mans Cedex 9, France.6*Corresponding author: Dr. Gireeshkumar Balakrishnan7Postal address : IMMM UMR-CNRS6283, Le Mans Université, 72085 Le Mans Cedex 9,



9



Figure S1. (a) The photo of the solar exposure simulator and (b) the corresponding highintensity UV lamp.



Figure S2. Spectral radiation distribution of (a) the high- intensity UV lamp and (b) the solar
simulator obtained from the user's manual of SUPRATEC UV high-pressure lamp and Sunset
XLS + (Atlas), respectively.



17

Figure S3. Schematic representation of the materials and methods that were used in the study. Two particles suspension at C = 5 mg/L and C = 100 mg/L were used for this investigation. The particle radius varied from 0.1 to 2.5 μ m. UV irradiation was done utilizing (a) a commercial XLS+ chamber or (b) a high intensity UV lamp. Transparent suspensions at C = 5 mg/L were used for light scattering measurements to measure M_w and R_{hz}. Turbid suspensions at C = 100 mg/L were analysed with TOC, UV visible spectroscopy and confocal microscopy.



Figure S4. (a) Double logarithmic plot of the scattering intensity as a function of q for PS particles in ultrapure water at different ageing times (hours) in the dark for particles with $R_h=0.1$ μ m (a) and $R_h=0.25 \mu$ m (b)



Figure S5. Double logarithmic plot of the scattering intensity as a function of q for PS particles with $R_h = 0.25 \ \mu m$ in ultrapure water after 96 h of UV exposure and the corresponding pure Millipore water. At t= 96h the relative scattering intensity of the particle suspension was not significantly higher than the Millipore water. A weak increase in scattering intensity perhaps denote the formation dissolved organic carbon but no particles or no autocorrelation function were detected with DLS.



Figure S6. Double logarithmic plot of the scattering intensity as a function of q for PS particles with $R_h = 0.52 \ \mu m$ in ultrapure water at different aging times (hours) during high intensity UV irradiation.



Figure S7. (a) I_{rel} with respect to the initial value as a function of UV exposure time for
suspensions of PS particles with R_{hz}=0.25 μm aged at two different initial concentrations c=100
mg/L and C=5 mg/L. (b) Average hydrodynamic radius of PS particles at different irradiation
time. The particle suspension at c=100 mg/L was stirred during irradiation.



120 h 178 h

Figure S8 CLSM images of the PS particle suspension ($R = 2.5 \mu m$) with Nile red at different UV irradiation times under high intensity UV irradiation. Images of individual particles at higher magnification (vertical scale is 7.5 μm) are shown in the insets. The particle suspension is irradiated at C=100 mg/L without any stirring.



Figure S9 CLSM images of the PS particle suspension ($R = 2.5 \mu m$) with FITC at different irradiation. No particles were labelled with FITC at t = 0 or before UV irradiation. Images of individual particles at higher magnification (vertical scale is 7.5 μm) are shown in the insets. The particle suspension is irradiated at C=100 mg/L without any stirring.



Figure S10. Absorbance spectra of a suspension of PS particles with R= 2.5 µm at 100mg/L as
a function of UV irradiation time under high intensity UV lamp (hours) as indicated. The
particle suspension was stirred during irradiation.



85 Figure S11. Effect of high intensity UV irradiation time (hours) on the visual appearance of a

86	suspension of PS	particles with $R_h = 0$.25 µm at C	= 100 mg/L	in simulated	seawater.
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Figure S12. Double logarithmic plot of the scattering intensity as a function of q for PS particles





Figure S13. Double logarithmic plot of the scattering intensity as a function of q for a PE
particle suspension in ultrapure water in the dark (a) and (b) after different high intensity UV
irradiation times (hours) as indicated in the figure.