Supporting Information

Fabrication and Interfacial Characteristics of Surface Modified Ag Nanoparticle Based Conductive Composites

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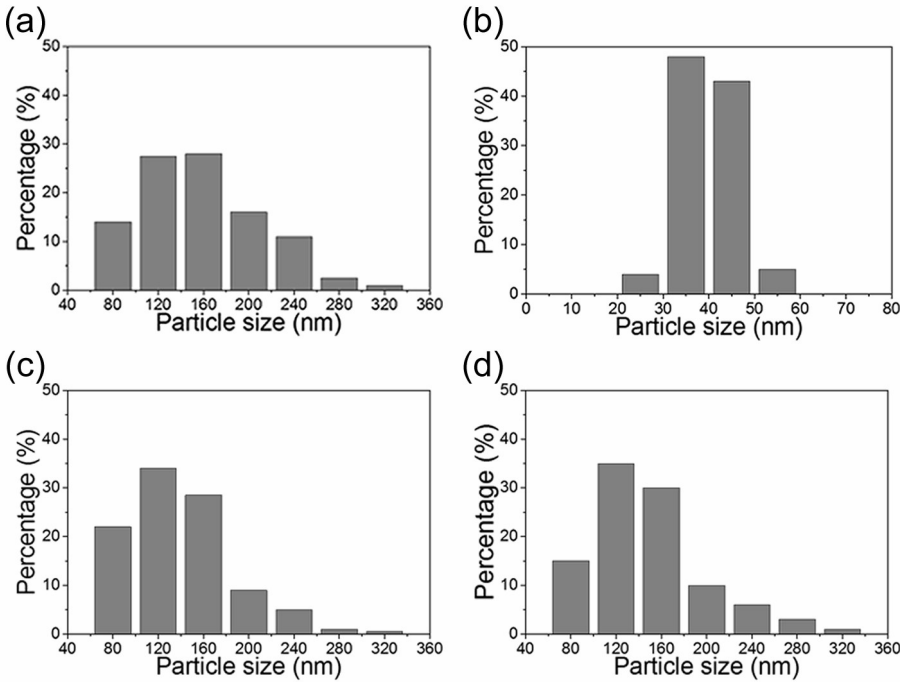

Figure S1 Size distribution of the as-synthesized (a) Ag-PAA, (b) Ag-PVP, (c) Ag-PAA-PVP (1:1) and (d) Ag-PAA-PVP (1:10) nanoparticles.

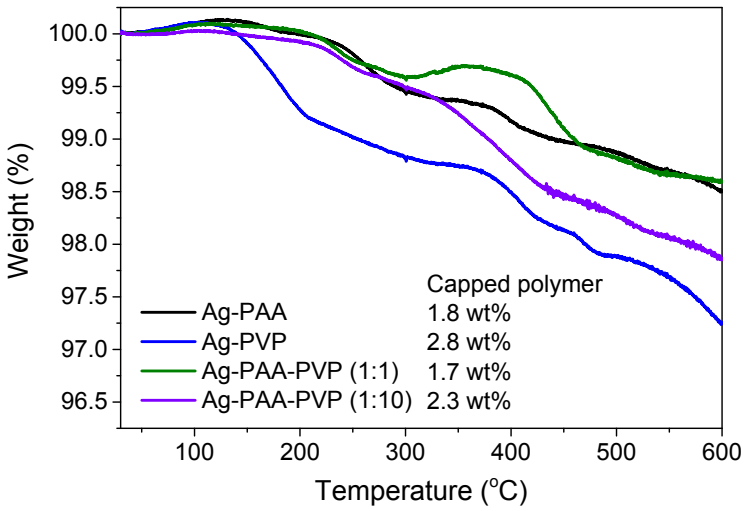

Figure S2 TGA profiles of Ag-PAA, Ag-PVP, Ag-PAA-PVP (1:1) and Ag-PAA-PVP (1:10) nanoparticles up to 600 °C under N_2 atmosphere.

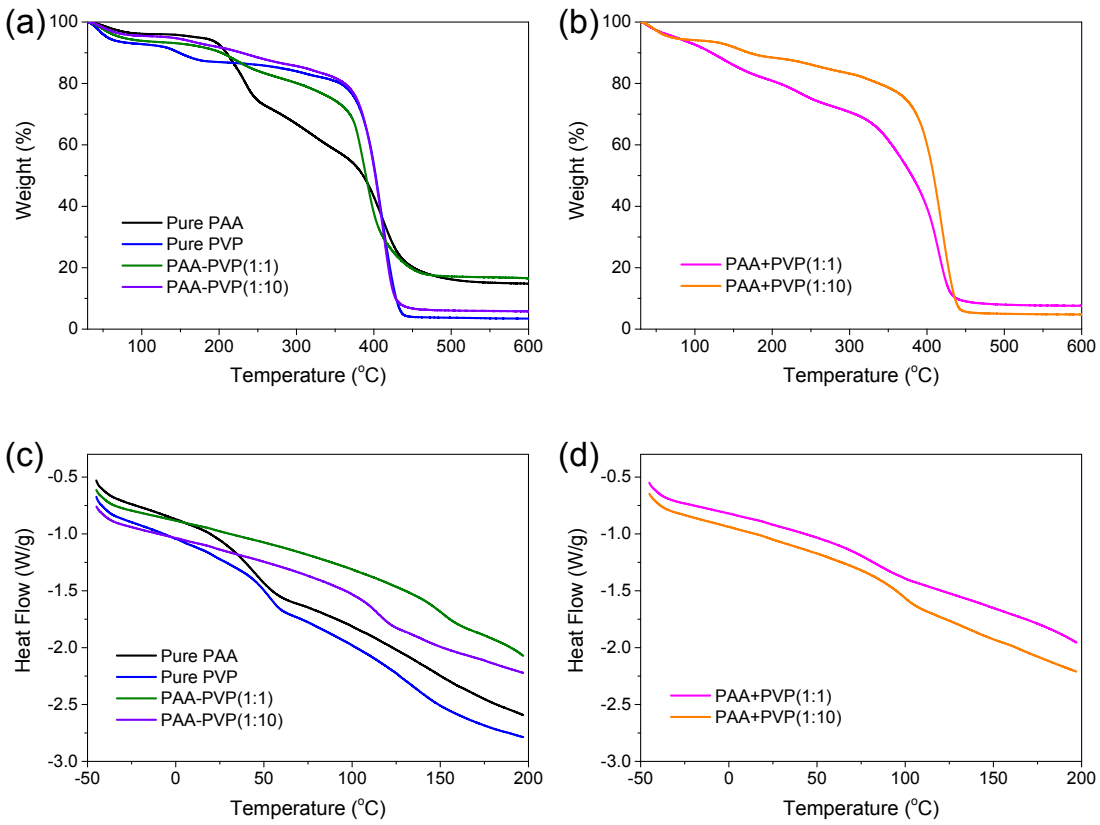

Figure S3 (a, b) Thermal behaviors for weight losses by TGA and (c, d) transition temperatures by DSC of pure PAA and PVP, complexes of PAA-PVP (1:1) and PAA-PVP (1:10), as well as physical blends of PAA+PVP (1:1) and PAA+PVP (1:10) in N_2 atmosphere.

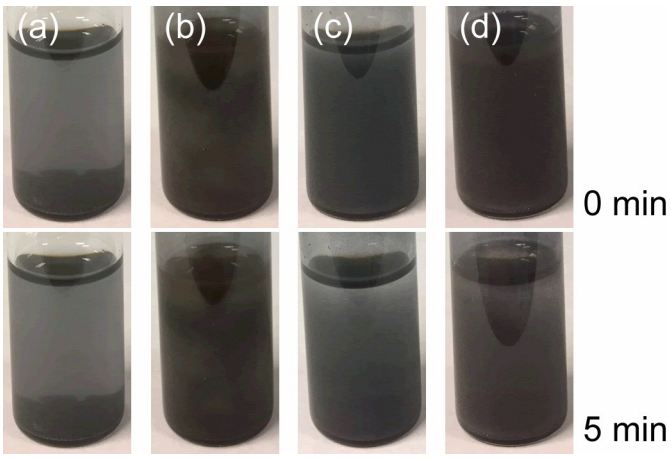

Figure S4 Optical photos of the suspensions containing toluene and (a) Ag-PAA, (b) Ag-PVP, (c) Ag-PAA-PVP (1:1) and (d) Ag-PAA-PVP (1:10) nanoparticles at the standing times of 0 min and 5 min.

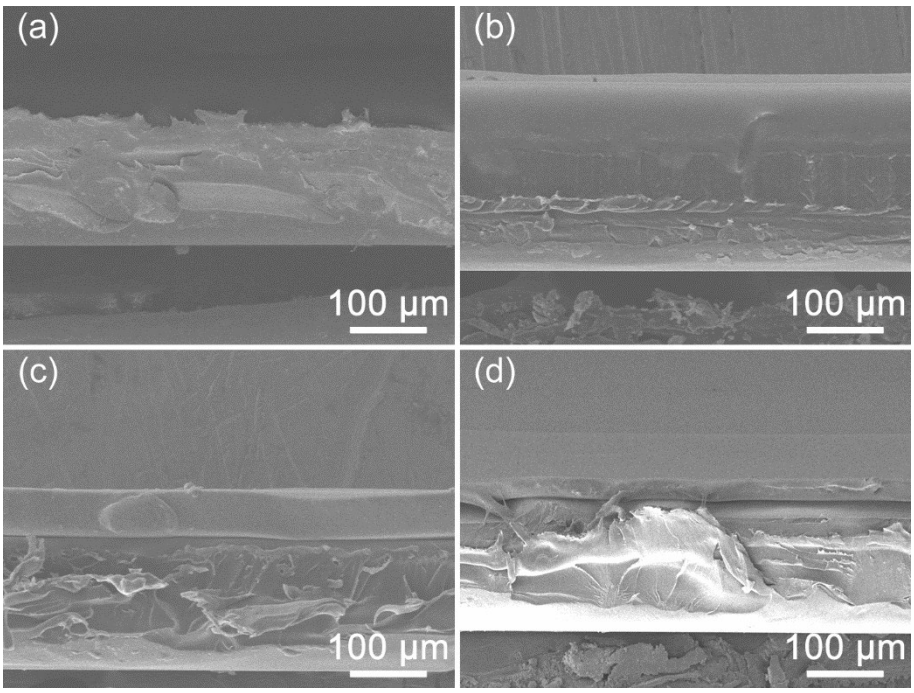

Figure S5 Low magnification cross-section SEM images of (a) Ag-PAA/PDMS, (b) Ag-PVP/PDMS, (c) Ag-PAA-PVP (1:1)/PDMS and (d) Ag-PAA-PVP (1:10)/PDMS composites.

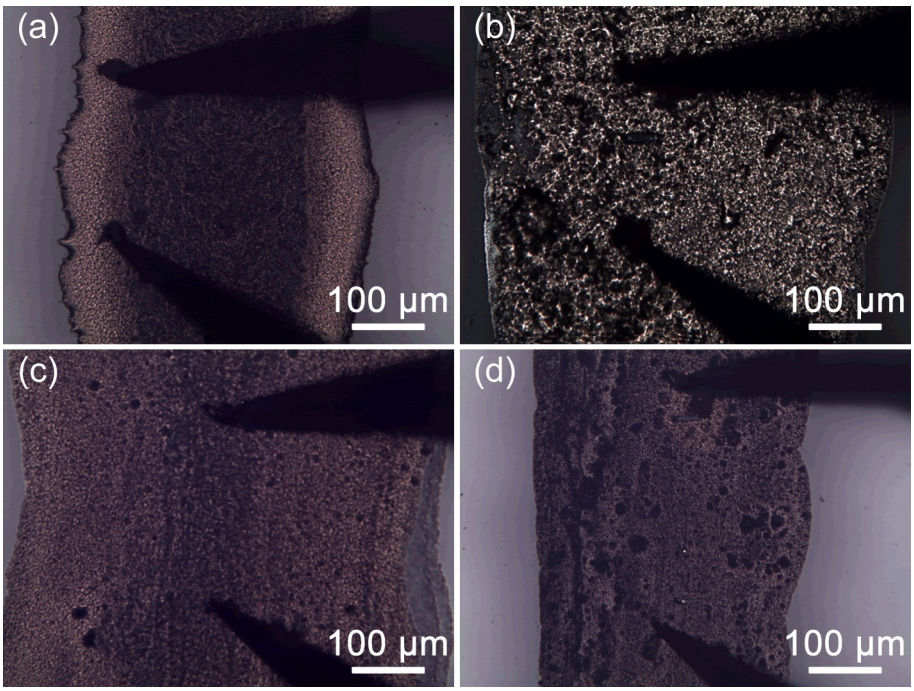

Fig. S6 Optical microscope images showing the positions of the 2 point probes for the as-printed (a) Ag-PAA, (b) Ag-PVP, (c) Ag-PAA-PVP (1:1) and (d) Ag-PAA-PVP (1:10) inks containing 40 wt% Ag particles on glass slides with probe station measurement.

Table S1 Particle sizes of the synthesized Ag-PAA, Ag-PVP, Ag-PAA-PVP (1:1) and Ag-PAA-PVP (1:10) nanoparticles according to SEM observation and DLS measurements.

Samples	SEM Diameter (nm)	DLS Diameter (nm)	Thickness, radii difference (nm)
Ag-PAA	158 ± 52	195 ± 4.5	18.5
Ag-PVP	40 ± 5.5	70 ± 1.3	15
Ag-PAA-PVP (1:1)	138 ± 46	173 ± 4.9	17.5
Ag-PAA-PVP (1:10)	149 ± 50	186 ± 5.5	18.5

Table S2 Elemental analysis results of Ag-PAA, Ag-PVP, Ag-PAA-PVP (1:1) and Ag-PAA-PVP (1:10) PDMS composites determined by EDS.

Samples	Ag (at%)	O (at%)	Si (at%)
Ag-PAA	0.9	38.8	57.1
Ag-PVP	14.3	44.0	38.5
Ag-PAA-PVP (1:1)	14.2	42.1	40.3
Ag-PAA-PVP (1:10)	16.1	42.6	38.1

Table S3 Two-point probe measurements of the intrinsic linear resistivity of our surface modified nanoparticles. Distance, cross-section area, measured resistance, calculated resistivity and calculated conductivity of the printed Ag-PAA, Ag-PVP, Ag-PAA-PVP (1:1) and Ag-PAA-PVP (1:10) lines.

Samples	Distance/L (μm)	Area/S (μm^2)	Resistance/R (Ω)	Resistivity/ρ (μΩ.cm)	Conductivity/σ (S/cm)
Ag-PAA	235	1376	1.95×10^{7}	1.14×10^{6}	8.74×10^{-1}
Ag-PVP	175	1792	2.62×10^{5}	2.03×10^{4}	4.92×10^{1}
Ag-PAA-PVP (1:1)	270	2408	1.37×10^{7}	1.22×10^{6}	8.18×10^{-1}
Ag-PAA-PVP (1:10)	350	2812	1.61×10^{7}	1.30×10^{6}	7.72×10^{-1}