Supplementary materials

Chitosan/LDH surface-modified polyurethane carriers: enhanced biofilm formation, stability, and nitritation reactor performance

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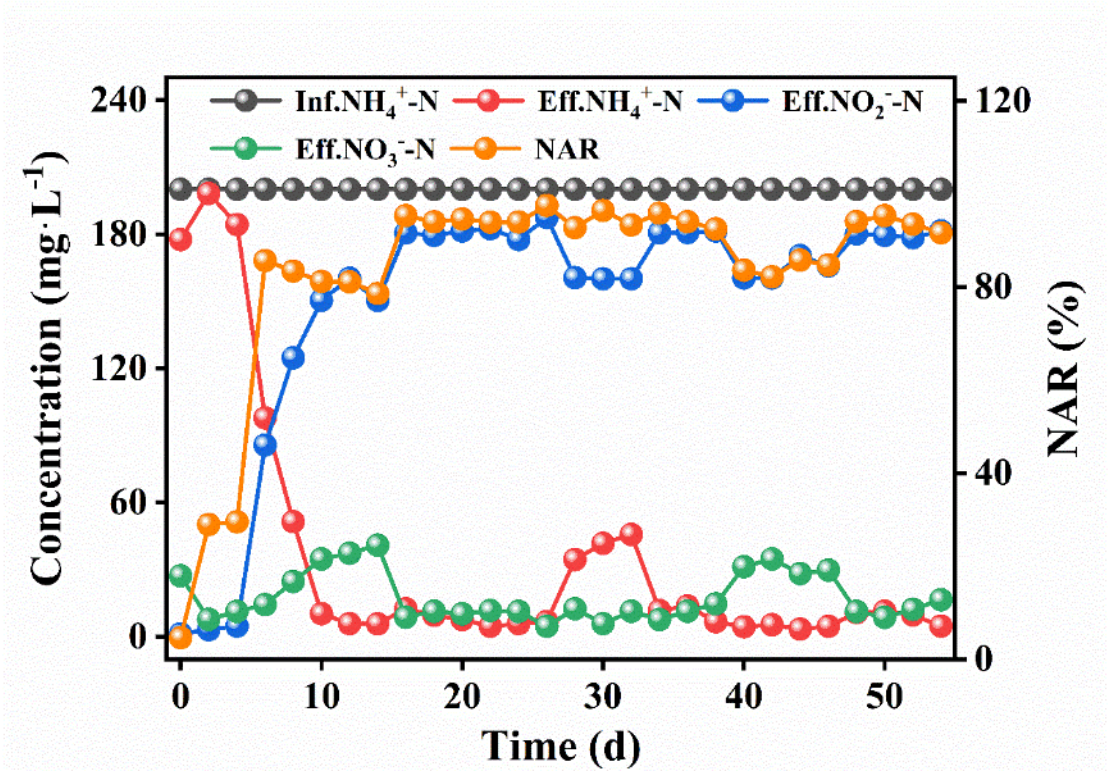

Fig. S1 Reactor operation during the biofilm growth experiment.

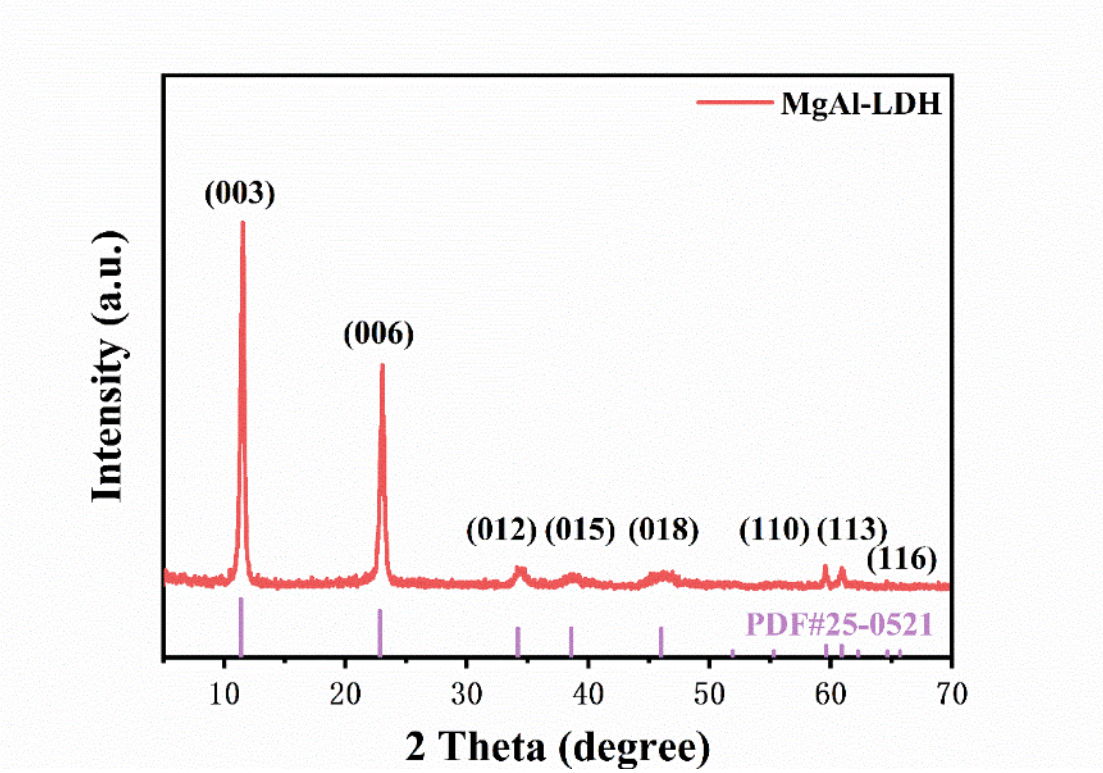

Fig. S2 XRD analysis of the synthesized LDH.

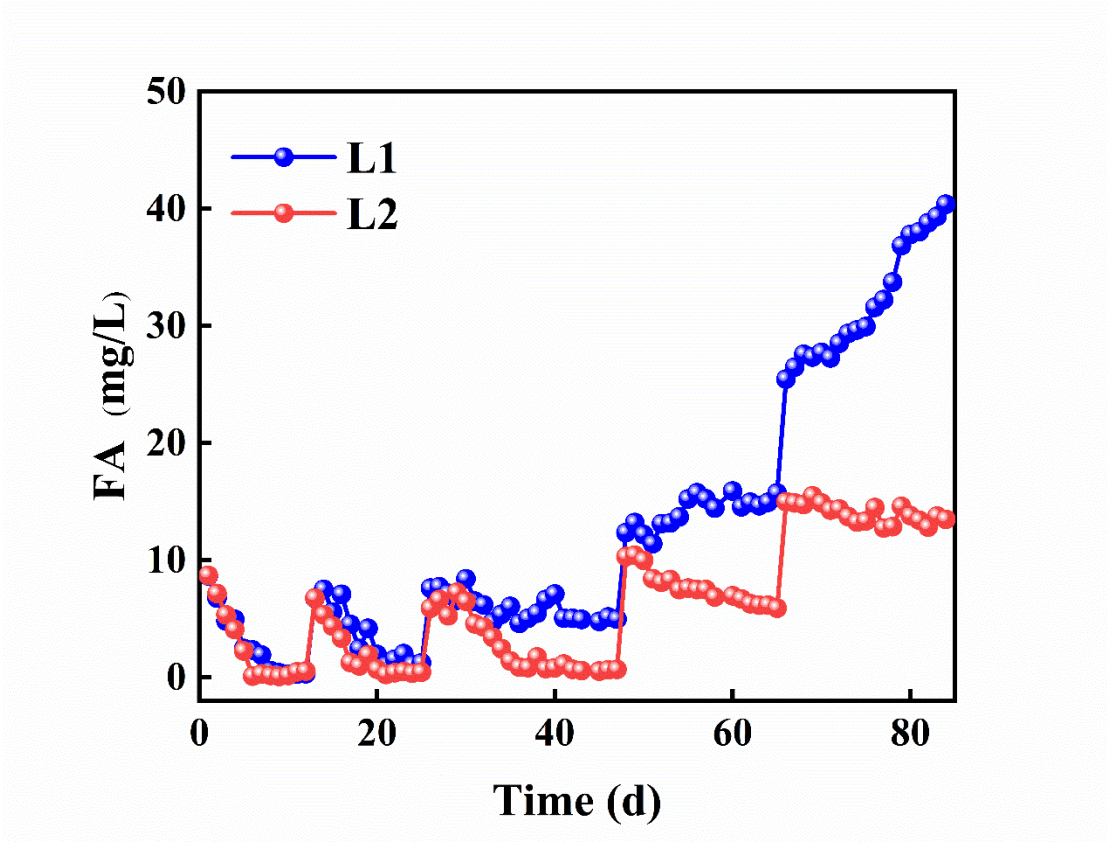

Fig. S3 Free ammonia (FA) in reactors L1 and L2.

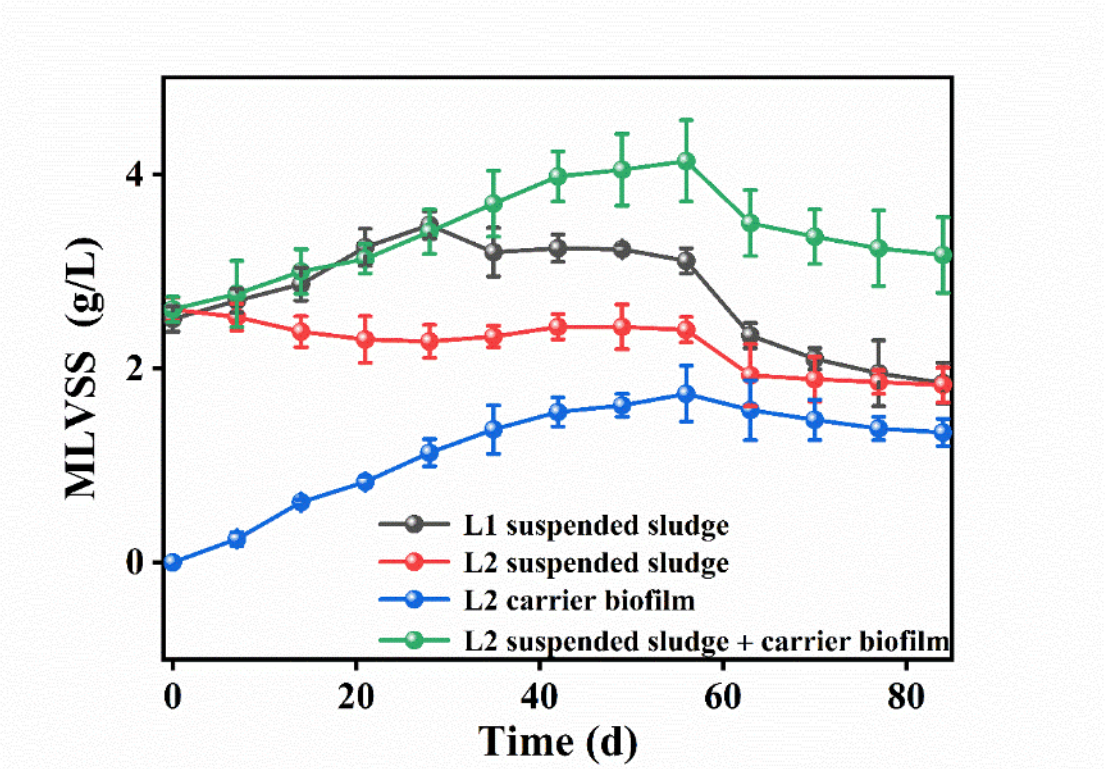

Fig. S4 MLVSS in reactors L1 and L2.

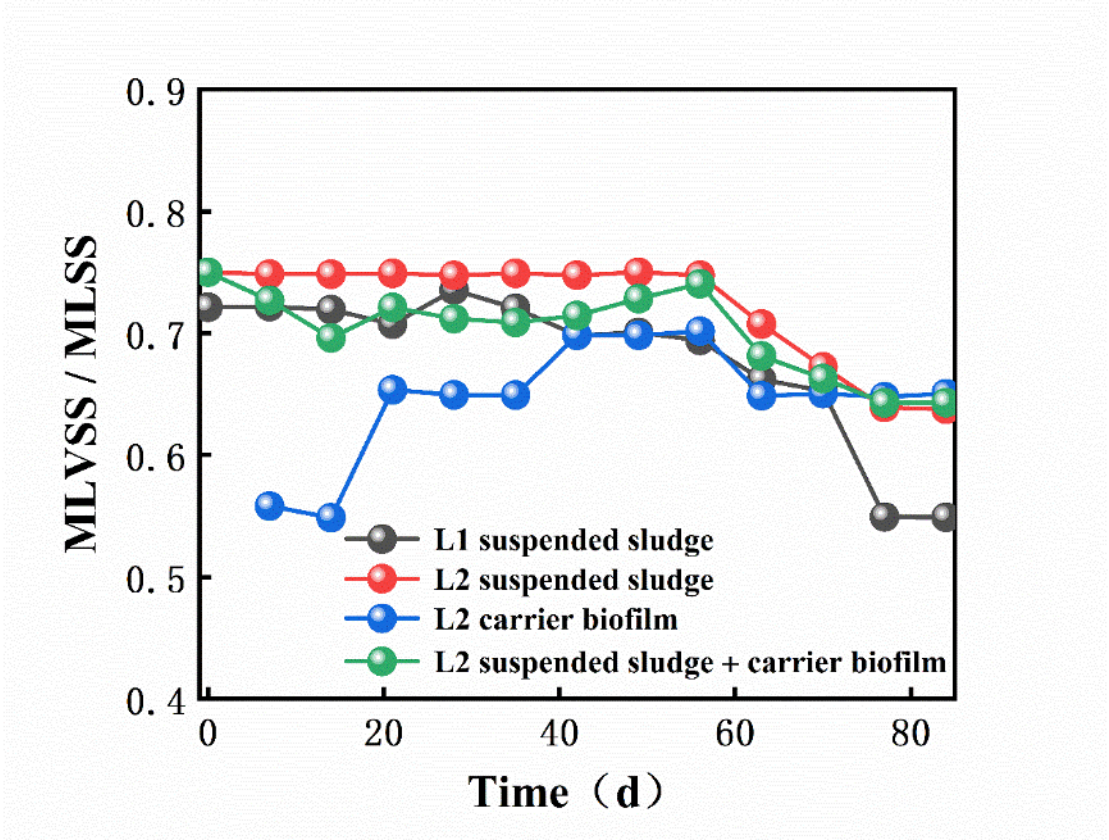

Fig. S5 MLVSS/MLSS ratio in reactors L1 and L2.

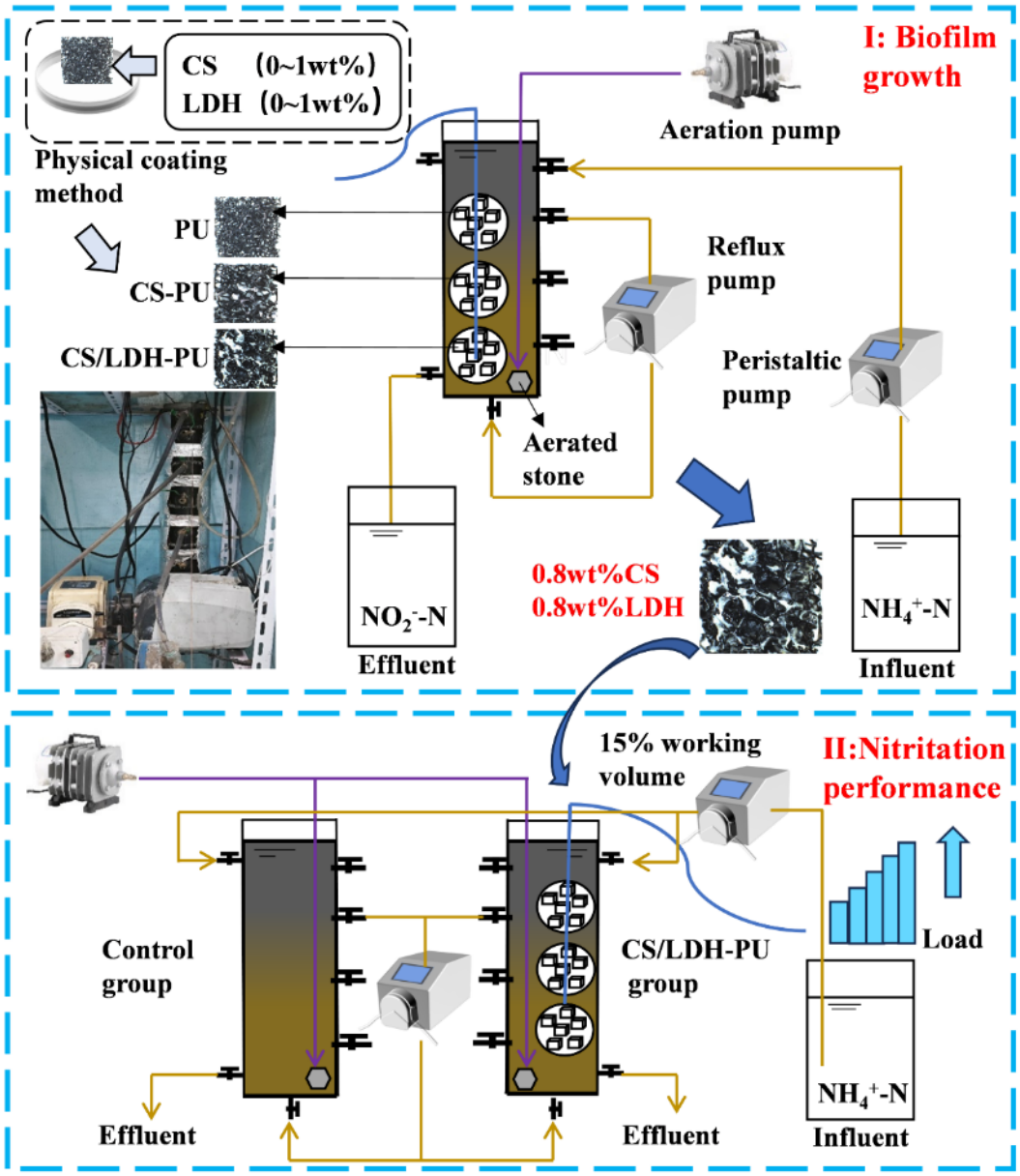

Fig. S6 Photographs of the reactor apparatus.

Table S1 Composition of Synthetic Wastewater.

Category	Reagent	Concentration	Unit	Molar Mass
Substrates	NH_4Cl	200.00-1000.00	mg N/L	53.5
Major Salts	$KHCO_3$	500.00	mg/L	100.1
	KH_2PO_4	27.20	mg/L	136.1
	$MgSO_4 \cdot 7H_2O$	300.00	mg/L	246.5
	$CaCl_2 \cdot 2H_2O$	180.00	mg/L	147.0
Trace I	EDTA	5.00	g/L	292.2
	$FeSO_4 \cdot 7H_2O$	5.00	g/L	278.0
Trace II	EDTA	15.00	g/L	292.2
	$ZnSO_4 \cdot 7H_2O$	0.43	g/L	287.5
	$CoCl_2 \cdot 6H_2O$	0.24	g/L	237.9
	$MnCl_2 \cdot 4H_2O$	0.99	g/L	197.9
	$CuSO_4 \cdot 5H_2O$	0.25	g/L	249.7
	$Na_2MoO_4 \cdot 2H_2O$	0.22	g/L	241.9
	$NiCl_2 \cdot 6H_2O$	0.19	g/L	237.7
	$Na_2SeO_4 \cdot 10H_2O$	0.21	g/L	321.0

H_3BO_3	0.01	g/L	61.8

Table S2 Preparation Ratios of Carrier Materials.

Sample	Chitosan (wt%)	LDH (wt%)
1	0	0
2	0.20	0
3	0.40	0
4	0.60	0
5	0.80	0
6	1.00	0
7	0.80	0.20
8	0.80	0.40
9	0.80	0.60
10	0.80	0.80
11	0.80	1.00

Table S3 Operating parameters for each stage of the reactor.

Stages	Time（d）	L1 and L2-inf.NH_4^+ -N (mg/L)	Objectives for each Stage
Ⅰ	0-12	200	Nitritation start-up phase
Ⅱ	13-25	400	Increase the influent ammonium load
Ⅲ	26-47	600	Investigating the ability of the reactor to cope with increasing loading
Ⅳ	48-65	800	Investigating the ability of the reactor to cope with increasing loading
Ⅴ	66-84	1000	Investigating the ability of the reactor to cope with increasing loading