Surface plasmonic welding of silver nanowire via the intense pulsed light irradiation combined with NIR for flexible transparent conductive film

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Supplementary information

1. Folding test of AgNW film

Video S1. Folding test of the AgNW transparent electrode film

Before bending fatigue test, we have to check the mechanical durability of AgNW films. In order to confirm that, folding test was conducted. The AgNW films before and after IPL welding process were folded directly by hand, and resistance was measured at both ends. A multimeter (3244-60 CARD HiTester, HiOKi) was used to measure the resistance of the AgNW films. As can be seen from Video S1, the resistance was measured before and after folding the AgNW films, and it can be seen that the resistance change is different depending on the before (99 ohm → 151 ohm) or after (61 ohm → 63 ohm) IPL welding process.

2. Bending fatigue test of AgNW film

Video S2. Bending fatigue test of the AgNW transparent electrode film for 100,000 cycles

In order to confirm the higher mechanical properties of the AgNW film as an extension of the previous bending test, the number of bending fatigue tests was progressed up to 100,000 times and the rate of change of resistance at that time was less than 10%. A bending tester (JIFT-530; Inner/outer folding, $-180^{o} \sim +180^{o}$; JUNIL TECH Co. Ltd.) was used to analyze the mechanical properties of before/after welded AgNW films. As can be seen from this video, the NIR assisted flash light welded AgNW film was subjected to repeated bending test to be folded 180 degrees, with a bending radius of 1 mm.

3. Transparent touch screen panel test video

Video S3. Test video of the AgNW transparent touch screen panel with drawing of various figures

A transparent touch screen panel was fabricated with the AgNW film which was welded by NIR assisted flash light irradiation. The transparent touchscreen panel consists of a touchscreen panel module (5.5” Standard TSP, TLVision) and a AgNW transparent electrode that acts as a touch sensor. The touch panel was operated very well because of its high conductivity and high uniformity in large area. As shown in the video, we can detect the touch in all areas of the panel, and we can see that there is no problem recognizing the touch.