Supplementary materials

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Dominating Role of Ionic Strength in the Sedimentation of Nano-TiO_2 in Aquatic Environments

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The supplementary materials consist of 9 pages, 9 tables and 6 figures.

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The characterization of nano-titanium dioxide (n-TiO_2)

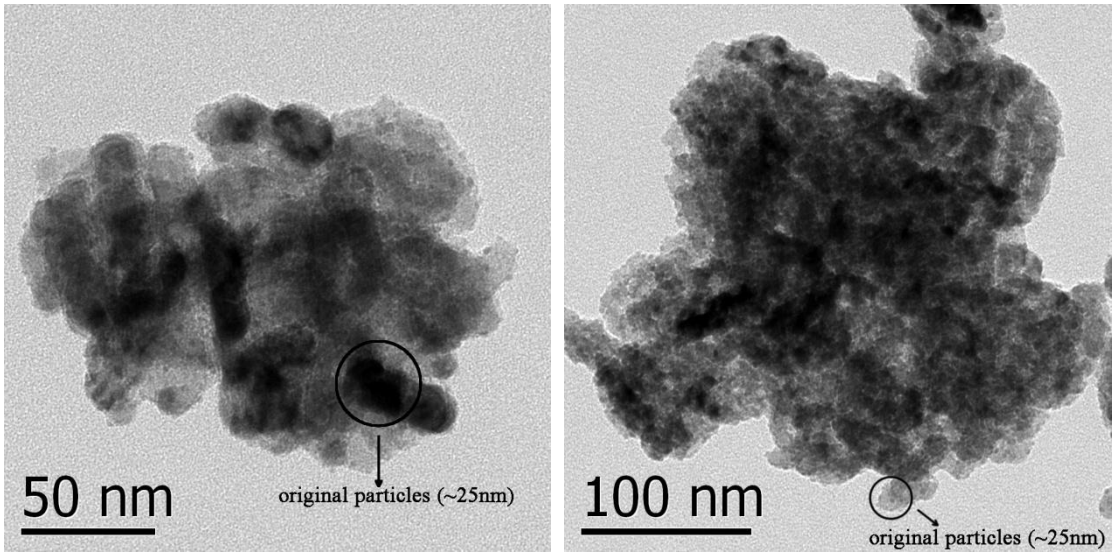

FIGURE S1: The transmission electron microscope images of n-TiO_2.

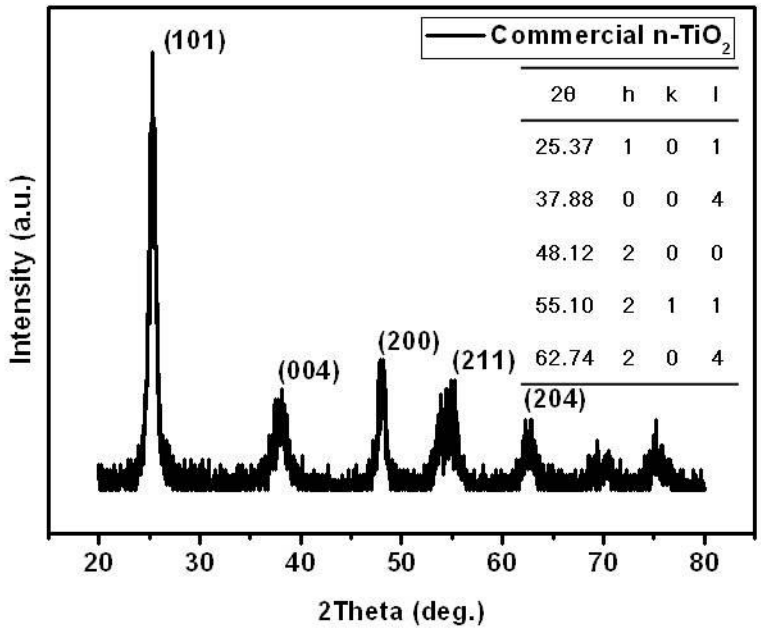

FIGURE S2: The X-ray diffractometer patterns of n-TiO_2.

The standard curve of n-TiO_2 concentration

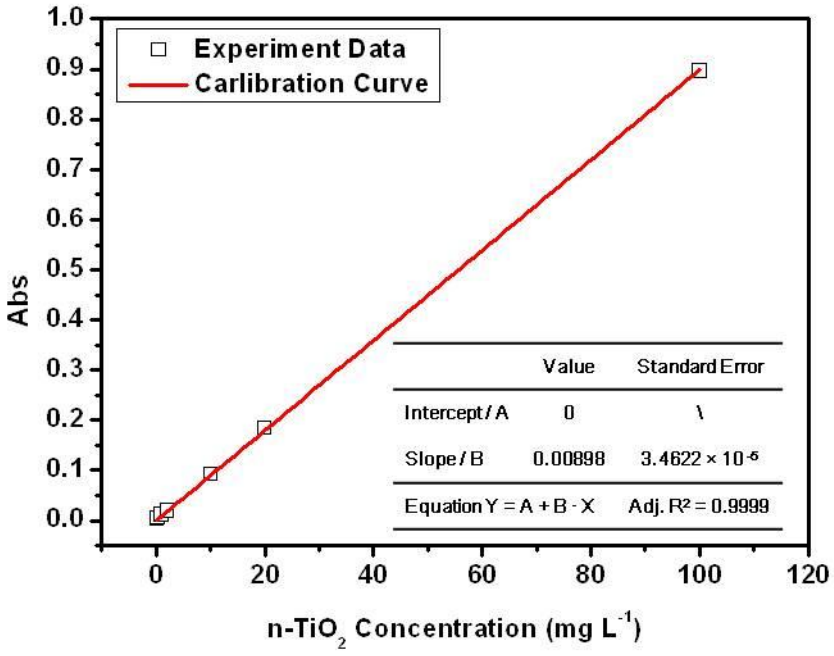

FIGURE S3: The standard curve of n-TiO_2.

The analysis of natural organic matter (NOM)

TABLE S1: The C, N, H and S relative concentration of NOM.

NOM	C (%)	H (%)	N (%)	S (%)	C/N Ratio	C/H Ratio
FA	41.28	4.092	0.85	0.479	48.5943	10.0884
HA	61.19	3.532	1.43	0.797	42.6427	17.3229

TABLE S2: The total carbon (TC), total organic carbon (TOC) and inorganic carbon (IC) concentration of NOM.

NOM	TC (mg L^{-1})	TOC (mg L^{-1})	IC (mg L^{-1})
FA	6.97	6.39	0.579
HA	6.45	5.98	0.473

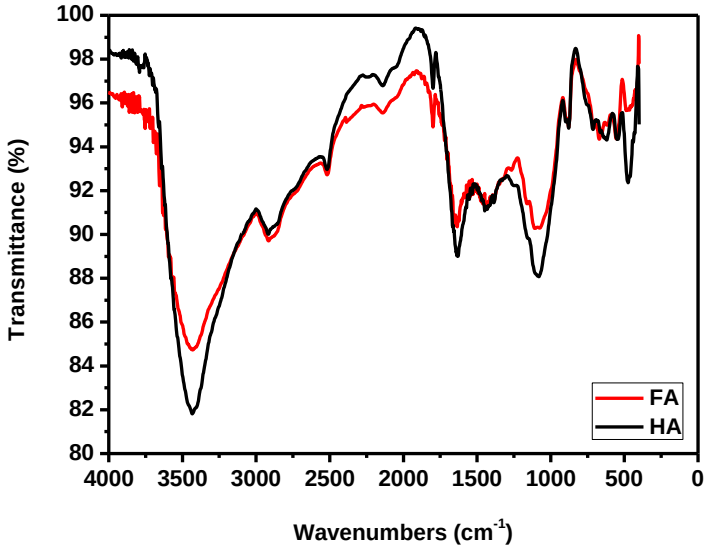

FIGURE S4: The infrared radiation spectrum of NOM.

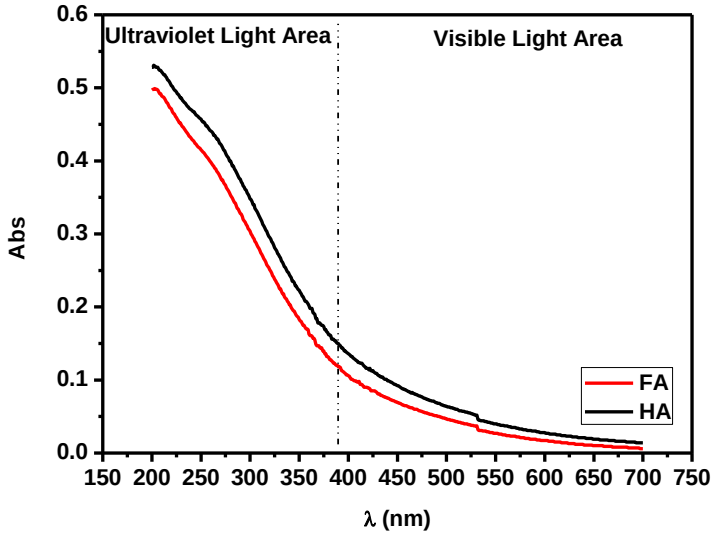

FIGURE S5: The ultraviolet-visible spectrum of NOM.

The analysis of the environmental water samples

TABLE S3: Common ion analysis of the environmental water samples.

NO.	Na^+ (mM)	K^+ (mM)	Mg^{2+} (mM)	Ca^{2+} (mM)	Cl^- (mM)	NO_3^- (mM)	SO_4^{2-} (mM)
1#	0.31	0.06	0.14	0.81	0.28	0.14	0.22
2#	1.48	0.17	0.24	1.06	1.13	0.20	0.84
3#	0.81	0.17	0.14	0.80	0.61	0.10	0.44
10%-4#	40.6	0.92	4.63	0.84	44.9	< 0.003	2.57
5#	16.6	0.51	1.97	0.87	19.5	0.14	1.25
6#	0.25	0.04	0.02	0.04	0.05	< 0.008	0.04
7#	8.07	0.03	0.36	0.95	5.90	0.48	2.89

***4# phreatic water sample was diluted because of its high salinity.**

TABLE S4: pH of the environmental water samples.

NO.	1#	2#	3#	10%-4#	5#	6#	7#
pH	7.4	7.9	7.1	7.5	8.0	6.8	6.6

***4# phreatic water sample was diluted because of its high salinity.**

TABLE S5: Conductivity of the environmental water samples.

NO.	1#	2#	3#	10%-4#	5#	6#	7#
K (mS cm^{-1})	0.247	0.512	0.311	5.65	2.56	0.053	1.39

***4# phreatic water sample was diluted because of its high salinity.**

TABLE S6: Carbon analysis of the environmental water samples.

NO.	TOC (mg L^{-1})	TC (mg L^{-1})	IC (mg L^{-1})
1#	2.132	19.23	17.10
2#	1.556	23.73	22.18
3#	1.623	14.82	13.20
10%-4#	0.196	2.847	2.650
5#	1.706	16.35	14.65
6#	3.432	6.668	3.236
7#	5.696	18.22	12.52

***4# phreatic water sample was diluted because of its high salinity.**

The isoelectric point of n-TiO_2

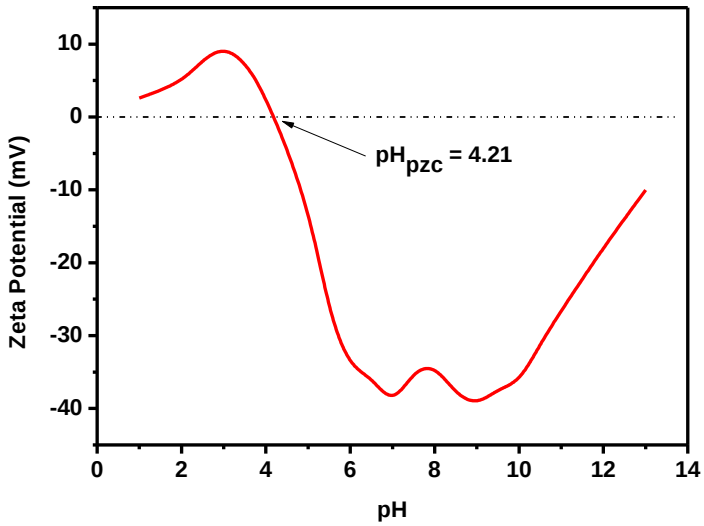

FIGURE S6: The isoelectric point of n-TiO_2.

The detail results of the orthogonal experiment

TABLE S7: The detail results of the range analysis.

Factor	K_1	K_2	K_3	$\overline{K}_1$	$\overline{K}_2$	$\overline{K}_3$	R
pH	274.44	218.89	346.67	30.49	24.32	38.52	14.2
IS	140.00	218.89	481.11	15.56	24.32	53.46	37.9
pH × IS	272.22	285.56	282.22	30.25	31.73	31.36	1.48
pH × IS	283.33	261.11	295.56	31.48	29.01	32.84	3.83
NOM	351.11	268.89	220.00	39.01	29.88	24.44	14.57
pH × NOM	287.78	268.89	283.33	31.98	29.88	31.48	2.10
pH × NOM	273.33	278.78	278.89	30.37	31.98	30.99	1.61

IS × NOM	290.00	290.00	260.00	32.22	32.22	28.89	3.33
BLANK	287.78	282.22	270.00	31.98	31.36	30.00	1.98
BLANK	277.78	280.00	280.00	30.86	31.11	31.11	0.25
IS × NOM	292.22	264.44	283.33	32.47	29.38	31.48	3.09
BLANK	281.11	277.78	281.11	31.23	30.86	31.23	0.37
BLANK	278.89	280.00	281.11	30.99	31.11	31.23	0.24

******R* **is range difference,** K_1**,** K_2**, and** K_3 **represent the sum of SE with each factor in level 1, level 2, level 3,** $\overline{K}_1$**,** $\overline{K}_2$**, and** $\overline{K}_3$ **represent the average number of SE with each factor in level 1, level 2, level 3 and "×" represents the interaction between two factors.**

TABLE S8: The detail results of the variance analysis.

Factor	$\overline{K}_1$	$\overline{K}_2$	$\overline{K}_3$	$\overline{K}$	***S***
pH	30.49	24.32	38.52	31.11	101.40
IS	15.56	24.32	53.46	31.11	787.43
pH × IS	30.25	31.73	31.36	31.11	1.19
pH × IS	31.48	29.01	32.84	31.11	7.54
NOM	39.01	29.88	24.44	31.11	108.41
pH × NOM	31.98	29.88	31.48	31.11	2.41
pH × NOM	30.37	31.98	30.99	31.11	1.32
IS × NOM	32.22	32.22	28.89	31.11	7.39
BLANK	31.98	31.36	30.00	31.11	2.05
BLANK	30.86	31.11	31.11	31.03	0.04

IS × NOM	32.47	29.38	31.48	31.11	4.98
BLANK	31.23	30.86	31.23	31.11	0.09
BLANK	30.99	31.11	31.23	31.11	0.03

***S is sum of square of deviations, $\overline{K}_1$, $\overline{K}_2$, and $\overline{K}_3$ represent the average number of SE with each factor in level 1, level 2, and level 3, $\overline{K}$ represents the average number of $\overline{K}_1$, $\overline{K}_2$, and $\overline{K}_3$ while "×" represents the interaction between two factors.**

The estimate ionic strength of the environmental water samples

TABLE S9: The estimate ionic strength of the environmental water samples.

NO.	IS (Na^+ and K^+) (mM)	IS (Mg^{2+} and Ca^{2+}) (mM)	IS_{Total} (mM)
1#	0.185	1.90	2.735
2#	0.825	2.60	5.770
3#	0.490	1.88	3.605
10%-4#	20.8	10.94	59.29
5#	8.56	5.68	26.56
6#	0.145	0.120	0.3740
7#	4.05	2.62	15.64

***The estimate total ionic strength only includes the ionic strength brought by Na^+, K^+, Mg^{2+}, Ca^{2+}, Cl^-, NO_3^- and SO_4^{2-}.**