Electronic Supplementary Material (ESI) for Nanoscale

Supporting Information

Effect of the substrate on the performance of transparent silver nanowire films sintered under high-intensity pulsed light

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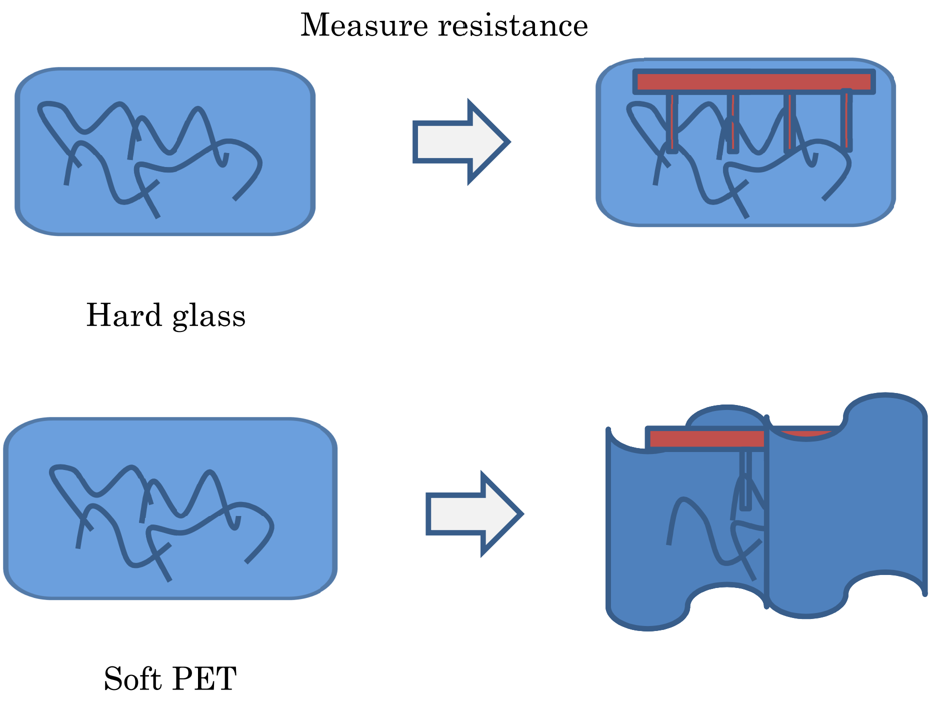

Fig. S1. The Schematic diagram for explaining the difference of sheet resistance with glass and PET substrates. When the hard needles touched the hard glass substrate, the junctions between nanowires didn't be affected. Contrary, the soft PET substrates has been torn from the Ag nanowires film which caused the junctions between wires to give gap or space lending to high sheet resistivity in PET.

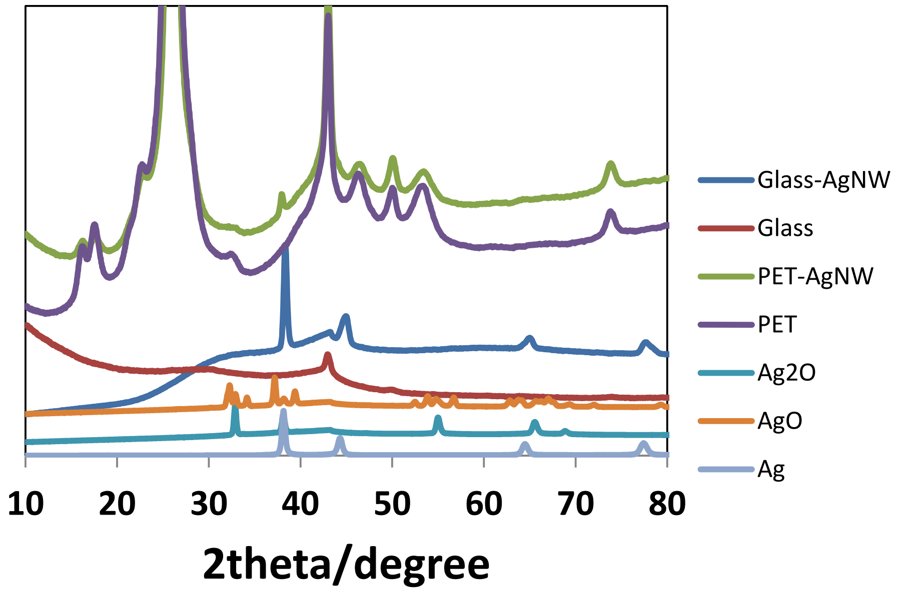

Fig. S2a. The XRD patterns of AgNWs films and substrates. Except the diffraction peaks of Ag, no other phases have been observed.

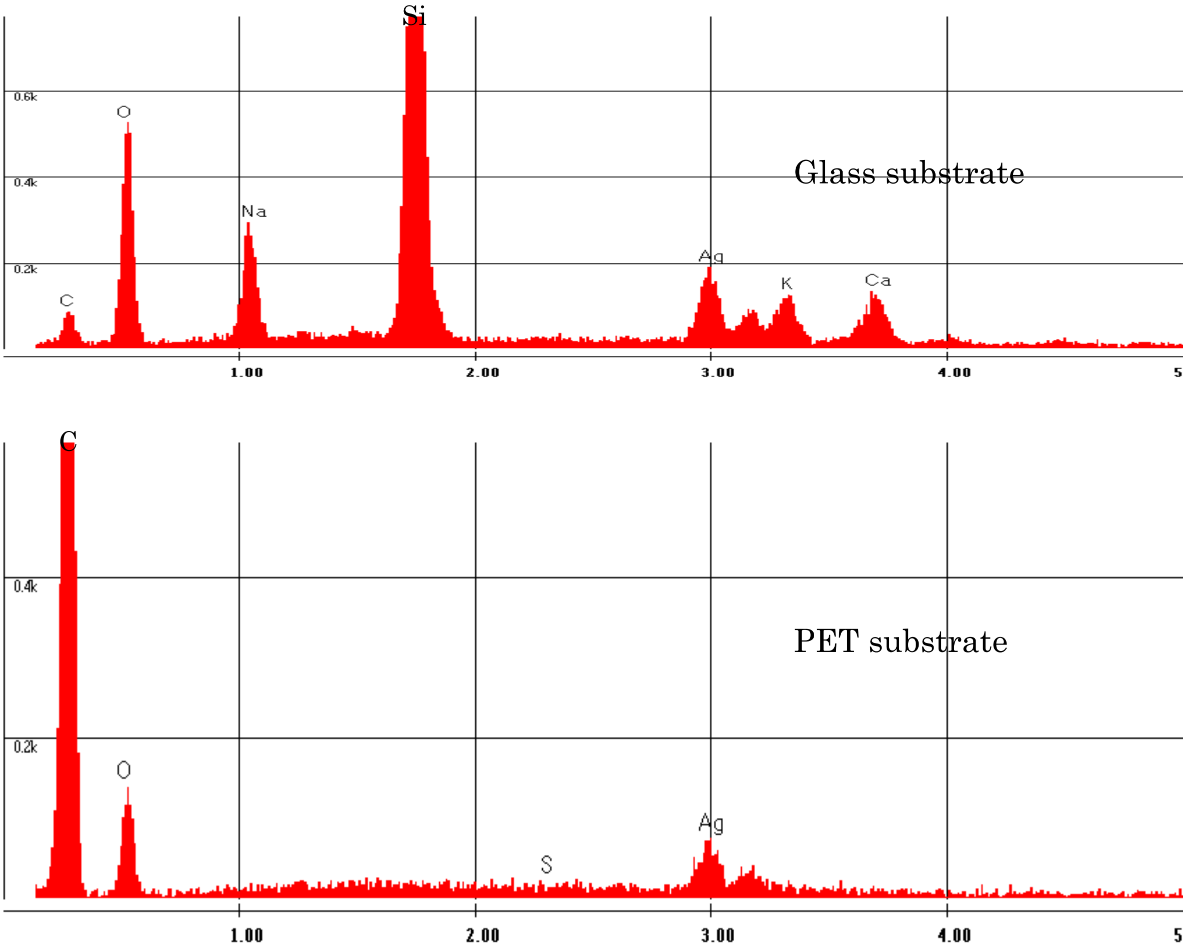

Fig. S2b. The EDX results of AgNWs film after HIPL treatment. EDAX were recorded using a Hitachi SU8020 FE-SEM microscope (Hitachi, Tokyo, Japan) operated at an accelerating voltage of 10 kV and an accelerating current of 10 μA. There are other elements has been detected except the metal silver and substrates composition. XRD patterns of AgNWs films and substrates. Except the diffraction peaks of Ag, no other phases have been observed.

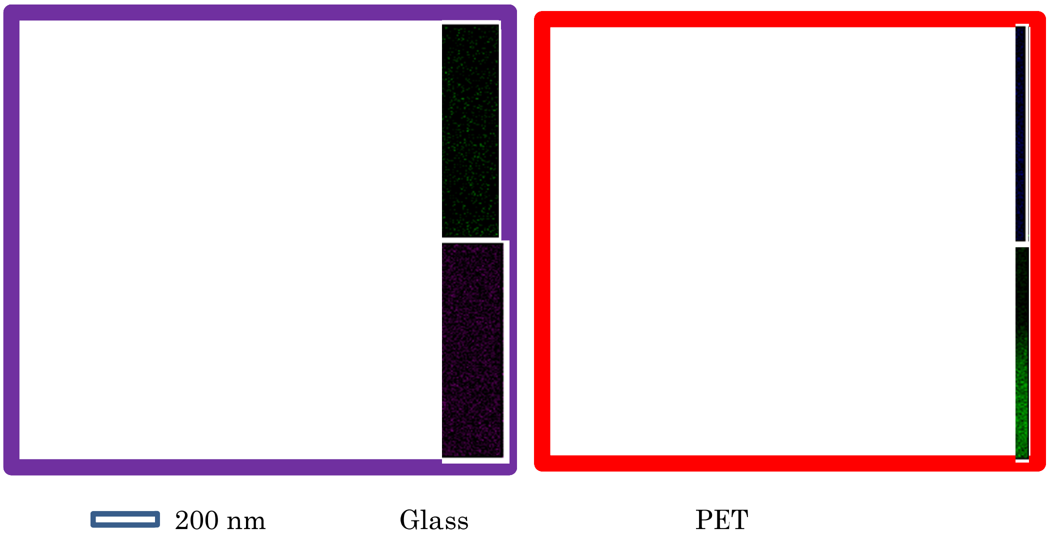

Fig. S2c. The mapping images of AgNWs on the glass and PET substrates after HIPL treatment. Some suspecting elements, such as O and S have been analyzed. However, except the metal silver and substrates, no clear signal has been detected with the mapping measurement.

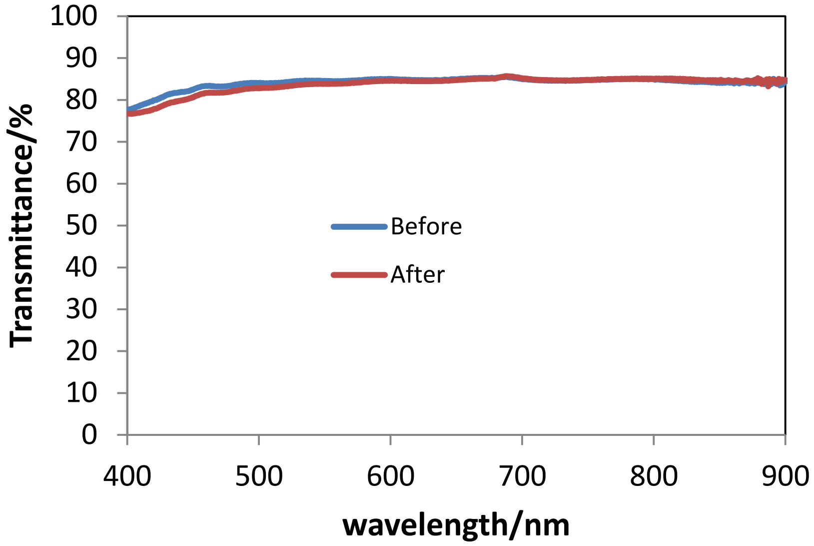

Fig. S3. The transmittance spectra of AgNWs film on PET substrates before and after HIPL.

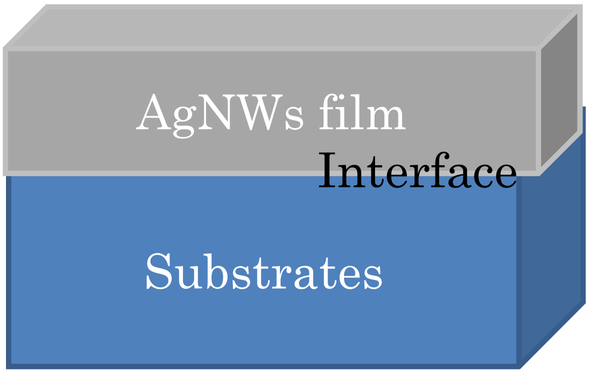

Table S1

The temperature distribution in the AgNWs film and interface simulated with software.

Light intensity (J/cm^2) / Temperature (^0C)	Glass					PET				
	0.074	0.21	0.49	0.74	1.14	0.074	0.21	0.49	0.74	1.14
AgNWs film	99.1	241.6	470.9	794.1	1213.1	157.7	488.8	1022.3	1758.2	2707.4
Interface	99	241.2	470.5	794	1212.9	157.6	488.7	1022.2	1758	2707.2

PET is polyethyleneterephthalate.

Table S2

The temperature of AgNWs film and interface on PC and PI substrates

Energy (J/cm^2) / Tem.(^0C)	0.074	0.21	0.49	0.74	1.14
PI	178.8(35.8)	325.7(65.1)	757.7(151.5)	1427.2(285.4)	2325.6(465)
PC	*128.5(25.7)*	292.3(58.5)	644.6(128.9)	1091.7(218.3)	1671.4(334.2)
PET	157.7(31.5)	488.8(97.8)	1022.3(204.5)	1758.2(351.6)	2707.4(541.5)
PVC	110.3(22.1)	252.2(50.4)	641.2(128.2)	1237.1(247.4)	2211.4(442.3)
Glass	57(11.4)	182.4(36.5)	373.7(74.7)	683.9(136.8)	1083.6(216.7)

PC is polycarbonate and PI is polyimide, PVC is polyvinyl chloride.

The temperature is simulated with a dense Ag layer. The actual temperature in the mesh AgNWs film is expected to be very lower than that in a dense film. Here, the actual temperatures are estimated and shown in parentheses according the amount of metal in the film.

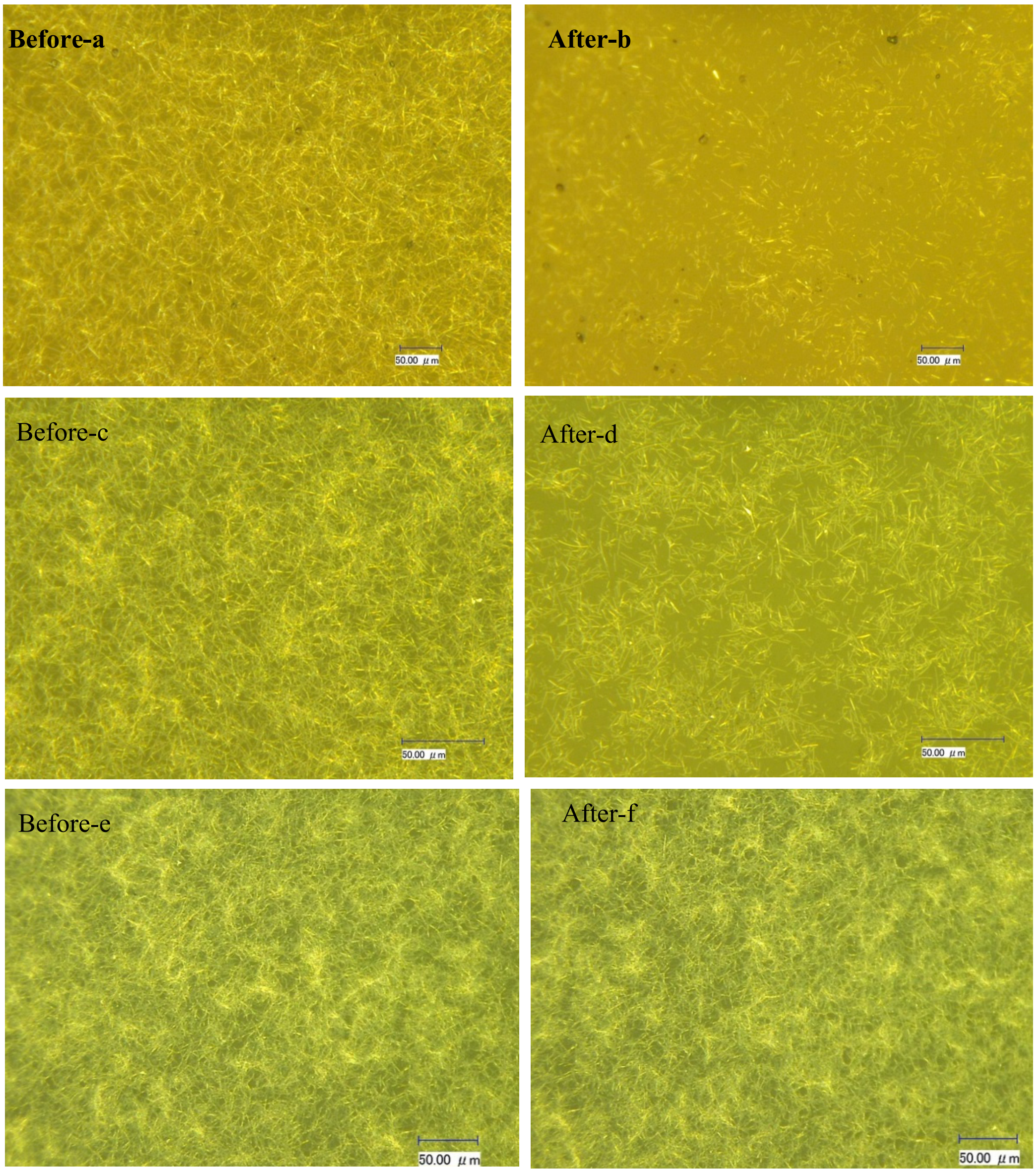

Fig. S4 Optical microscope images of AgNWs film on polyimide (a and b), polycarbonate (c and d) and polyvinyl chloride (e and f) substrates before and after peeling test.

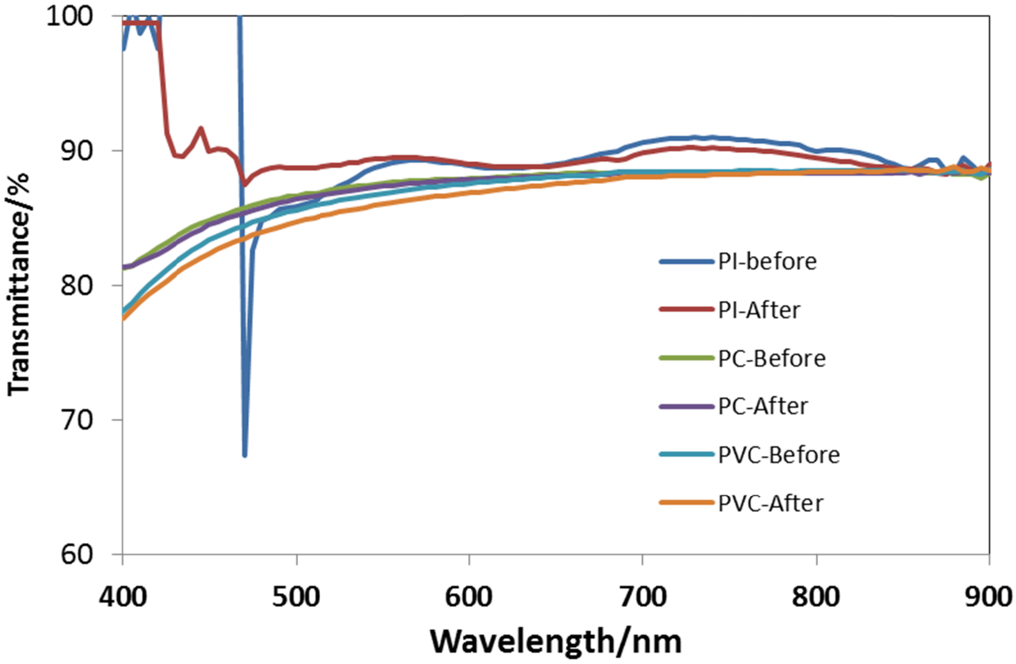

Fig. S5. The transmittance spectra of AgNWs films on PI, PC and PVC substrates before and after HIPL.

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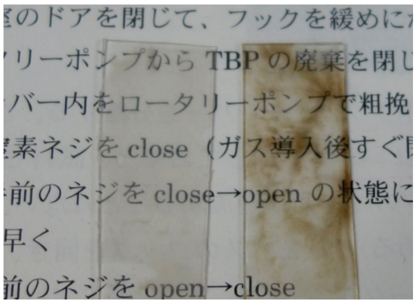

Fig. S6. The photo of AgNWs films on PC substrates with 2 pulses (left) and 12 pulses (right) with HIPL.

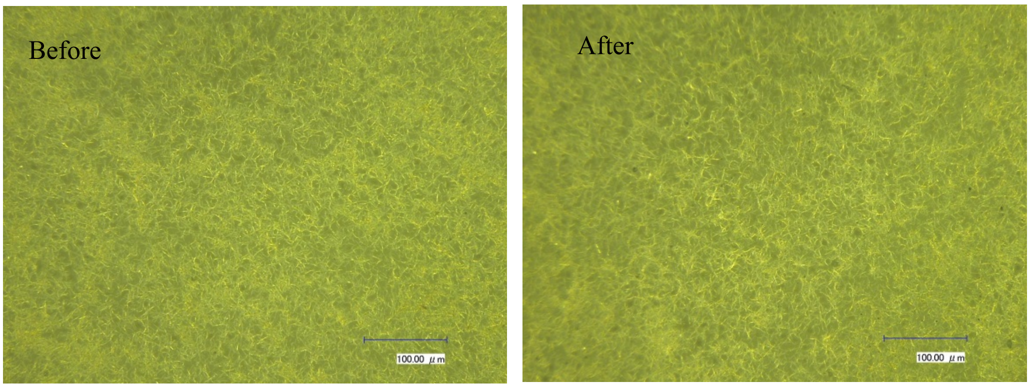

Fig. S7 Optical microscope images of AgNWs film prepare with 6 pulses on PC substrates before and after ten times peeling test.