Electronic Supplementary Material (ESI) for Environmental Science: Nano.

Field deployable reactors for investigating the interaction of nanoparticles with natural organic matter under field conditions

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Table S1: Properties of the river water used for the laboratory and field experiments (May-September 2018).

Date	Conductivity (µs/cm)	pH	DOC (mg/l)	Stream flow rate (cm/s)[1]	Temp. C	Dissolved oxygen (mg/l)
Late May	271	7.2	6.1(± 0.16)[2]	-	-	-
Mid Jun	301	7.1	8.2(± 0.42)[2]	-	-	-
Mid July	280	7.1	6.1(± 0.37)[2]	-	-	-
Late July	293	7.4	6.7(± 0.21)[2]	-	-	-
Late September (field experiment)	272	7.2	6.5(± 0.15)[2]	32.3(± 7.5)[2]	21	8.79(± 1.23)[2]

[1]One meter from the river bank

[2]Standard deviation

Table S2: Total concentration of selected elements in the river water determined using ICP-OES (September 2018). LOD: limit of detection.

Elements	Concentration (µg/l)	LOD (µg/l)	Standard deviation (%)
Al	16.5	1	1.20
Ba	43.5	0.5	3.02
Ca	5246.0	1	0.35
Cu	< LOD	0.5	-
Fe	20.3	1	2.80
Ti	< LOD	0.05	-
K	509.4	2.5	0.80
Mg	1030.2	0.5	0.15
Mn	2.7	0.3	0.01
Na	3227.1	25	0.33
Sr	93.4	0.5	0.13
Zn	1.6	0.5	6.25

Table S3: Anions concentrations of the river water using ion chromatography (September 2018). LOD: limit of detection.

Anions	Concentration (mg/l)	LOD (mg/l)	Standard deviation (%)
Fluoride	0.04	0.02	4.0
Chloride	10.11	0.65	4.5
Nitrate	4.94	0.67	3.0
Phosphate	0.148	0.08	3.5
Sulphate	20.98	1.61	5.4

Figure S1: The cellulose ester dialysis bag (cylindrical design) used in this study.

Figure S2: The dialysis bags in plastic canisters deployed in the river Queich.

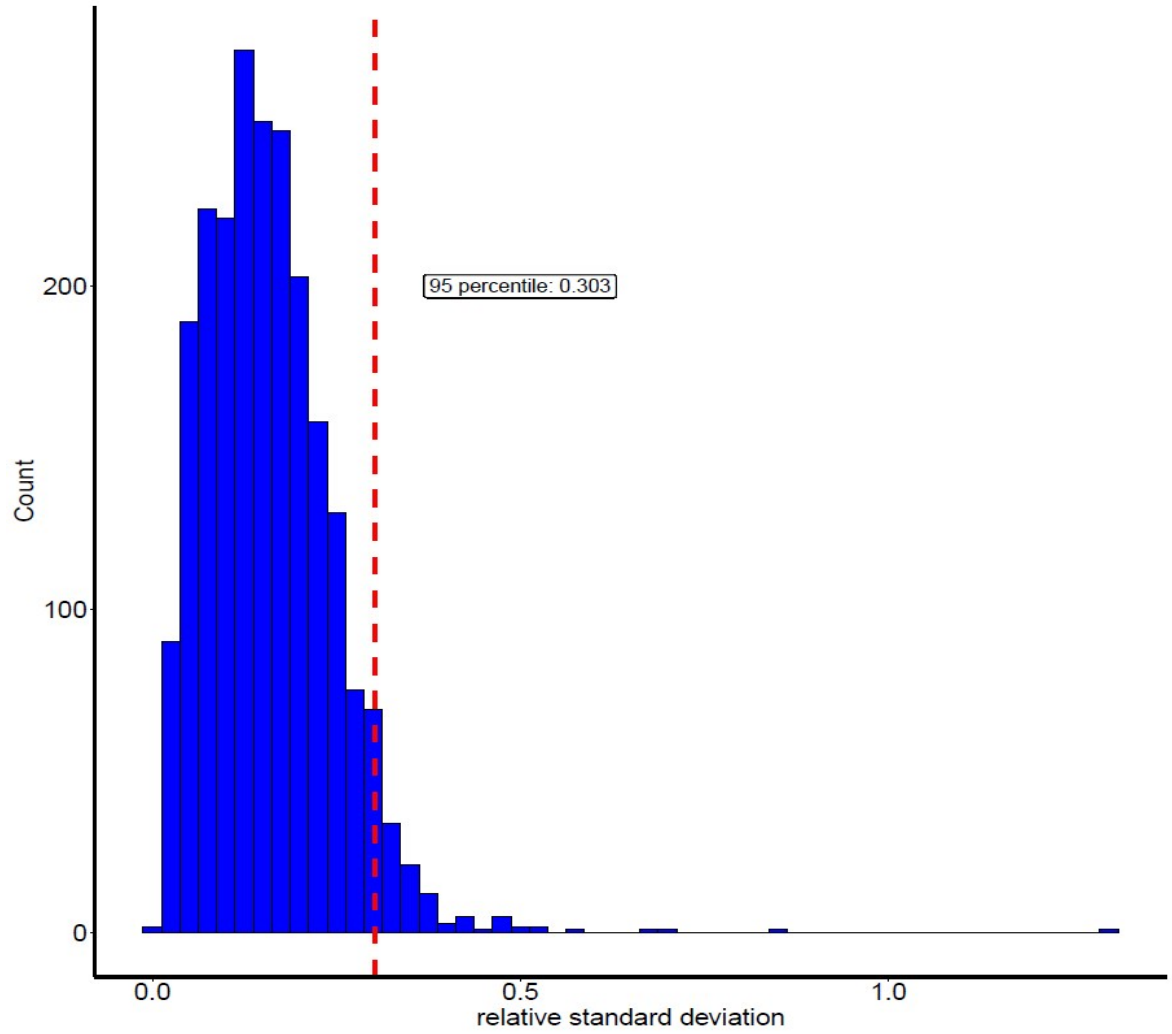

Figure S3: Assessment of the instrumental variability based on replicate measurements of SRFA (*n* = *6*). Normalized intensity values were used to calculate the relative standard deviation (RSD). 95 % of the RSD values were below 0.303.

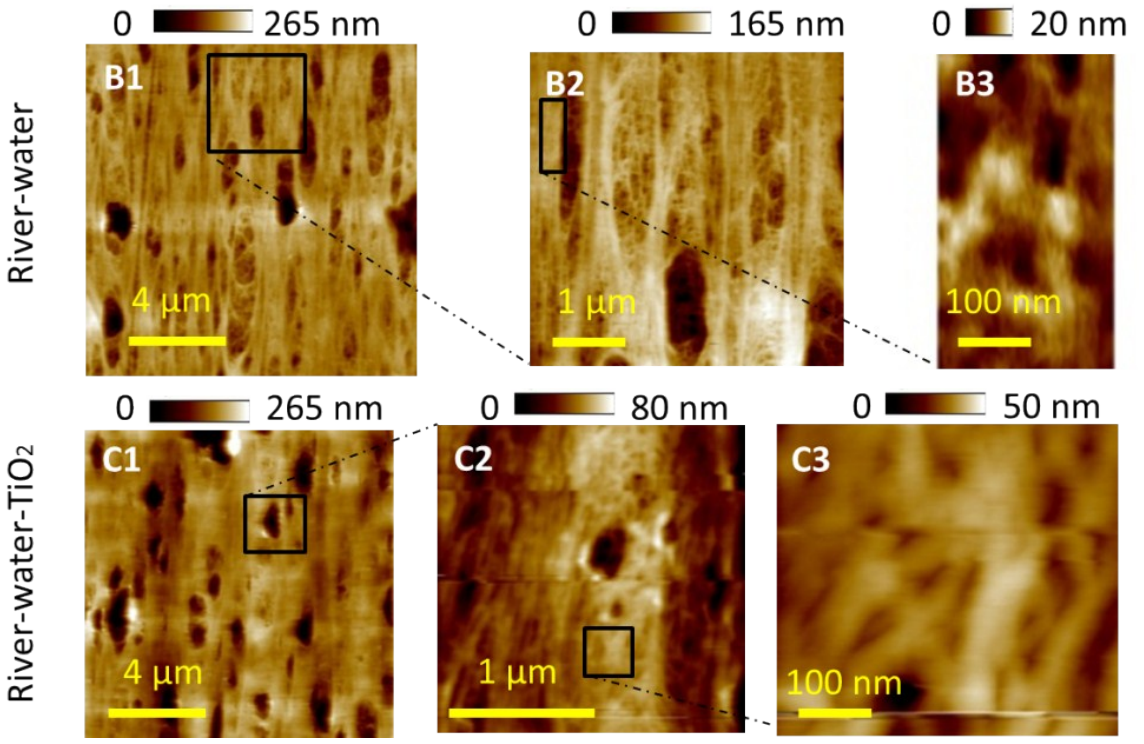

Figure S4: AFM height image of the dialysis bag in river water, and river water exposed to n-TiO_2.

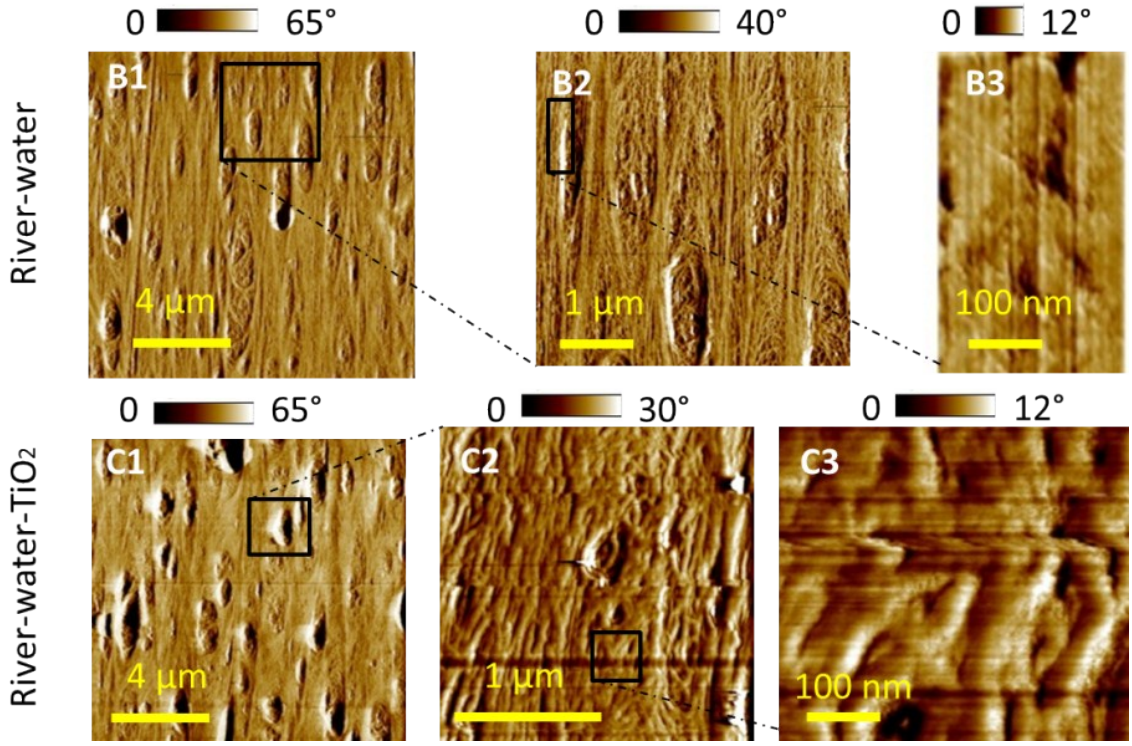

Figure S5: AFM phase image of the dialysis bag in river water, and river water exposed to n-TiO_2.

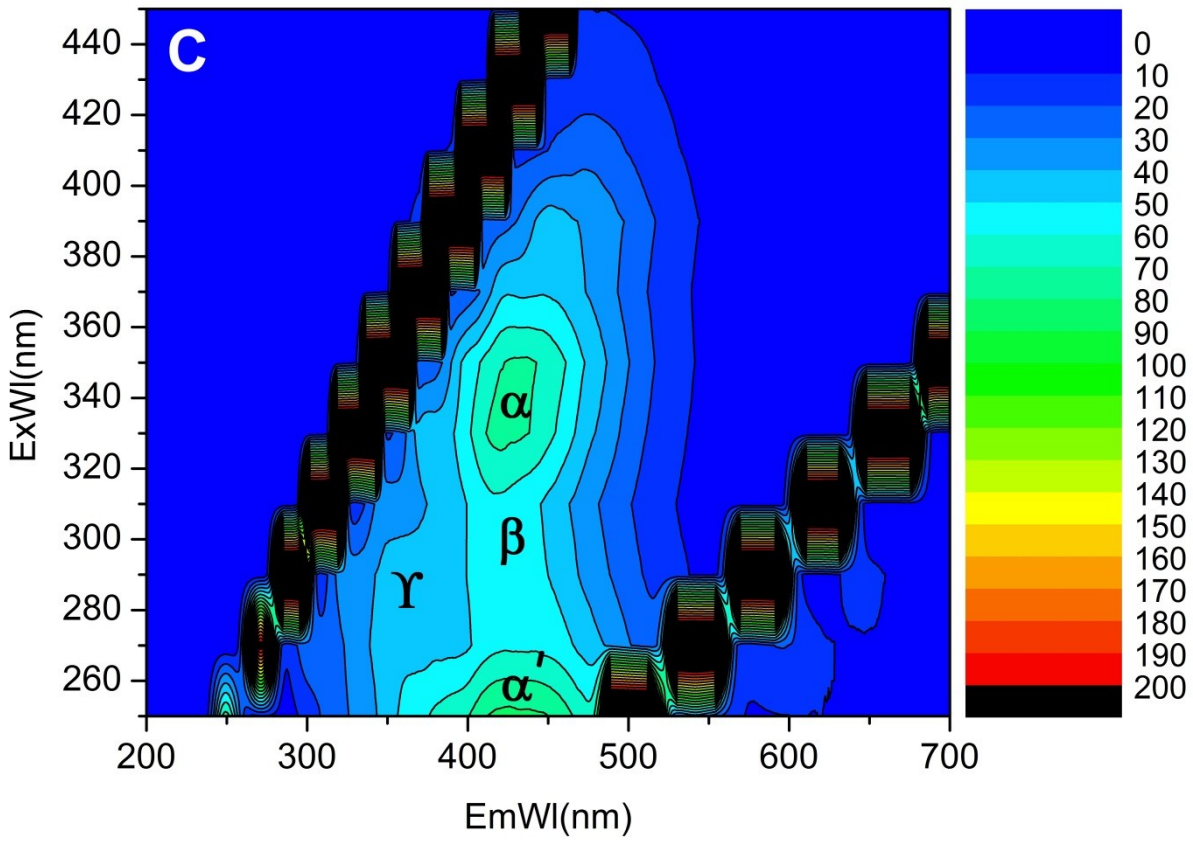

Figure S6: Fluorescence EEMs of the samples carried out in the field C) river water inside the dialysis bags with n-TiO_2 (the color scale depicts the intensity a.u).

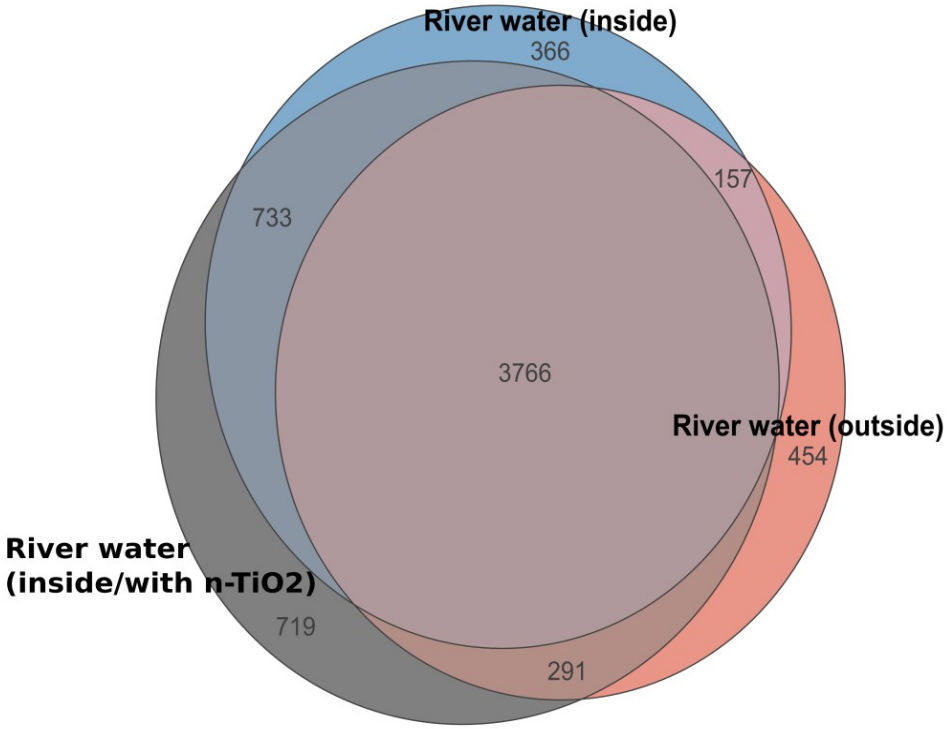

Figure S7: Euler diagram depicting the distribution of molecular formulas detected by FT-ICR-MS in all three samples (outside the dialysis bag, and inside the dialysis bag with and without n-TiO_2) deployed on the field.

Table S4: Major compound class distribution of all three samples deployed on the field based on the molecular formulas determined using FT-ICR-MS.

Sample	CHO	CHNO	CHOS	CHNOS	Other
River water (inside)	2677	1777	472	91	5
%	53.3	35.4	9.4	1.8	0.1
River water (outside)	2443	1565	537	116	7
%	52.3	33.5	11.5	2.5	0.1
n-TiO_2 (inside)	2906	1927	534	138	4
%	52.8	35.0	9.7	2.5	0.1

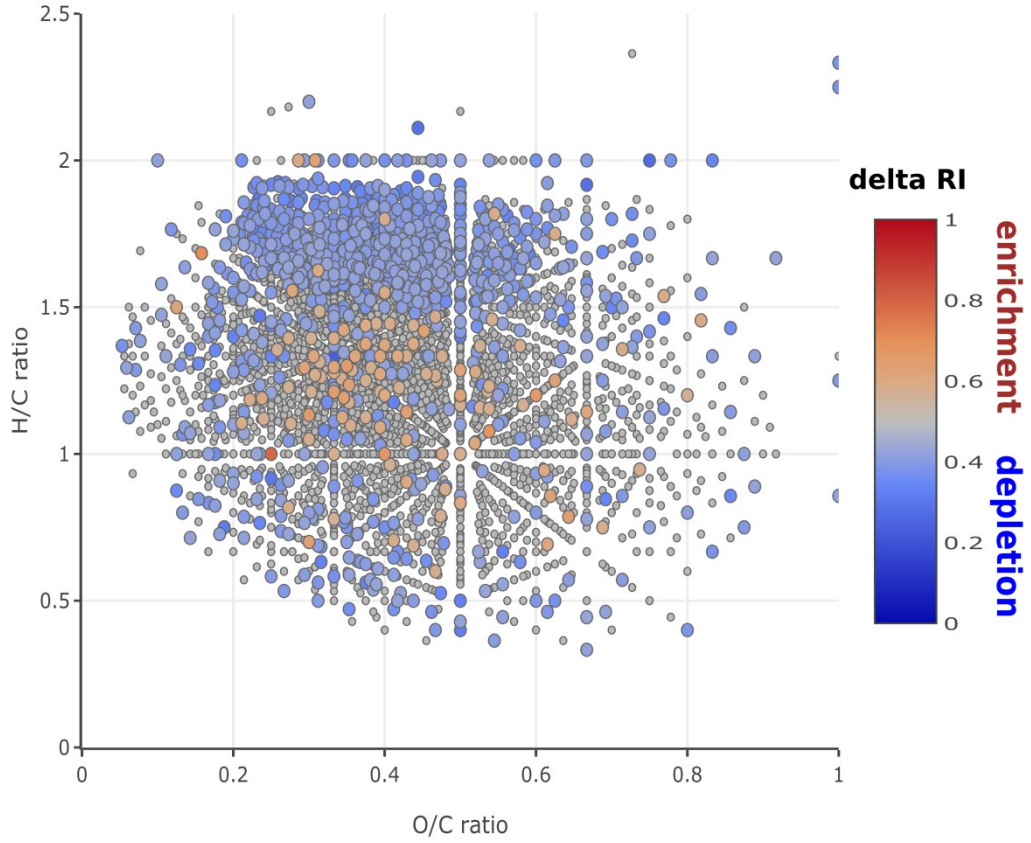

Figure S8: Van Krevelen diagram with intensity differences for river water inside the dialysis bags with n-TiO_2 vs without n-TiO_2. ΔRI values below 0.43 (blue) indicate the respective compound is depleted in the river water inside the dialysis bag with n-TiO_2 compared to without n-TiO_2.

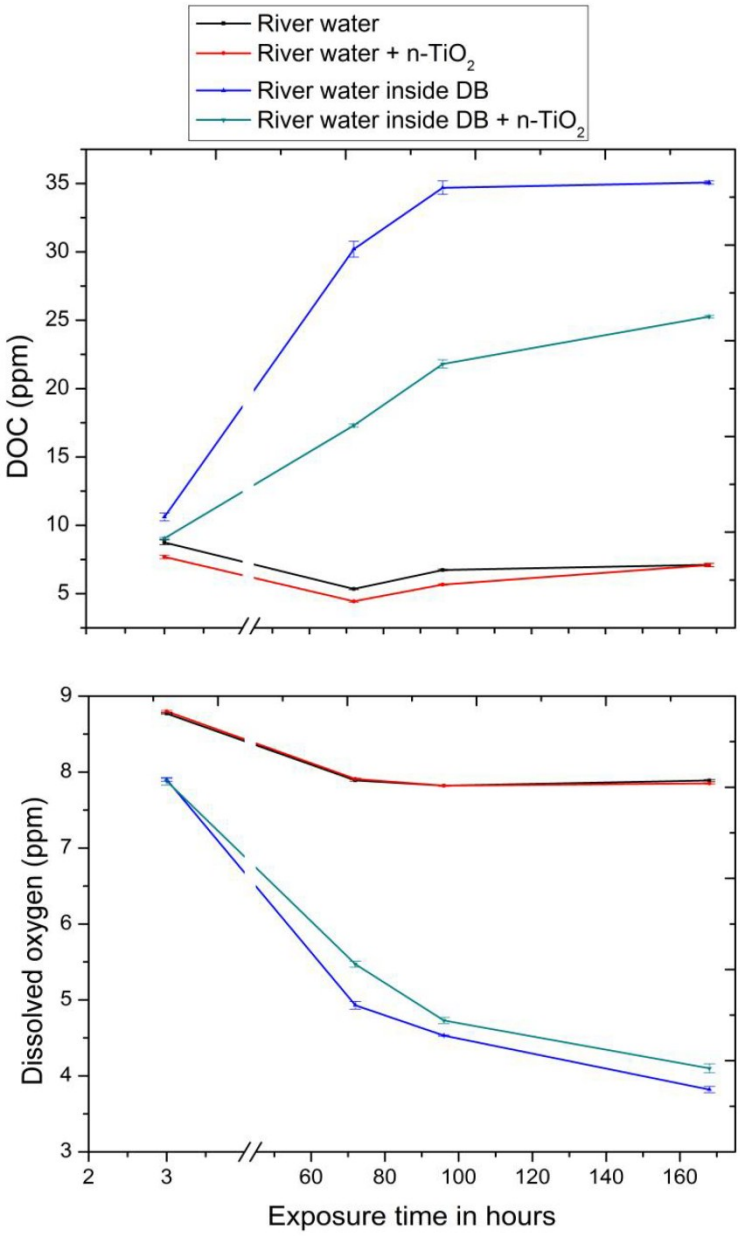

Figure S9: DOC and Dissolved oxygen of the river water inside dialysis bags (DB) with and without n-TiO_2, and the river water as control with and without n-TiO_2 at room temperature (Nov. 2019).

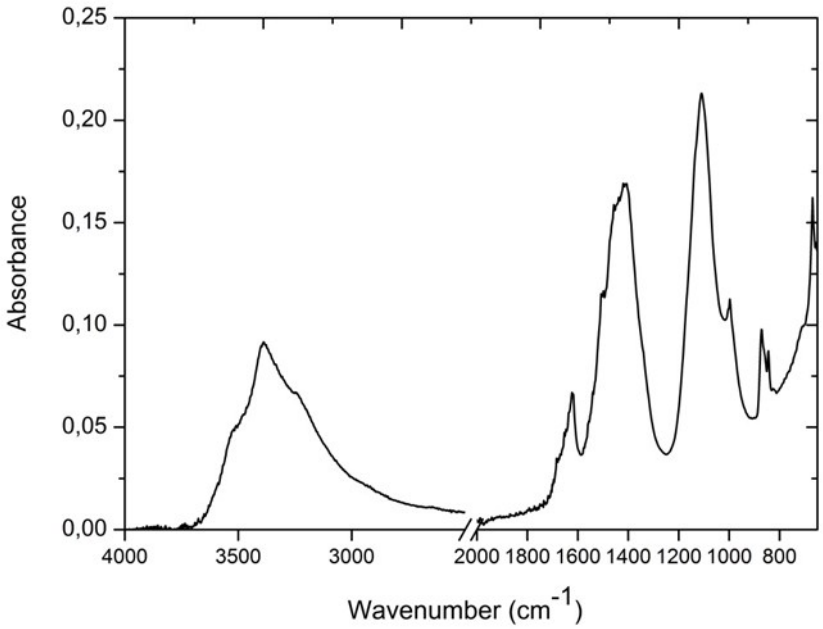

Figure S10: ATR-FTIR spectrum of the river water (freeze-dried sample).