

Supporting Information

## Sequentially Coated Wavy Nanowire Composite

## Transparent Electrode for Stretchable Solar Cells

*Hyun Jeong Kwon<sup>‡</sup>, Geon-U Kim<sup>‡</sup>, Chulhee Lim, Jai Kyeong Kim, Sang-Soo Lee, Jinhan*

*Cho, Hyung-Jun Koo, Bumjoon J. Kim\*, Kookheon Char\*, Jeong Gon Son\**

H. J. Kwon, J. K. Kim, S.-S. Lee, Dr. J. G. Son  
Soft Hybrid Materials Research Center, Korea Institute of Science and Technology, Seoul  
02792, Republic of Korea  
E-mail: [jgson@kist.re.kr](mailto:jgson@kist.re.kr),

H. J. Kwon, Prof. K. Char  
School of Chemical and Biological Engineering, Seoul National University, Seoul 08826,  
Republic of Korea  
E-mail: [khchar@snu.ac.kr](mailto:khchar@snu.ac.kr),

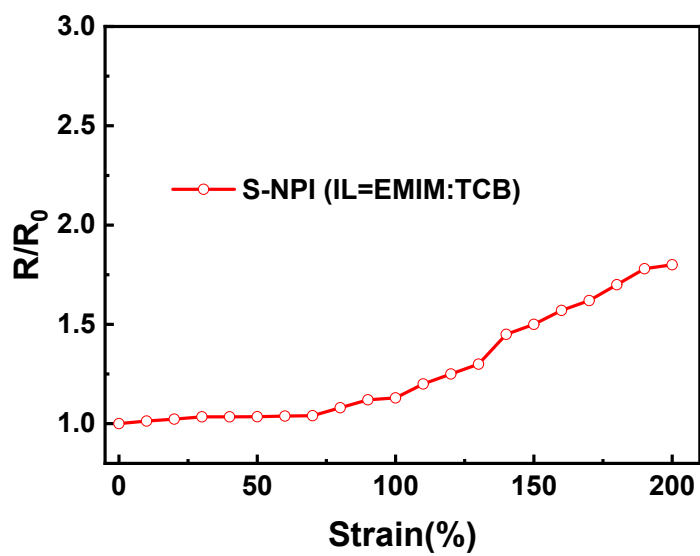
G.-U Kim, C. Lim, Prof. B. J. Kim  
Department of Chemical and Biomolecular Engineering, Korea Advanced Institute of  
Science and Technology (KAIST), Daejeon 34141, Republic of Korea  
E-mail: [bumjoonkim@kaist.ac.kr](mailto:bumjoonkim@kaist.ac.kr),

Prof. J. Cho  
Department of Chemical & Biological Engineering, Korea University, Seoul 02841, Republic  
of Korea;

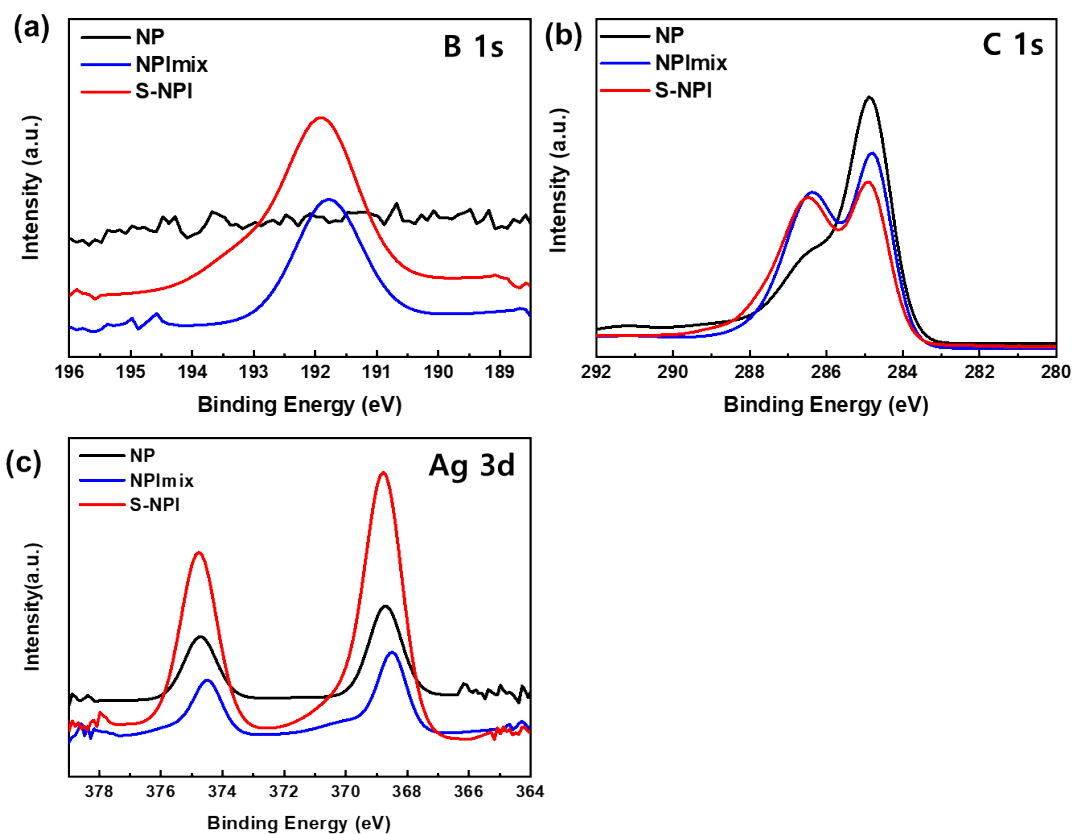
Prof. J. Cho, Prof. J. G. Son  
KU-KIST Graduate School of Converging Science and Technology, Korea University, Seoul  
02841, Republic of Korea

Prof. H.-J. Koo  
Department of Chemical & Biomolecular Engineering, Seoul National University of Science  
& Technology

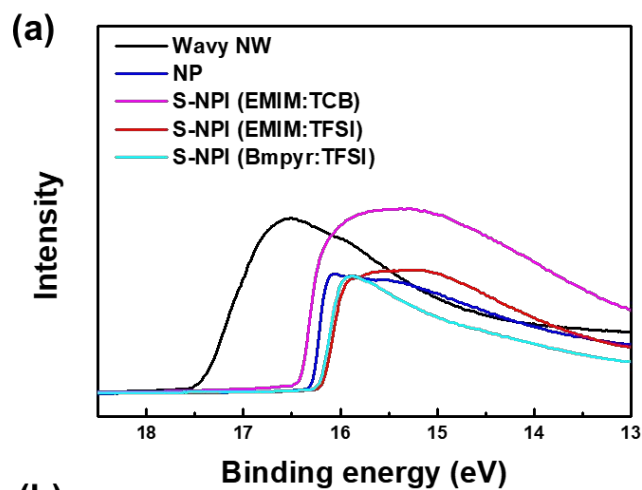
<sup>‡</sup>These authors contributed equally to this work.



**Figure S1.** Performance of the PEDOT:PSS/EMIM:TCB sequentially introduced wavy nanowire network after thermal annealing at 60 °C for 1 hr under the change in resistance according to uniaxial tensile strains.



**Figure S2.** (a) B 1s, (b) C 1s, (c) Ag 3d XPS spectra of pure PEDOT:PSS coated nanowire network, PEDOT:PSS and ionic liquid mixed composite films, and sequentially coated nanowire/PEDOT:PSS/ionic liquid composite film.



(b)

He1 (21.2eV)	ITO glass	Wavy NW	NP	S-NPI (IL=EMIM:TCB)	S-NPI (IL=EMIM:TFSI)	S-NPI (IL=Bmpyr:TFSI)
Work function (eV)	4.7-5.1	3.97	4.97	4.85	5.11	5.09

**Figure S3.** (a) UPS spectra of nanocomposite films according to various ionic liquids.

(b) Tunable work function of nanocomposite at different Ionic liquids.

**Table S1.** Device structures and mechanical and photovoltaic performances of reported AgNW-based SOSCs.

Year	Device structure	Active Layer	PCE (%)	Stretchability	Ref.
2017	PUA-AgNW/ SWNT/PEDOT:PSS/ Active Layer/ PEIE/SWNT/ AgNW-PUA	PTB7-Th: PC <sub>71</sub> BM	2.90	74% PCE retention at 100% strain	53
2021	PET/AgNW/ PEDOT:PSS/Active Layer/EGaIn	P3HT:PC <sub>61</sub> BM	2.51	33% PCE retention at 37% strain	62
		P3HT: BCP:PC <sub>61</sub> BM, (1:0.05:0.9)	4.03	60% PCE retention at 37% strain	
2021	TPU/AgNW/ PEDOT:PSS/Active Layer/EGaIn	PTB7-Th: IEICO-4F	10.1	73% PCE retention at 20% strain/ 47% PCE retention after 300 cycles at 20% strain	50
2022	TPU/S-NPI/ PEDOT:PSS/Active layer/PNDIT-F3N-Br /EGaIn	PM6-OEG5:Y6- BO:N2200 (1:1:0.2)	11.3	89% PCE retention at 20% strain	This work