Supporting Information

S. P. Figure 1 The X-ray photoelectron spectroscopy (XPS) analysis of \((\text{NH}_4)_2\text{Co}_8(\text{CO}_3)_6(\text{OH})_6 \cdot 4\text{H}_2\text{O}\) nanosheet (S. P. Figure 1a) and \(\text{Co}_3\text{O}_4\) nanomesh (S. P. Figure 1b): the presence or absence of the shakeup satellite peaks is the determining factor to distinguish \((\text{NH}_4)_2\text{Co}_8(\text{CO}_3)_6(\text{OH})_6 \cdot 4\text{H}_2\text{O}\) from \(\text{Co}_3\text{O}_4\). Basically, two shakeup satellite peaks around the peaks of \(\text{Co}^{2+}\) are characteristic of pure phase of \(\text{Co}^{2+}\).
S. P. Figure 2 At the different scan rates, Co$_3$O$_4$ nanomesh exhibits very high specific capacitances of 152 to 238 F/g, though the voltage window is only ranging from 0.25 to 0.5V (S. P. Figure 5a). Similarly, very high specific capacitances are also remained under the mode of constant current densities (S. P. Figure 5b), where capacitances of above 286 F/g are available. From figure S. P. Figure 5c, we can detect that Co$_3$O$_4$ nanomesh demonstrates very good rate capability compared to other Co$_3$O$_4$ nanostructures with (111) or (100) crystal planes dominating.
S. P. Figure 3 S. P. Figure 6a and 6b are the SEM images for Co₃O₄ nanocubes and nano-octahedrons, which are prepared under the conditions as following: generally 12.5ml deionized water (D. I. water) and 12.5ml concentrated ammonia (fuming, 28wt%) are mixed homogeneously under strong magnetic stirring for 5 min. Then 5ml 1M aqueous Co(NO₃)₂ solution will be introduced into the former solution to form the final solution in brown color after another 30 min stirring. Afterwards, the solution is transferred into 45ml Teflon-lined autoclave and heated at 160-180°C for 16 hrs. The precipitates in the liner are washed with 3 times of deionized water and 1 time of ethanol by centrifugation. BET measurement is shown in figure S. P. Figure 6c to disclose the surface area of 51.86m²/g for the Co₃O₄ nanocubes and nano-octahedrons. Cyclic voltammograms (CV) and galvanostatic measurements are displayed in figure S. P. Figure 6d and 6e, respectively, to reveal the poor capacitive properties for these Co₃O₄ nanocubes and nano-octahedrons. The very low specific capacitance (S. P. Figure 6d and 6e) and poor rate capability (S. P. Figure 6f) jointly tell us the conventional crystal planes of (111) and (100) in spinel Co₃O₄ won’t show up highly expected capacitive performance. (Reprinted under permission from Tsinghua University Press and Springer-Verlag Berlin Heidelberg)
S. P. Scheme 1 A proposed schematic illustration about the function of ethylene glycol (E.G.) molecules during the preparation of lamellar (NH$_4$)$_2$Co$_8$(CO$_3$)$_6$(OH)$_6$·4H$_2$O nanosheet: generally E.G. molecules will play the similar part as other organic molecules to separate and isolate the (NH$_4$)$_2$Co$_8$(CO$_3$)$_6$(OH)$_6$·4H$_2$O layers through the intercalation process by hydrogen bonding action, which is a common property for layered double-metal hydroxides (LDHs).