Supporting Information

Hierarchical Co-Fe LDH rope-like nanostructure: facile preparation from hexagonal lyotropic liquid crystals and intrinsic oxidase-like catalytic activity

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Experimental details of the preparation of LLC-LDH (*R*=3, *V*=4):

For the preparation of LLC-LDH, 3.0 g lyotropic liquid crystal sample was constructed. As the concentration of the surfactant in the reaction medium was selected as 48 wt%, 1.44 g Triton X-100 and 1.56 g salt solution with cations concentration of 200 mmol/L (*R*=3) were applied. After 24 hours of equilibration, 625 μl (four times of the theoretical volume needed by the cations, *V*=4) 6 wt% dilute ammonia (about 4 mol/L) was added for the coprecipitation reaction.

Table S1 Chemical composition (metals), lattice parameters for the samples with various *R* values and *t*=48 h

sample	*R*=1.5	*R* =2	*R* =3	*R* =4
d_{003} / nm	0.834	0.839	0.834	0.825
d_{006} / nm	0.399	0.394	0.396	0.396
d_{110} / nm	0.154	0.155	0.156	0.156
a / nm	0.308	0.310	0.312	0.312
c / nm	2.522	2.535	2.522	2.475
Co/Fe[a]	1.47	1.95	2.81	3.90

[a]Atomic ratio.

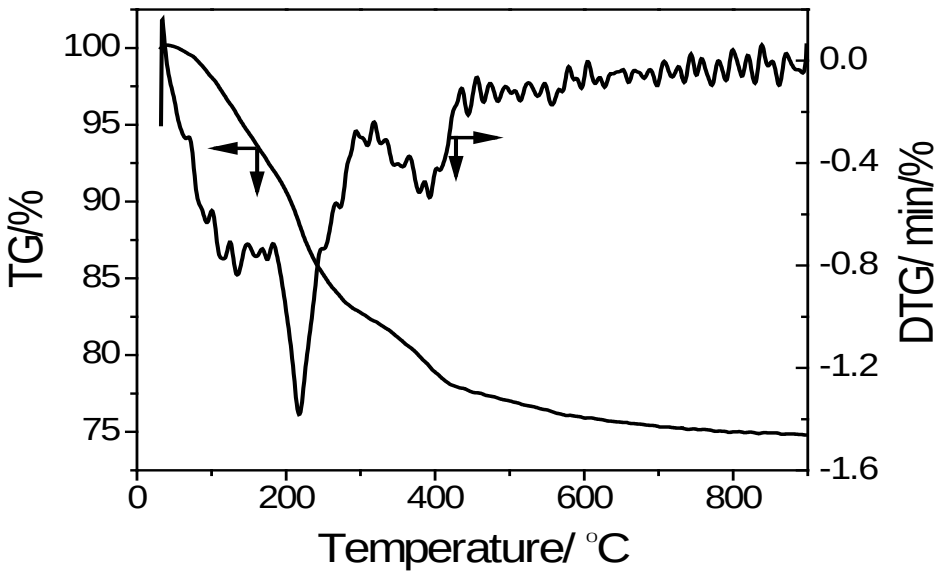


Fig. S1 TG-DTG diagram of synthesized LLC-LDH (*R*=3, *V*=4, *t*=96 h).

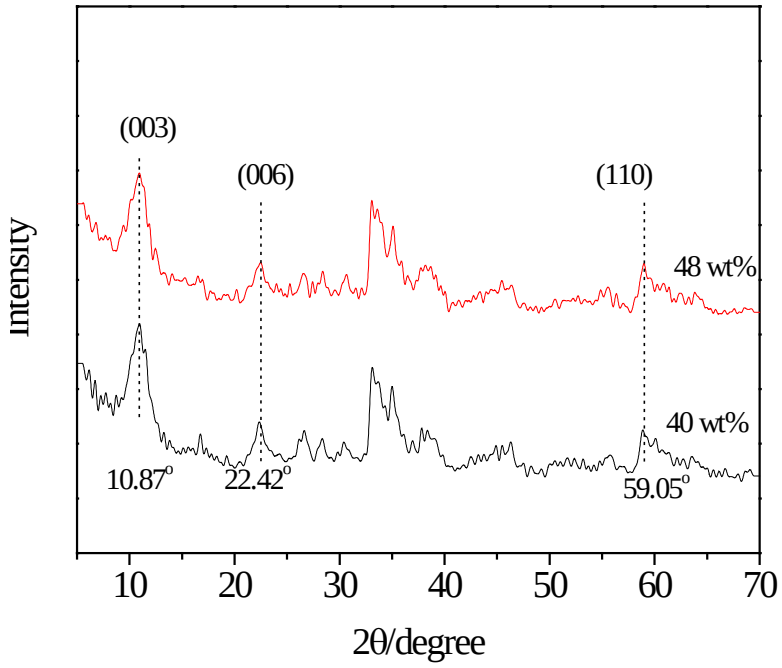


Fig. S2 XRD patterns of the LLC-LDHs prepared from hexagonal liquid crystals with surfactant concentrations of 40 wt% and 48 wt%. The reaction time was fixed at 96 h.

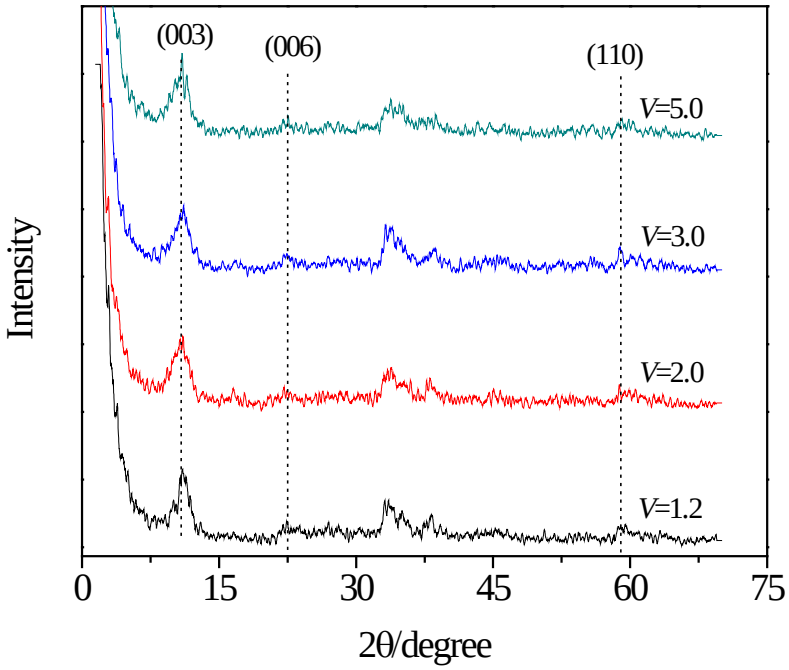


Fig. S3 XRD patterns of the LLC-LDHs prepared from hexagonal liquid crystals as the coprecipitant dosage was increased from 1.2 to 5 times of the theoretical amount (denoted as *V*=1.2, 2, 3, 4, 5). The reaction time was fixed at 48 h.

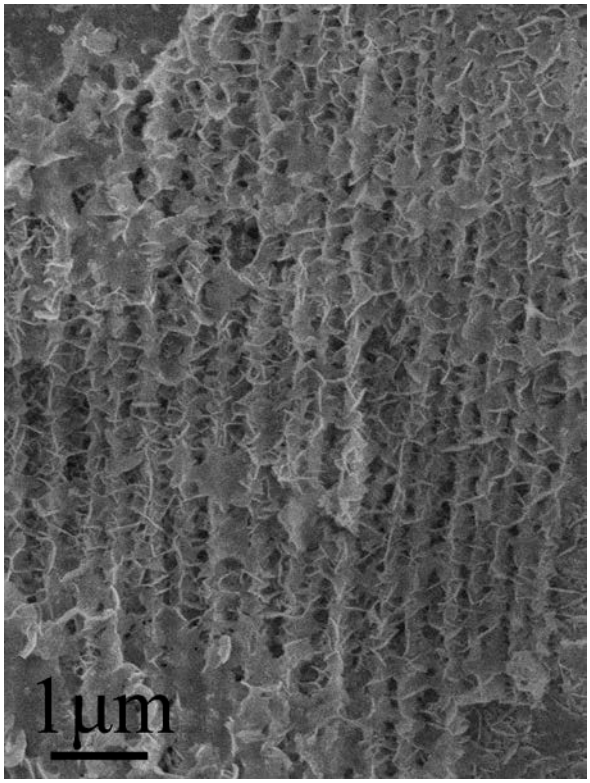


Fig. S4 SEM image of Co_3Fe LLC-LDH (V=4, t=96 h) for the evaluation of the aspect ratio of the hierarchical rope-like structure.

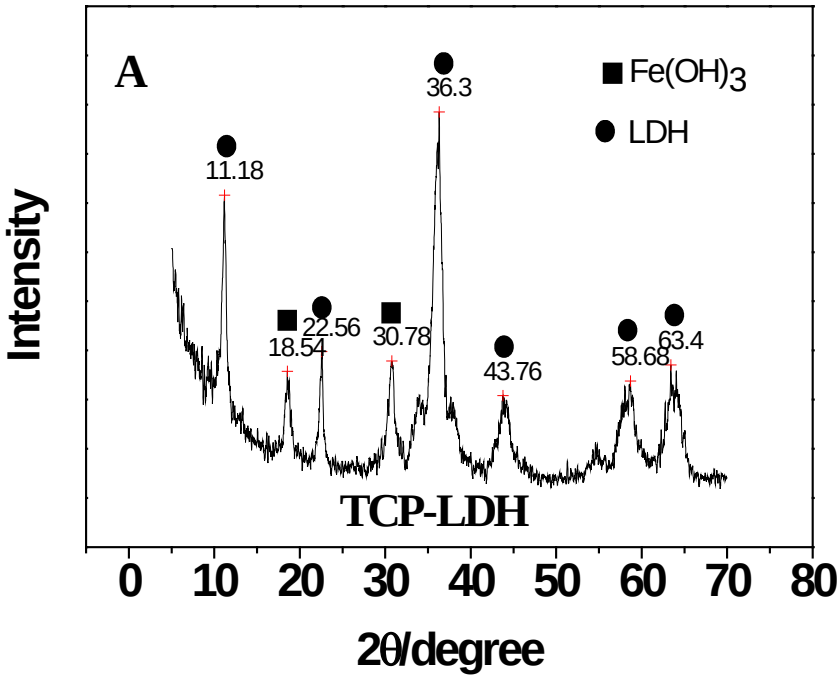
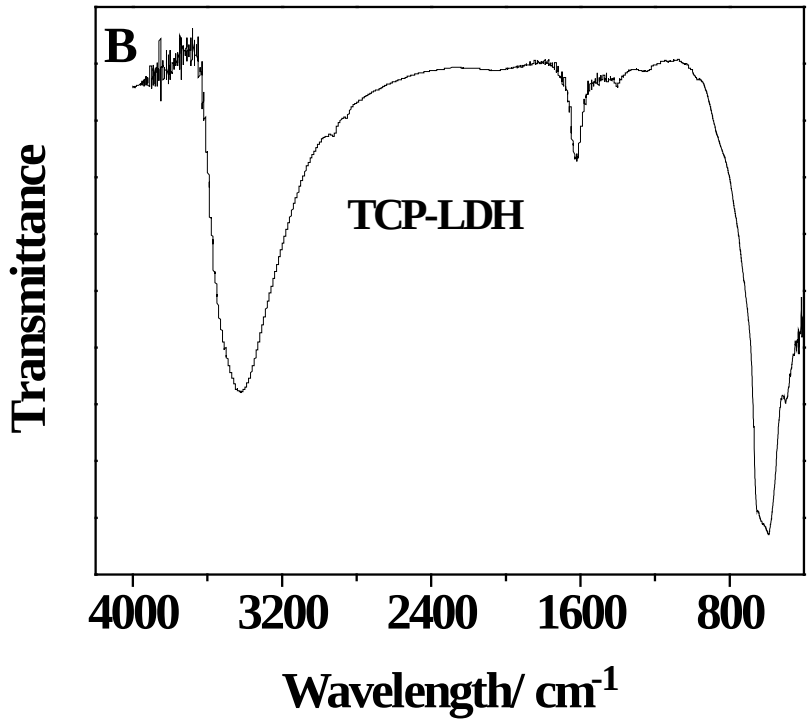


Fig. S5 XRD curve (A) and FT-IR spectrum (B) of TCP-LDH



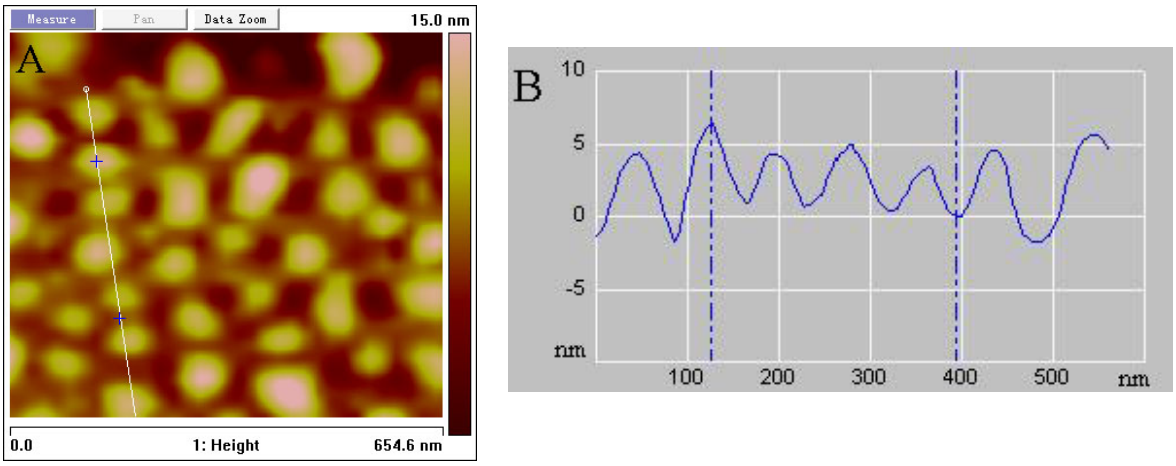


Fig. S6 Tapping-mode AFM image (A) of the prepared LLC-LDH (*R*=3, *V*=4, *t*=96 h) nanoparticles and cross sectional analysis (B)

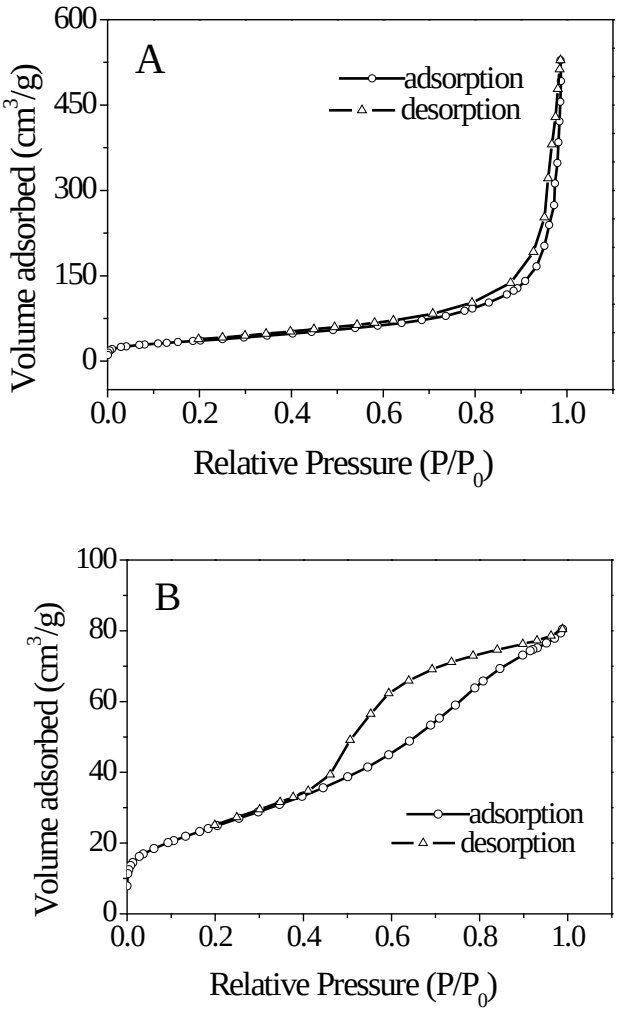


Fig. S7 N_2 adsorption-desorption isotherm of LLC-LDH (A) and TCP-LDH (B).