Supporting Information

Development of cost-effective and long-lasting integrated technology for H$_2$S control from sludge in wastewater treatment plants

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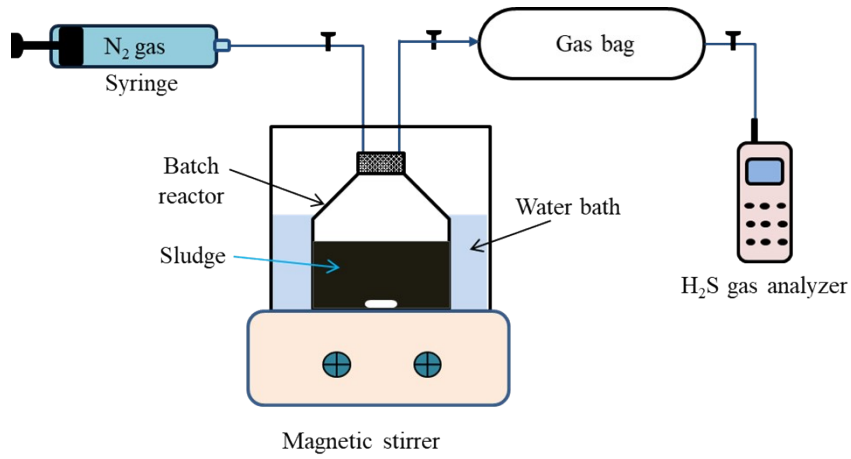
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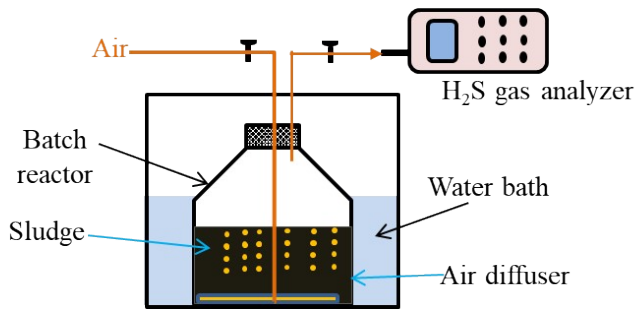

Fig. S2. The schematic representation of the batch reactor setup for studying the H$_2$S control in the liquid sludge by aeration.

Table S1. The properties of the liquid sludge samples collected from a conventional municipal WWTP in Hong Kong.

Parameter	Value
Total suspended solids (g L^{-1})	20.2–39.80
Volatile suspended solids (g L^{-1})	17.20–34.20
pH	5.30–6.30
Oxidation-reduction potential (mV)	-173.6–-294.00
Dissolved hydrogen sulfide (mg S per L)	21.50–74.30
Sulfate (mg S per L)	112.97–293.40

Table S2. The prices and purities of the chemicals used in the cost estimations.

Chemical	Commercial products	Price (USD per tonne)[a]
$NaClO_2$	85 wt% $NaClO_2$ solid	2500
H_2O_2	33% H_2O_2 solution	350
Iron oxide	98 wt% Fe_2O_3 solid	580
Glutaraldehyde	50 wt% glutaraldehyde solution	2000

[a] Prices were based on Alibaba International Prices in 2022

(https://www.alibaba.com).

Table S3. The optimal parameters for the integrated approaches to achieve the desired H$_2$S control performance.

Approach	Optimal parameters
H$_2$O$_2$-glutaraldehyde	400 mg L^{-1} H$_2$O$_2$ + 1 mM glutaraldehyde
NaClO$_2$-glutaraldehyde	400 mg L^{-1} NaClO$_2$ + 1 mM glutaraldehyde
Aeration-H$_2$O$_2$	30 min at a flowrate of 17.8 m^3 air per h m^{-3} sludge + 250 mg L^{-1} H$_2$O$_2$
Aeration-NaClO$_2$	30 min at a flowrate of 17.8 m^3 air per h m^{-3} sludge + 400 mg L^{-1} H$_2$O$_2$
H$_2$O$_2$-Fe$_2$O$_3$	400 mg L^{-1} H$_2$O$_2$ + 20000 mg L^{-1} Fe$_2$O$_3$
NaClO$_2$-Fe$_2$O$_3$	400 mg L^{-1} NaClO$_2$ + 20000 mg L^{-1} Fe$_2$O$_3$
H$_2$O$_2$	500 mg L^{-1} [b]
NaClO$_2$	800 mg L^{-1} [b]

[b] The optimal dosages of H$_2$O$_2$ and NaClO$_2$ were based on the results of Yin et al. [1].

References

1 R. Yin, J. Peng, J. Sun, C. Li, D. Xia, C. Shang, Simultaneous removal of hydrogen sulfide, phosphate and emerging organic contaminants, and improvement of sludge dewaterability by oxidant dosing in sulfide-iron-laden sludge, Water Research, 2021, **203**, 117557.