Electronic Supplementary Information of

Rationally Engineered Surface Properites of Carbon Nanofibers on the Enhanced Supercapacitive Performance of Binary Metal Oxide

Ji Hoon Kim[a], Chang Hyo Kim[a], Hyeonseok Yoon[a,b], Je Sung Youm[b], Yong Chae Jung[c], Christopher E. Bunker[d], Yoong Ahm Kim[a, b,*], Kap Seung Yang[a,b2,**]

[1]*Department of Polymer Engineering, Graduate School, Chonnam National University, 77 Yongbong-ro, Buk-gu, Gwangju 500-757, Republic of Korea*
[2]*Alan G. MacDiarmid Energy Research Institute and School of Polymer Science and Engineering, Chonnam National University, 77 Yongbong-ro, Buk-gu, Gwangju 500-757, Republic of Korea*
[3]*Institute of Advanced Composite Materials, Korea Institute of Science and Technology (KIST), Chudon-ro 92, Bongdong-eup, Wanju-gun, Jeonbuk 565-905, Republic of Korea*
[4]*Air Force Research Laboratory, Propulsion Directorate, Wright-Patterson Air Force Base, Ohio 45433-7103, USA*
*(*yak@jnu.ac.kr; **ksyang@jnu.ac.kr)*

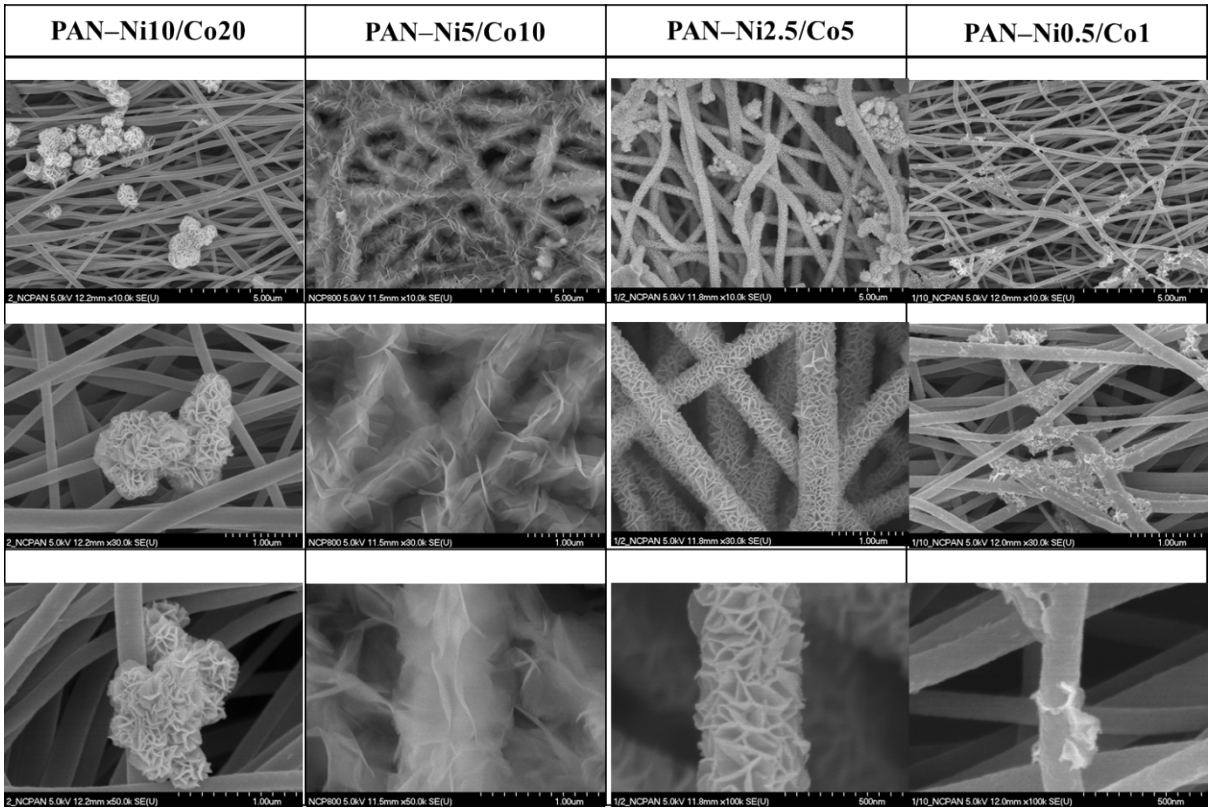
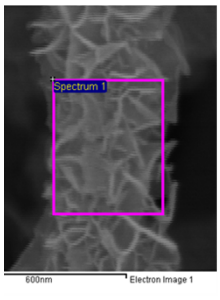
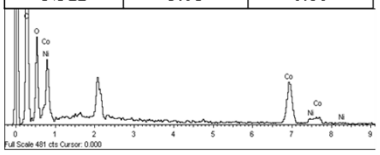


Figure S1 FE-SEM images of binary metal oxides-decorated carbon nanofibers as a function of the added amount of nickel and cobalt reagents.

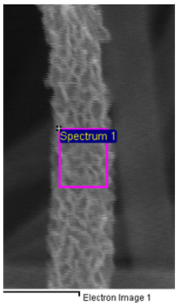
(a) PAN1000-Ni2.5/Co5



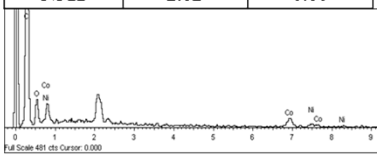
Element	Weight%	Atomic%
C K	50.83	70.70
O K	20.19	21.08
Co K	25.97	7.36
Ni K	3.01	0.86



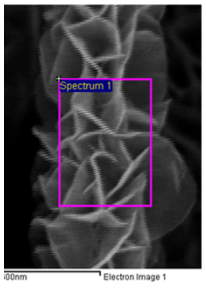
(b) PAN/pitch1000-Ni2.5Co5



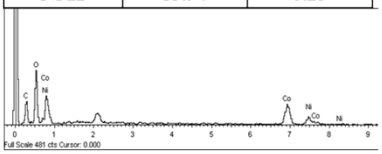
Element	Weight%	Atomic%
C K	77.88	87.21
O K	12.64	10.63
Co K	6.86	1.57
Ni K	2.62	0.60



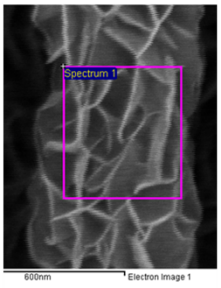
(c) PAN1000-Ni5/Co10



Element	Weight%	Atomic%
C K	21.62	41.39
O K	26.84	38.51
Co K	35.57	13.86
Ni K	15.94	6.23



(d) PAN/pitch1000-Ni5/Co10



Element	Weight%	Atomic%
C K	52.09	70.64
O K	21.72	22.11
Co K	18.72	5.17
Ni K	7.46	2.07

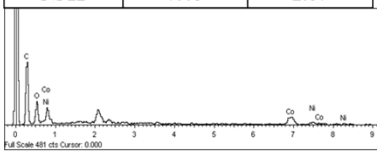
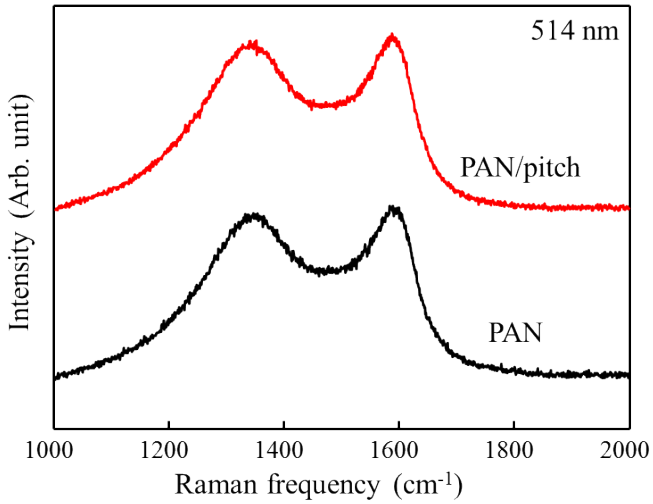


Figure S2 SEM-EDX analysis results of binary metal oxides-decorated carbon nanofibers at different amount of nickel and cobalt reagents.



I.D.	D band (cm^{-1})		G-band (cm^{-1})		I_D/I_G
	Position	HWHM	Position	HWHM	
PAN	1345.81	110.73	1583.16	87.42	1.29
PAN/pitch	1351.36	105.82	1586.71	92.61	1.28

Figure S3 Raman spectra and factors of PAN- and PAN/pitch-derived carbon fibers, respectively.

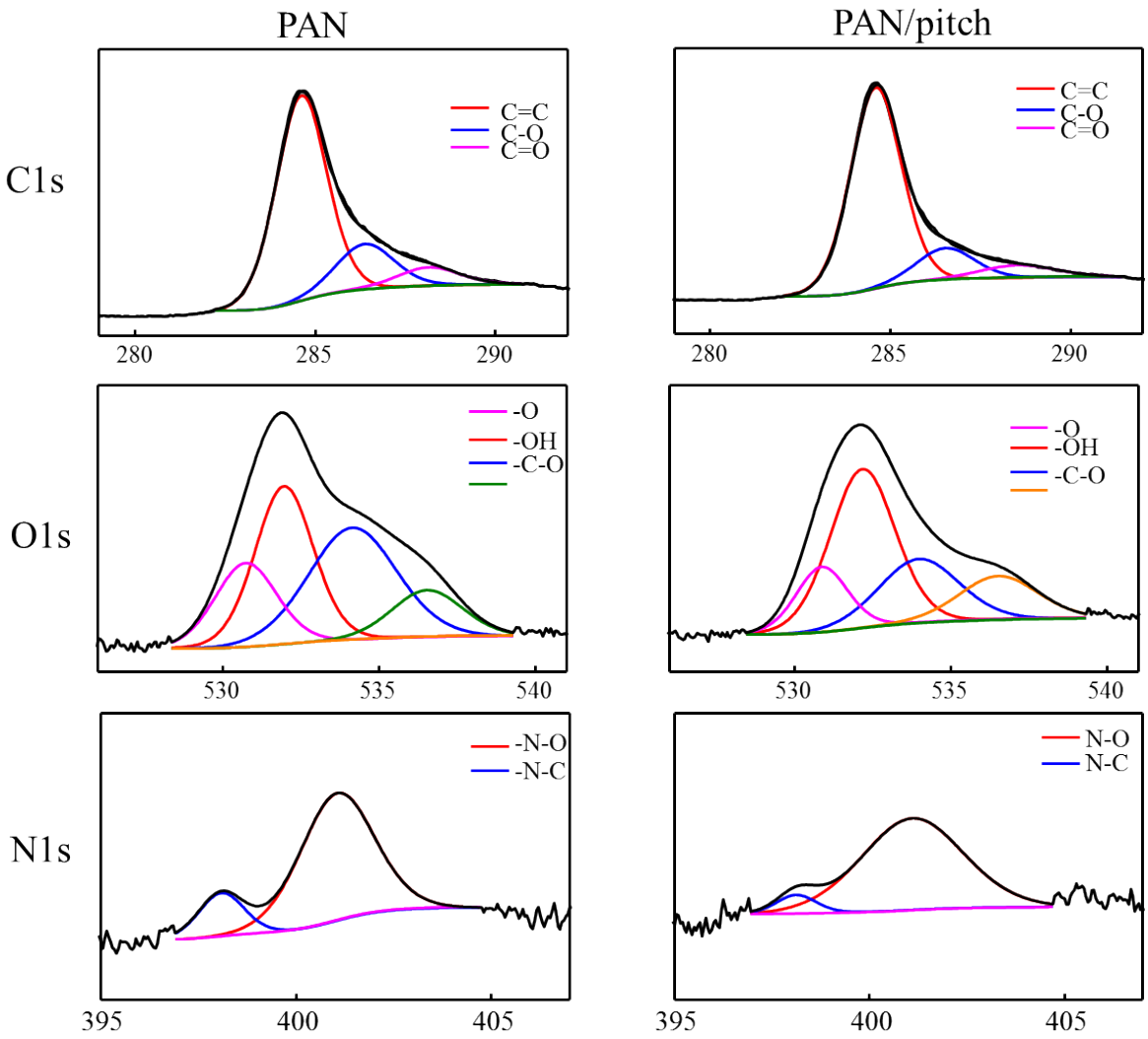


Figure S4 Detailed C 1s, O 1s and N 1s XPS spectra of PAN- and PAN/pitch-derived carbon nanofibers, respectively.

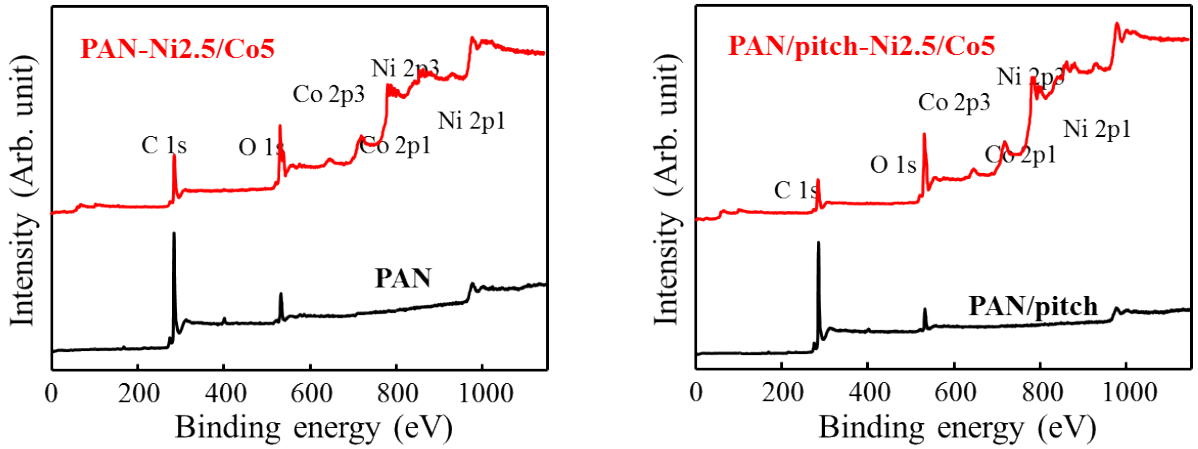


Figure S5 Wide-scan XPS spectra of pristine carbon nanofibers and metal oxide-decorated ca rbon nanofibers, respectively.