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Supporting Information

Fabrication of High Performance Printed Flexible Conductors by Doping of Polyaniline Nanomaterials into Silver Paste

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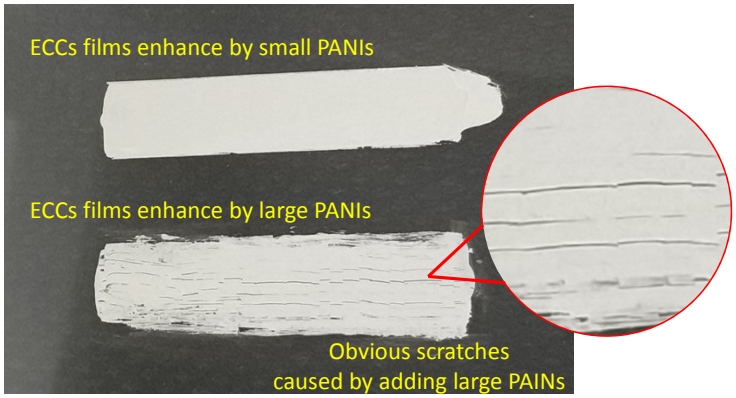

Fig. S1 Photograph of conductive films enhanced by PANIs with different size. Filming process always failed when adding large block of PANIs (Fig. 2a). Even conductive film was usually easily prepared when nano-structured well-dispersed PANIs (Fig. 2b) added into ECCs.

Table S1 Comparison of the viscosity of PECCs with different amounts of PANIs.

Composition of PECCs	Viscosity at 25°C (cP)
65wt% silver-filled TPU pastes	440
65wt% silver-filled TPU pastes + 0.5wt%PANIs	430
65wt% silver-filled TPU pastes + 1.0wt%PANIs	430
65wt% silver-filled TPU pastes + 1.5wt%PANIs	431

Four other kinds of PANIs with different micro-structure were synthesized to study the influence of morphology on electrical property. Fig. S2 shows the morphologies of PANIs prepared with different concentrations of PVP K30. The dosage of PVP is 8 mmol, 4 mmol, 2 mmol and 0.5 mmol respectively, which is 6 mmol in the main article. Higher PVP concentrations contributed to smaller particles with better dispersity.

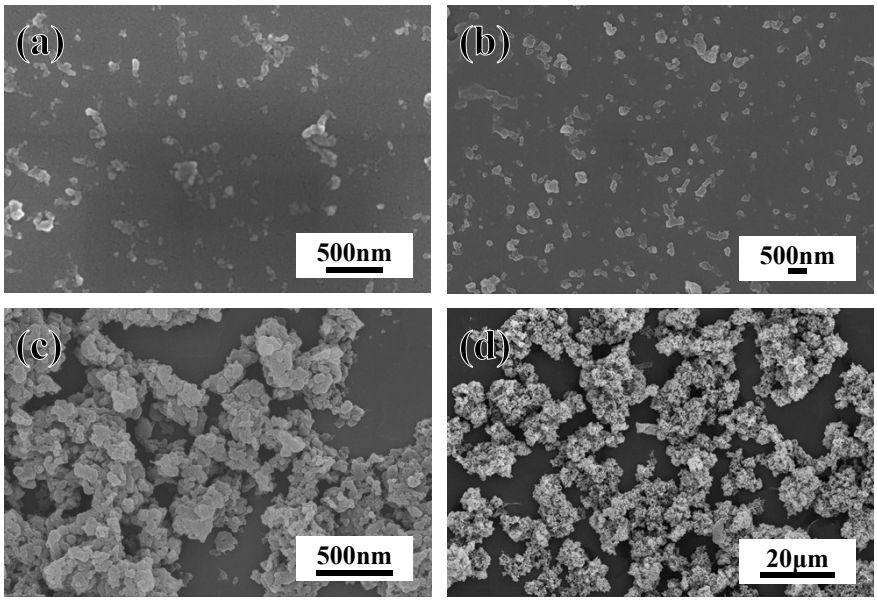

Fig. S2 SEM images of the PPy NPs synthesized with PVP K30 dosage of (a) 8 mmol, (b) 4 mmol, (c) 2 mmol and (d) 0.5 mmol.

Those four kinds of PANI materials (0.5 wt%) with different structure were filled into 65 wt% silver-filled PU-based ECCs. As shown in Fig S3, when PANIs are used as dopants, the electrical properties of ECCs had been apparently enhanced, which was little influenced by the structure of PANIs. However, nanoscale PANIs still contribute to the stability of electrical performance according to the error distribution of resistivity.

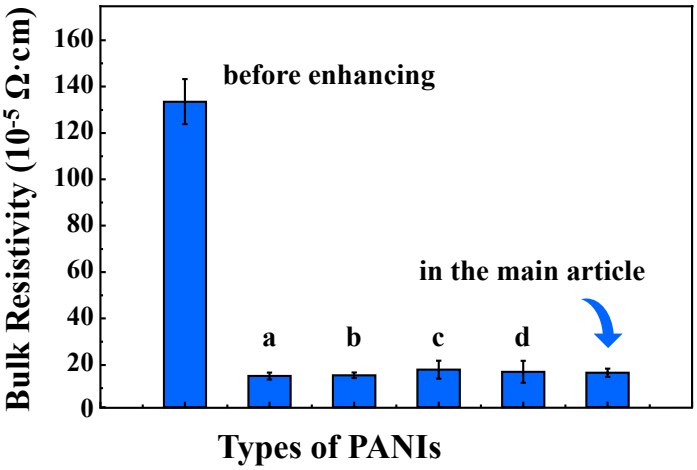

Fig. S3 Electrical property change of ECCs enhanced by four kinds of PANIs materials (Fig. S2).

Table S2. Resistance variation ratios of ECCs for different strain rates.

Strain rate (%)	Resistance variation ratios ($^{\Delta R/R_0}$)	
	ECCs without PANIs	ECCs with 0.5 wt% PANIs
10	246%	3.7%
20	842%	24%
30	1504%	298%
40	3022%	646%
50	4456%	1074%