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Supporting Information

Formation Mechanism of Layered Double Hydroxide Nanoscrolls by Facile Trinal-Phase Hydrothermal Treatment and Their Adsorption Properties



Fig. S1 AFM image of the LDH nanoscrolls deposited on mica from ethanol suspension. The curve is the corresponding cross-sectional data along the white line in the image.



Fig. S2 TEM micrographs of the LDH synthesized at different temperatures: (a) 100 °C; (b) 110 °C; (c) 120 °C and (d) their corresponding XRD patterns.



Fig. S3 SEM image of the LDH nanoscrolls synthesized at 110 °C for 12 h.



Fig. S4 TEM micrograph of the LDH synthesized using the SDS as the surfactant in microemulsion.

Table S1. Kinetic parameters of MO (300 mg/L at time zero) on LDH adsorbents at 30 °C.

Samples Parameters	Nanosheets	Nanoscrolls
First-Order		
q _e (mg/g)	283.66	439.37
k ₁ (/min)	0.092	0.149
R ²	0.9407	0.9856
Second-Order		
q _e (mg/g)	309.16	463.36
k ₂ (g/(mg·min))	0.00047	0.00067
R ²	0.9870	0.9981
Elovich		
α (mg/g)	1958.67	2433328.10
β (g·min/mg)	0.0312	0.364
R ²	0.9958	0.9923

In Table S1, q_e is the equilibrium sorption capacity, k_1 and k_2 are the pseudo-firstorder rate constant and pseudo-second-order rate constant, respectively, and α and β are the initial adsorption rate and the desorption constant, respectively.

Samples Parameters	Nanosheets	Nanoscrolls
Langmuir model		
OMAX (mg/g)	347.11	1153.94
Kr (L/mg)	0.072	0.065
\mathbb{R}^2	0.9646	0.9877
Freundlich model		
$K_{\mathbb{F}}(mg/g\cdot(L/mg)^{1/n})$	62.96	193.63
1/n	0.357	0.337
R ²	0.9693	0.9741

Table. S2 Adsorption isotherm parameters of methyl orange dye on LDH adsorbents at 30 °C.

In Table S2, Q_{MAX} is the maximum adsorption capacity, K_L is the constant related to the free energy of adsorption, K_F is the Treundlich isotherm constant and the 1/n is the adsorption intensity.