

## Supporting Information Figures:

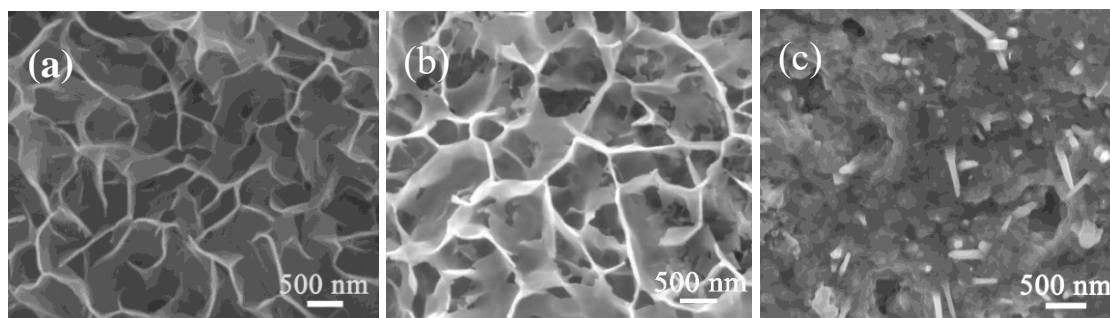


Figure S1. SEM images of (a) FeNi(OH/P)-0, (b) FeNi(OH/P)-0.6 and (c) FeNi(OH/P)-1.8, respectively.

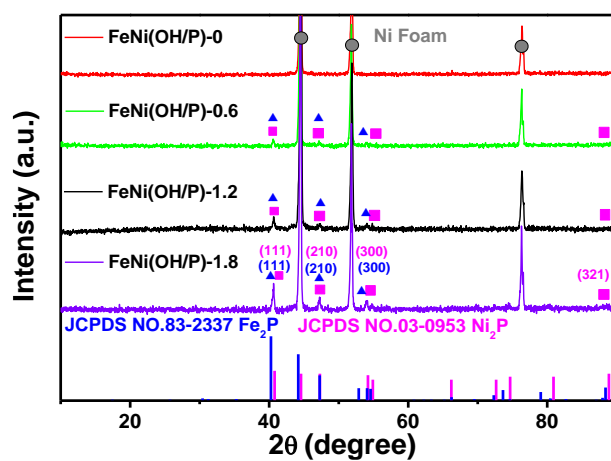


Figure S2. Comparison of XRD pattern for FeNi(OH/P) with different amount of  $\text{NaH}_2\text{PO}_4$ .

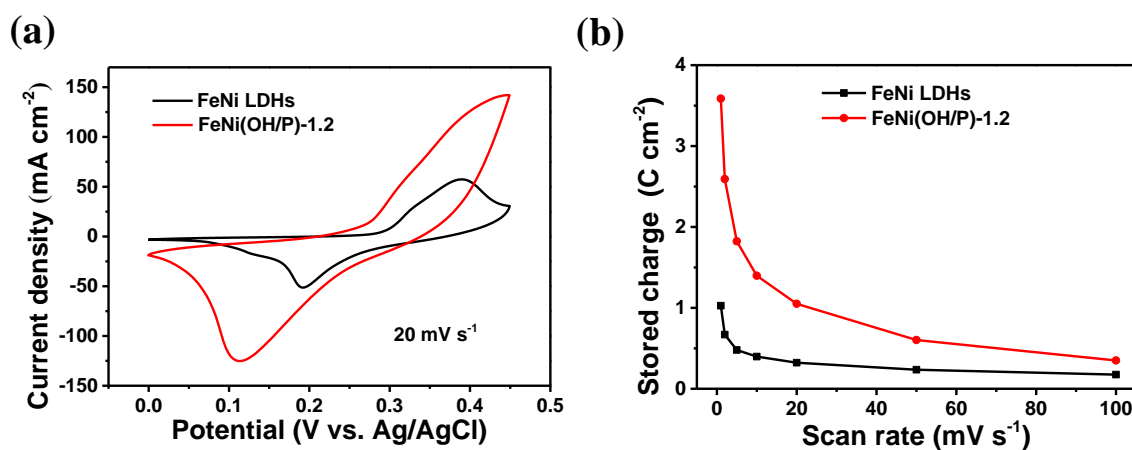
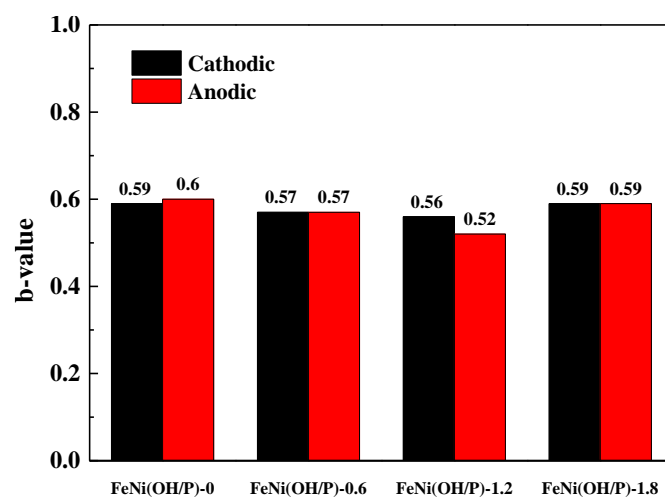
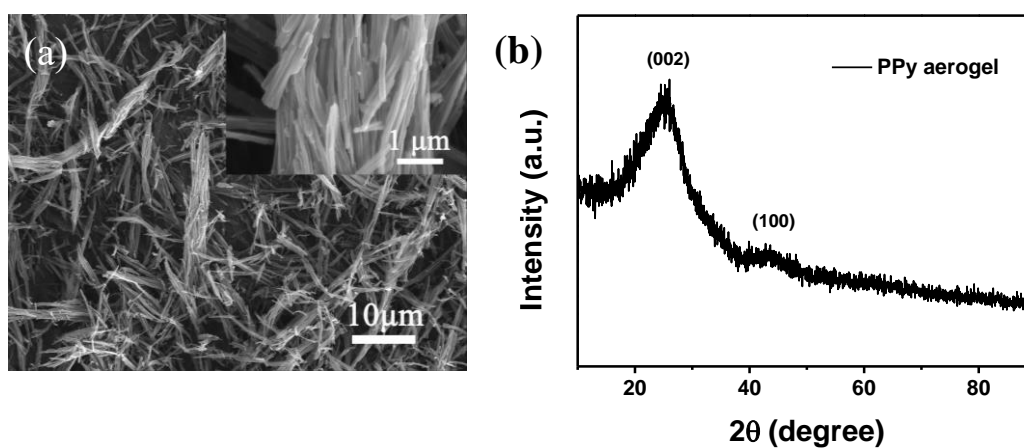


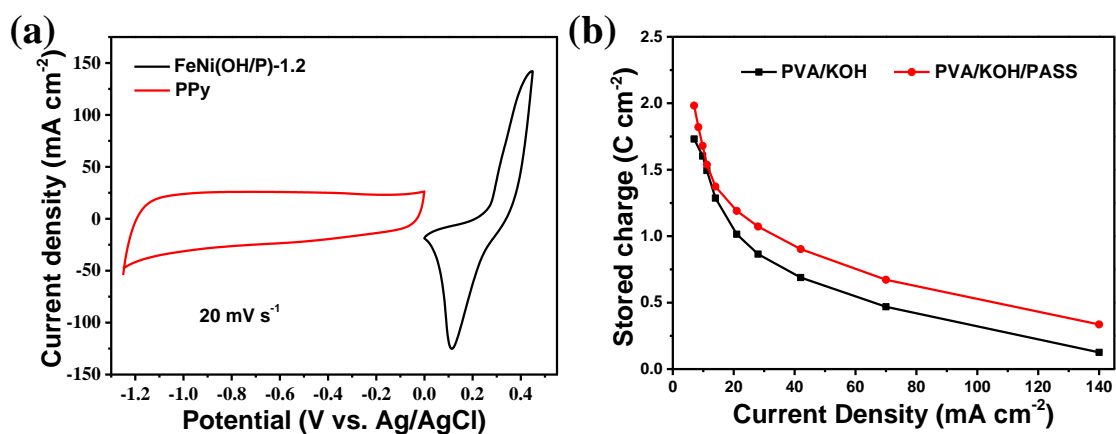
Figure S3. Comparison of (a) CV curves and (b) rate performance of FeNi LDHs and FeNi(OH/P) electrode.



**Figure S4.** The value of b for FeNi(OH/P) electrodes with different amount of  $\text{NaH}_2\text{PO}_2$ , respectively.



**Figure S5.** (a) SEM images and (b) XRD pattern of the PPy/C. Inset of (a) shows SEM image of the PPy/C under high magnifications.



**Figure S6.** (a) CV curves of FeNi(OH/P) cathode and PPy anode performed in 3 M KOH. (b) Comparison of rate performance capacity for FeNi(OH/P)//PPy HSC with different electrolyte.