Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supplementary data

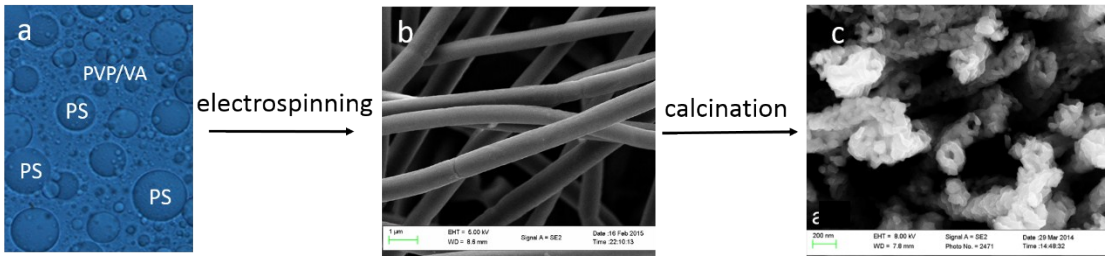

Fig. S1 Procedure for preparing tubular V2O5 templates. (a) Emulsion of the PS-(PVP/VA) mixture. (b) PS-(PVP/VA) nanofiber. (c) Tubular V2O5 templates.

Figure S1 shows the preparation procedure of the PS-(PVP/VA) nanofiber. Briefly, VA and PVP were first dissolved in DMF. At the same time, PS was dissolved in DMF. After mixing PS into PVP-VA solution, emulsion was formed in the mixture as shown in Figure S1a. After electrospinning, PS-(PVP/VA) fiber was obtained (Figure S1b). Hollow V_2O_5 templates were further obtained after calcination of the PS-(PVP/VA) core-shell fiber to convert VA to V_2O_5 (Figure 1c). Although core-shell structure of PS-(PVP/VA) fiber was not be able to be observed under SEM and TEM, core-shell structure was believed for PS-(PVP/VA) fiber based on the following reasons:

- Phase separation was obtained after mixing PS with PVP/VA solution before electrospinning.
- The precursor of V_2O_5 was only dissolved in the PVP/VA phase of the emulsion and tubular V_2O_5 template was obtained after calcination.

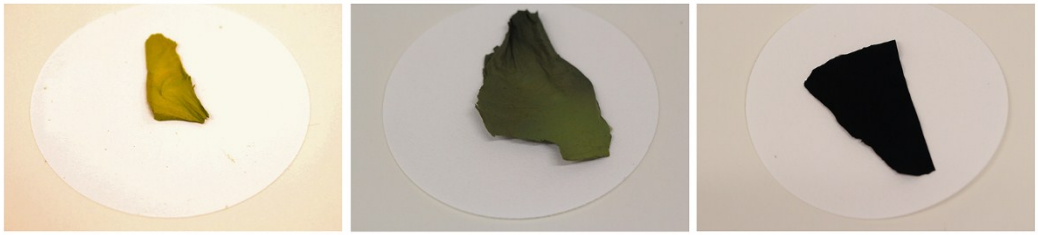

Fig. S2 Yellow V_2O_5 templates turn black after polymerization of PPy.

Solvent	Sorption Const.	Monolayer Capacity [mMol/g]	BET Specific Surface Area [m^2/g]	R^2
OCTANE	11.38524259	0.12626934	47.90594552	0.999847816

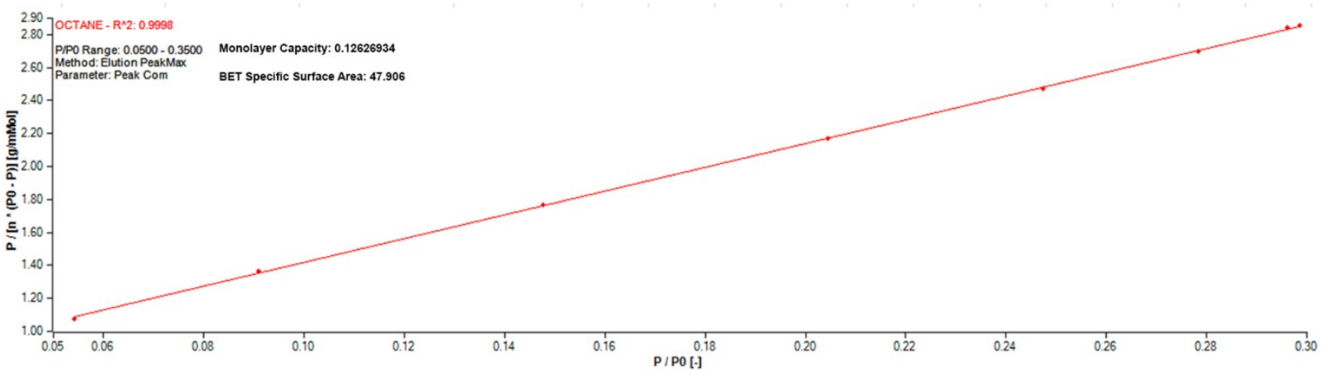

Fig. S3 BET results & plot of capsular PPy-HNFs using points collected at the pressure range 0.05 to 0.30.

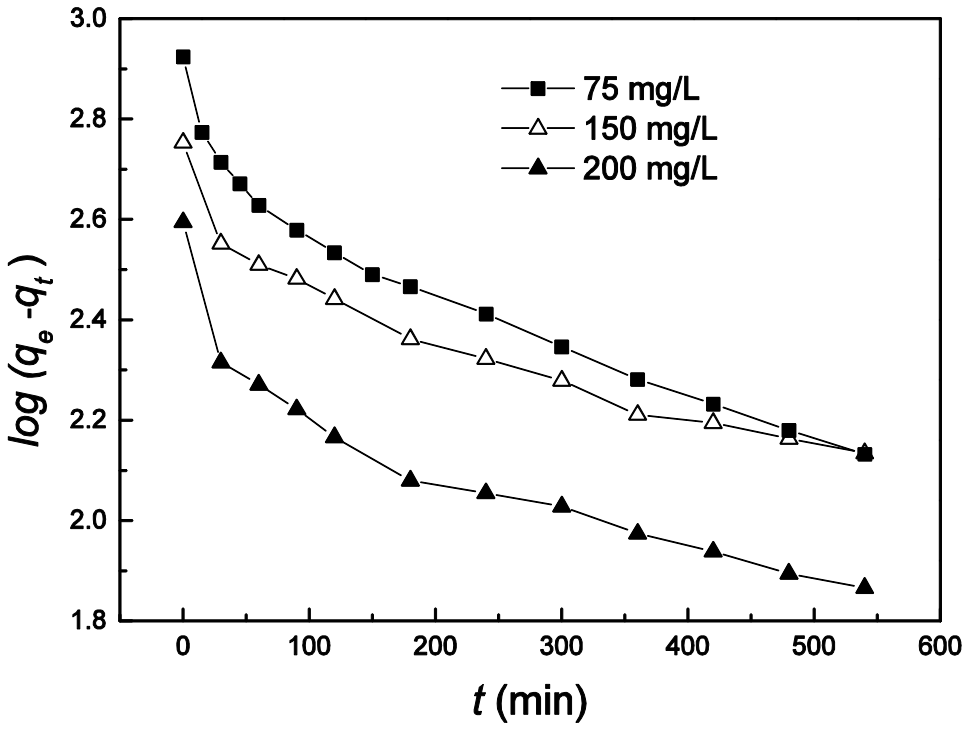

Fig. S4 Pseudo-first-order kinetic model for the adsorption of Cr (VI) on capsular PPy-HNFs.

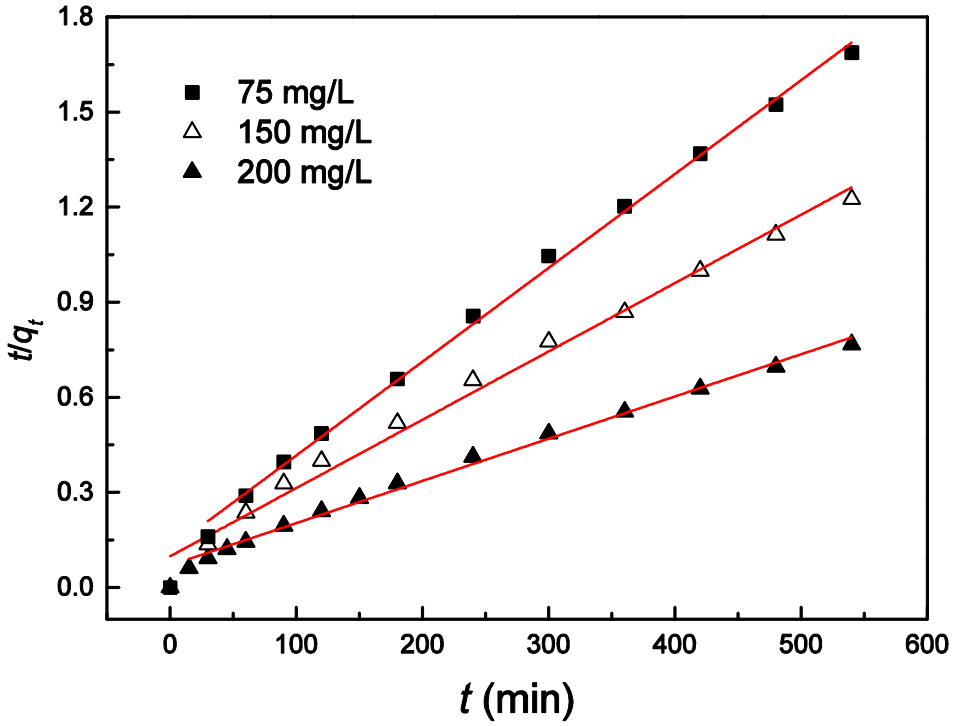

Fig. S5 Pseudo-second-order kinetic model for adsorption Cr (VI) on capsular PPy-HNFs.

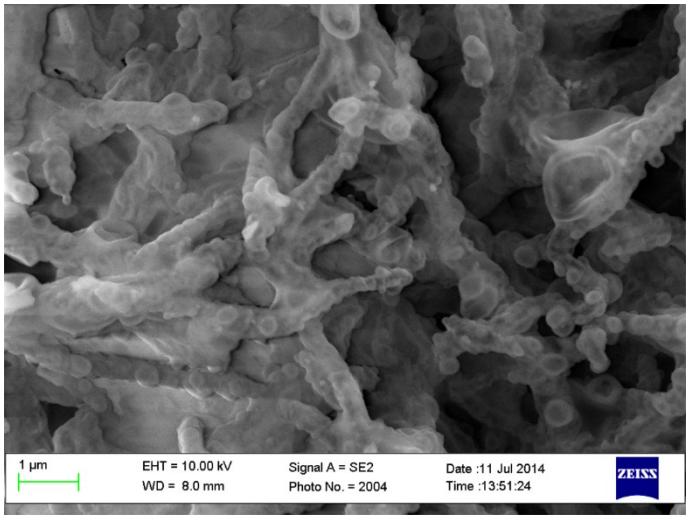

Fig. S6 SEM image of structural collapse of PPy-HNFs in concentrated alkaline solution.

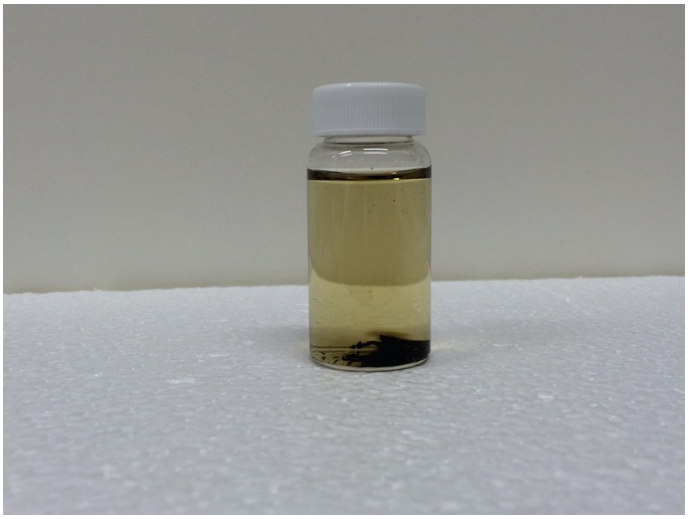

Fig. S7 Typical photograph of partially dissolved capsular PPy-HNFs in concentrated alkaline solution.

ICP-ES results for confirmatory experiments:

The confirmatory experiments for chromium removal were done with an inductively coupled plasma–optical emission spectrometer (ICP-ES, Varian 715-ES, Agilent Technologies, CA, USA). The adsorption was carried out at Cr (VI) concentration of 200 ppm and pH=2.The initial concentration of Cr (VI) solution was found to be 212.2 ppm at emission wavelength of 267.7 nm, which was 200 ppm in the UV test. After the adsorption for 24 h, the equilibrium adsorption capacity of 830.4 mg/g was observed by ICP, which is very close to the adsorption capacity (q_e) of 839.3 mg/g based on UV testing. The adsorption capacity during Cr adsorption process was further confirmed by ICP-ES and the results are displayed in Figure S8. The adsorption curve obtained from ICP-ES is consistent with that from UV testing based on some feature points.

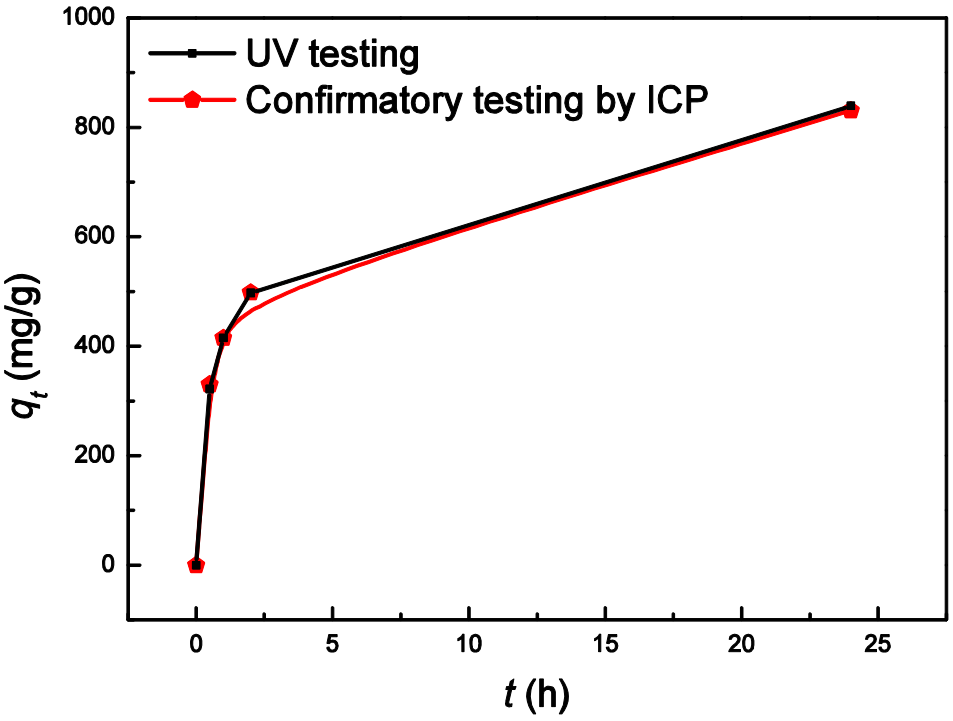

Fig. S8 Comparison of ICP-ES & UV testing results