

**Supplementary Information for:**

**Partial Nitrification and Enhanced Biological Phosphorus Removal in a Sequencing Batch Reactor Treating High-Strength Wastewater**

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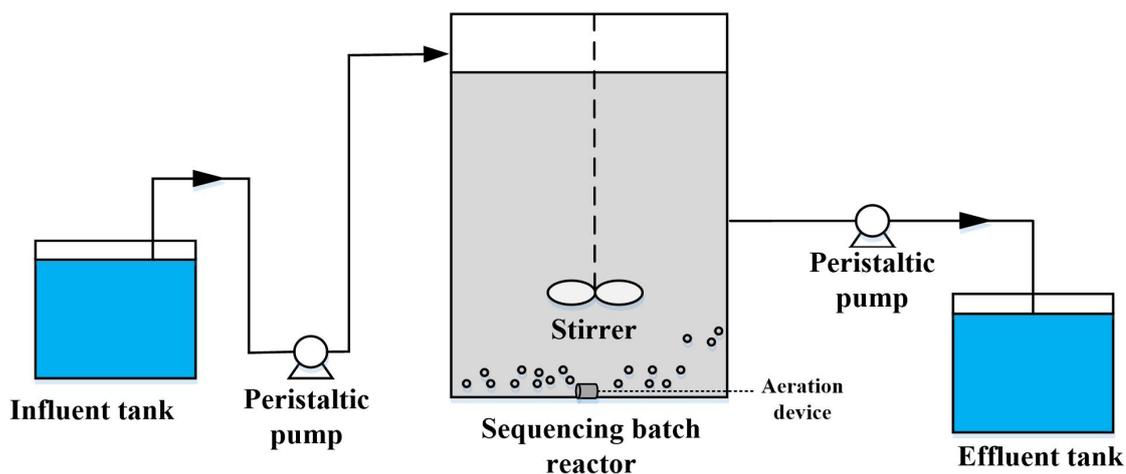
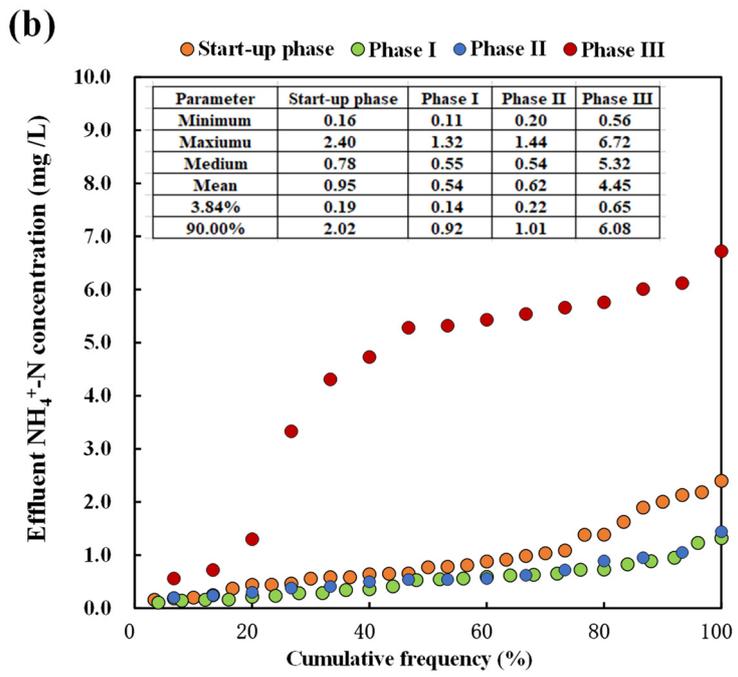
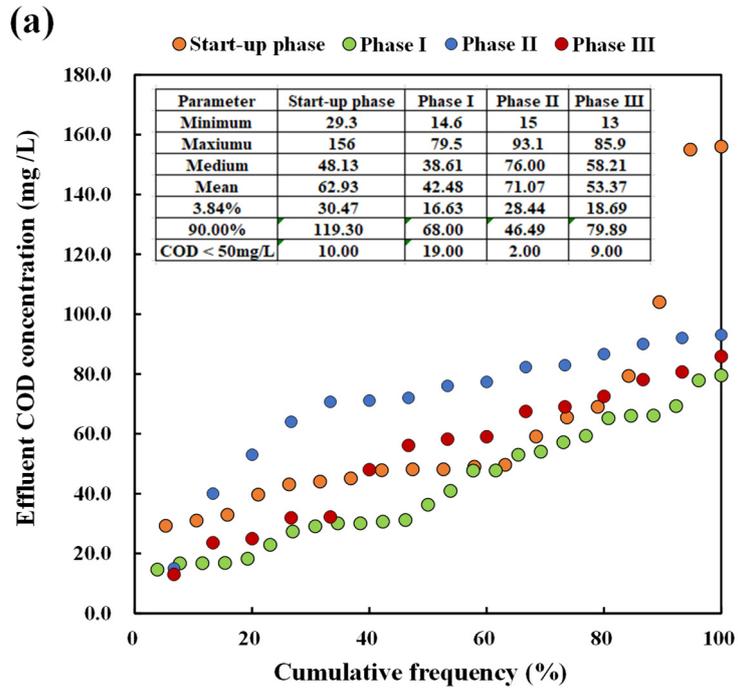


Figure S1. Schematic diagram of the SBR system.



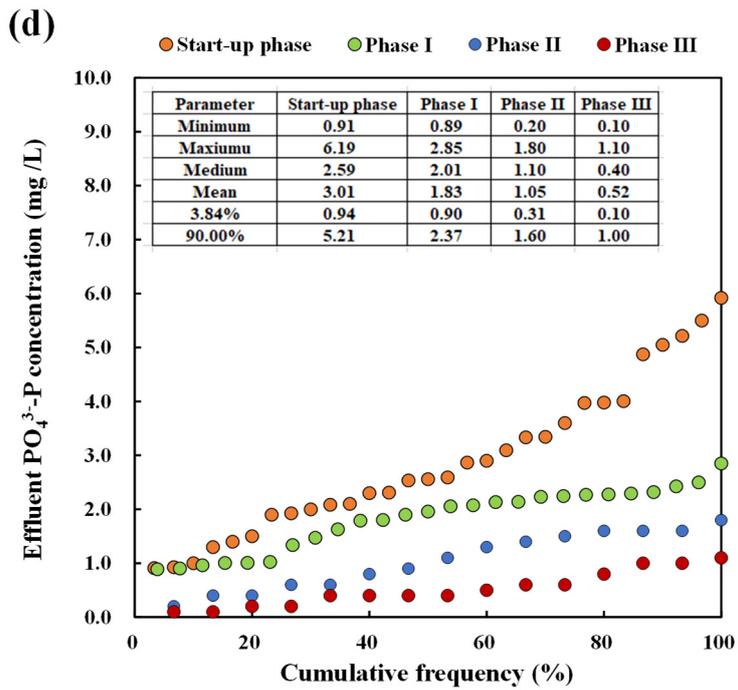
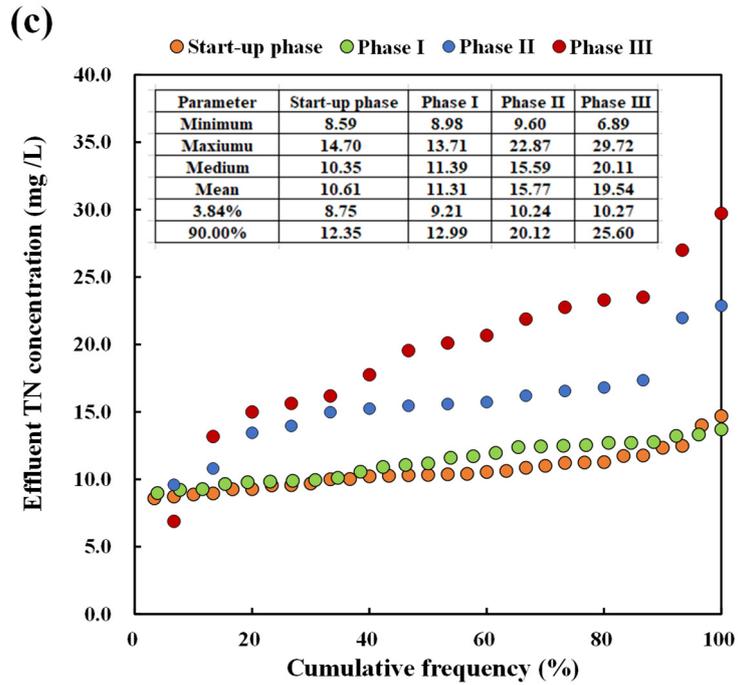
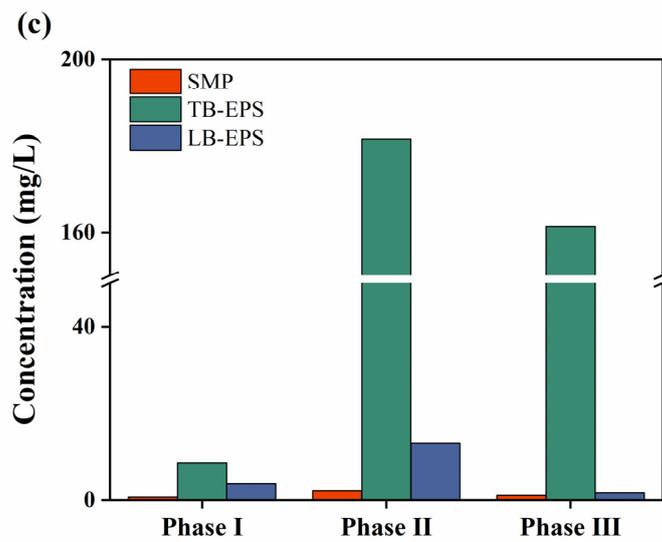
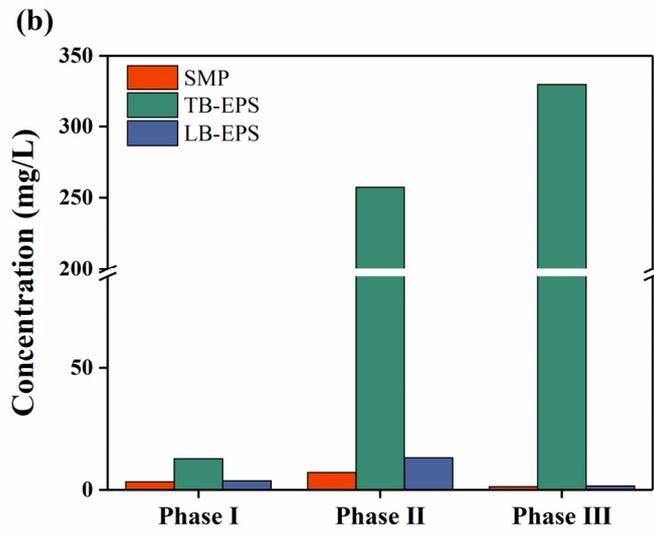
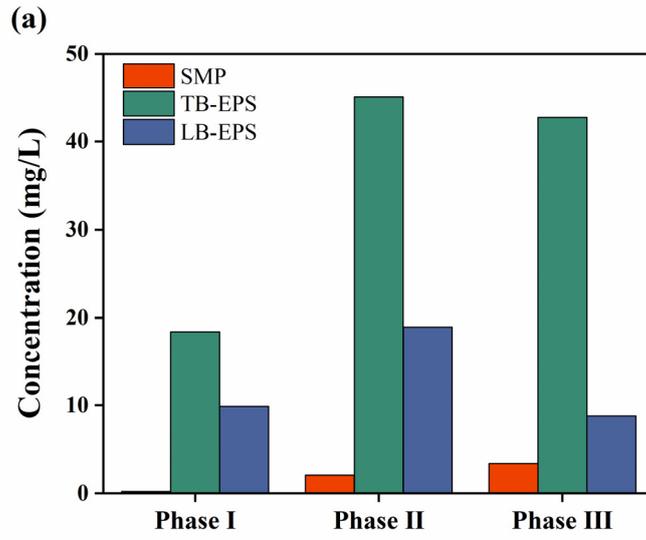
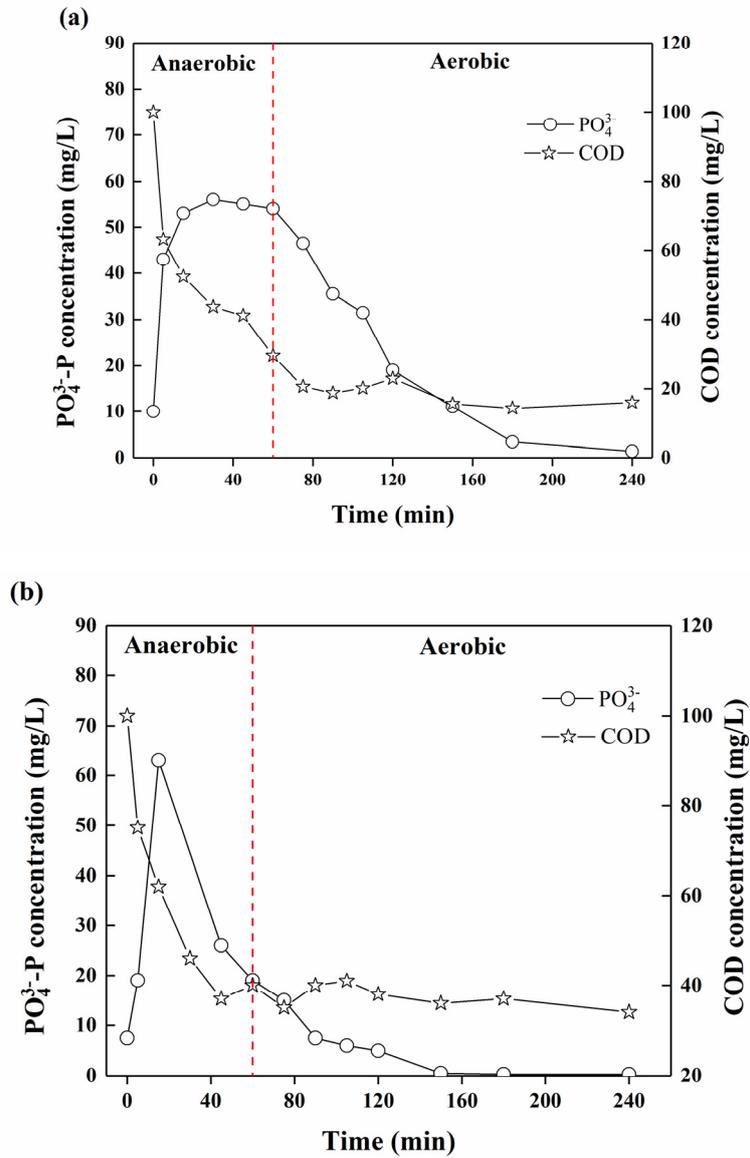
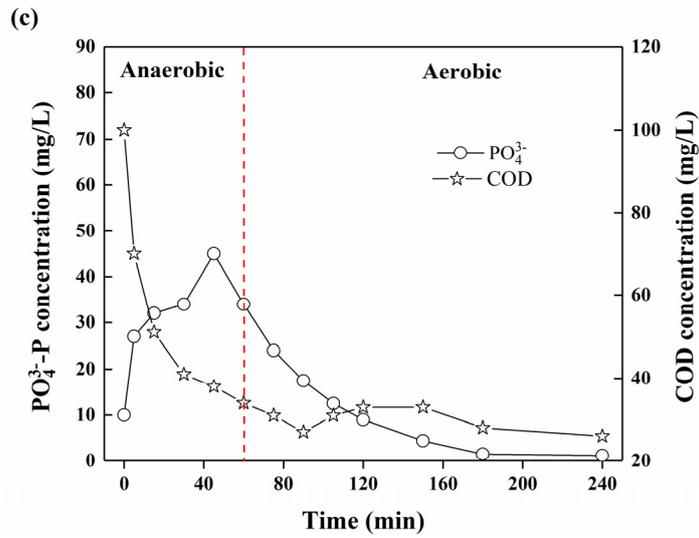


Figure S2. Cumulative frequency curves of (a) COD, (b)  $\text{NH}_4^+\text{-N}$ , (c) TN and (d)  $\text{PO}_4^{3-}\text{-P}$  concentrations in the effluent during the experiment.

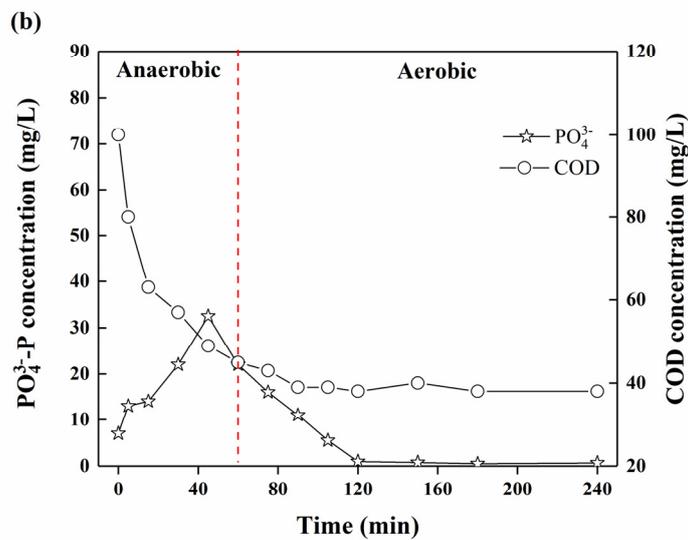
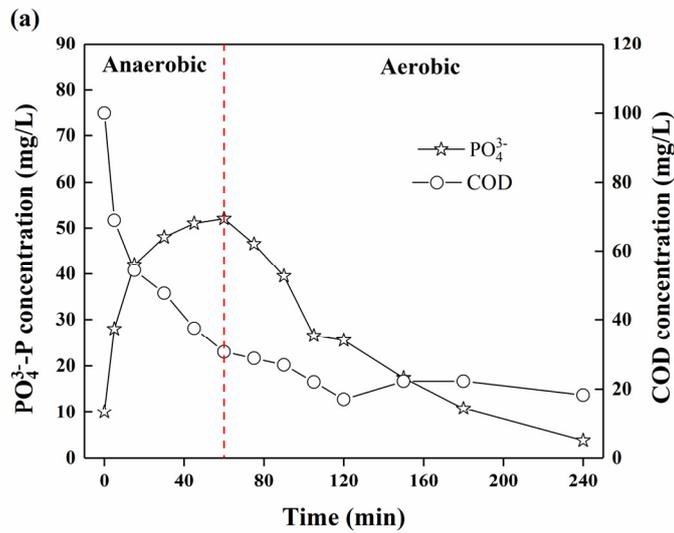


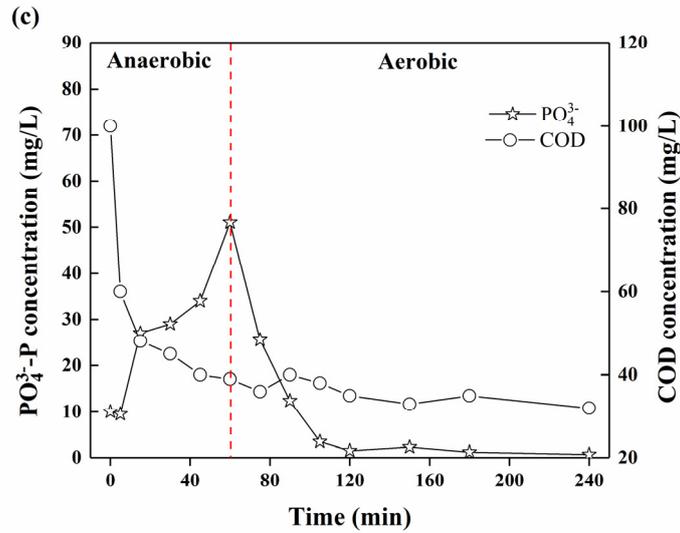
**Figure S3.** The concentrations of (a) proteins, (b) humic acids, and (c) polysaccharides in the soluble microbial products (SMP), loosely bound (LB-EPS) and tightly bound extracellular polymeric substances (TB-EPS) of the activated sludge during the experiment.





**Figure S4.** Profiles of PO<sub>4</sub><sup>3-</sup>-P and COD during P release and uptake batch tests fed with acetate in (a) Phase I, (b) Phase II, and (c) Phase III.





**Figure S5.** Profiles of PO<sub>4</sub><sup>3-</sup>-P and COD during P release and uptake batch tests fed with propionate in (a) Phase I, (b) Phase II, and (c) Phase III.

**Table S1** Summary of COD/P and COD/N ratios in high-strength dairy and manure wastewater.

Wastewater source	COD/P	COD/N	Reference
Synthetic digested manure	25.0	10.0–20.0	[1]
Synthetic dairy processing	19.5	24.1	[2]
Digested dairy manure	27.7	6.9	[3]
Diluted digested dairy manure	99.0	6.9	[4]
Diluted dairy manure	41.6	20.6	[5]
Poultry farm	37.5–42.1	6.8–8.0	[6]
Livestock farm	23.4–51.2	8.9–19.7	This study

**Table S2** Component and concentrations of other trace elements in the synthetic pre-fermented high-strength wastewater.

Component	Concentration (mg/L)
Yeast extract	8
MgCl <sub>2</sub> ·6H <sub>2</sub> O	219
MgSO <sub>4</sub> ·7H <sub>2</sub> O	14
KCl	98
CaCl <sub>2</sub>	46
H <sub>3</sub> BO <sub>3</sub>	0.061
Na <sub>2</sub> MoO <sub>4</sub> ·2H <sub>2</sub> O	0.031
KI	0.015

CuSO <sub>4</sub> ·5H <sub>2</sub> O	0.061
Co(NO <sub>3</sub> ) <sub>2</sub> ·6H <sub>2</sub> O	0.075
ZnSO <sub>4</sub> ·7H <sub>2</sub> O	0.3

**Table S3.** Average specific ammonia oxidation rate (AOR) and specific nitrite oxidation rate (NOR) in typical cycles of SBR reactor during the experiment.

Phase	AOR [mg N/(g VSS·h)]	NOR [mg N/(g VSS·h)]	Reference
I	0.51	0.61	This study
II	0.66	0.42	This study
III	0.72	0.18	This study
Other activated sludge systems	3.25-3.62	4.68-5.57	[7,8]

AOR: specific ammonia oxidation rate; NOR: specific nitrite oxidation rate.

## References

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