

**Supporting Information**

**for**

**Mechanism involved in the evolution of physically irreversible fouling in microfiltration and ultrafiltration membranes used for drinking water treatment**

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**3 Pages, 4 Tables and no graph**

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**Table S1.** Operating conditions of the membrane units.

|  | PVDF                | PE                 | PAN                 |
|--|---------------------|--------------------|---------------------|
| Permeate flux (m <sup>3</sup> /m <sup>2</sup> /d)    | 0.65                | 0.65               | 0.65                |
| Backwashing flux (m <sup>3</sup> /m <sup>2</sup> /d) | 0.98                | 0.98               | 0.98                |
| Pore size (MWCO)                                     | 0.1 μm              | 0.1 μm             | 100,000 Da          |
| Surface area   | 0.69 m <sup>2</sup> | 1.5 m <sup>2</sup> | 12.0 m <sup>2</sup> |

**Table S2.** Average quality of the feed water and permeates <sup>a</sup>.

|                                       | Feed water    | PVDF          | PE            | PAN           |
|---------------------------------------|---------------|---------------|---------------|---------------|
| Turbidity <sup>b</sup> (TU)           | 16.2 (25.6)   | ND            | ND            | ND            |
| DOC <sup>b</sup> (mg/L)               | 1.4 (0.7)     | 1.2 (0.7)     | 1.2 (0.7)     | 1.0 (0.4)     |
| UV <sub>254</sub> <sup>b</sup> (1/cm) | 0.10 (0.05)   | 0.08 (0.05)   | 0.08 (0.05)   | 0.07 (0.05)   |
| SUVA (1/m/mg/L)                       | 7.1           | 6.7           | 6.7           | 7.0           |
| Total Al <sup>c</sup> (mg/L)          | 0.21 (0.27)   | 0.041 (0.05)  | 0.039 (0.05)  | 0.053 (0.06)  |
| Dissolved Al <sup>c</sup> (mg/L)      | 0.046 (0.025) |               |               |               |
| Total Ca <sup>c</sup> (mg/L)          | 11.8 (1.8)    | 11.3 (1.9)    | 11.5 (1.9)    | 11.3 (2.3)    |
| Dissolved Ca <sup>c</sup> (mg/L)      | 11.8 (2.0)    |               |               |               |
| Total Mn <sup>c</sup> (mg/L)          | 0.081 (0.03)  | 0.061 (0.02)  | 0.056 (0.02)  | 0.054 (0.03)  |
| Dissolved Mn <sup>c</sup> (mg/L)      | 0.061 (0.03)  |               |               |               |
| Total Fe <sup>c</sup> (mg/L)          | 0.69 (0.07)   | 0.033 (0.002) | 0.036 (0.002) | 0.027 (0.016) |
| Dissolved Fe <sup>c</sup> (mg/L)      | 0.17 (0.07)   |               |               |               |

<sup>a</sup> Values in parentheses are standard deviations. <sup>b</sup> n=34. <sup>c</sup> n=24.

**Table S3.** Concentrations of organic and inorganic substances desorbed with HCl (pH 2) and NaOH

(pH 12) solutions.

|      |      | DOC               | SUVA     | Al                | Ca                | Mn                | Fe                |
|------|------|-------------------|----------|-------------------|-------------------|-------------------|-------------------|
|      |      | mg/m <sup>2</sup> | l/m/mg/L | mg/m <sup>2</sup> | mg/m <sup>2</sup> | mg/m <sup>2</sup> | mg/m <sup>2</sup> |
| PVDF | NaOH | 135               | 4.8      | 0.29              | 0.92              | 0.02              | 0.44              |
|      | HCl  | 73                |          | 1.21              | 5.11              | 2.52              | 11.09             |
| PE   | NaOH | 6                 | 4.9      | 0.08              | 0.03              | ND                | 0.09              |
|      | HCl  | 7                 |          | 0.19              | 0.39              | 0.27              | 1.78              |
| PAN  | NaOH | 99                | 4.6      | 1.46              | 4.24              | ND                | 4.41              |
|      | HCl  | 9                 |          | 0.94              | 4.83              | 0.22              | 4.28              |

**Table S4.** Zeta potentials of new and fouled membranes <sup>a</sup>.

|                 | PVDF  | PE     | PAN    |
|-----------------|-------|--------|--------|
| New membrane    | -2 mV | -11 mV | -11 mV |
| Fouled membrane | 0 mV  | -6 mV  | -6 mV  |

<sup>a</sup> Measurements were carried out by using a zeta potential meter (ELS-8000, Otsuka Electronics, Osaka, Japan) at pH 7.0 and 5 mM KCl.