Electronic Supplementary Material (ESI) for Nanoscale

Supporting Information for:

Flexible Transparent Conducting Coimposite Film Using Monolithically Embedded AgNW Electrode with Robust Performance Stability

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Flexibility of AgNW-GFRHybrimer film

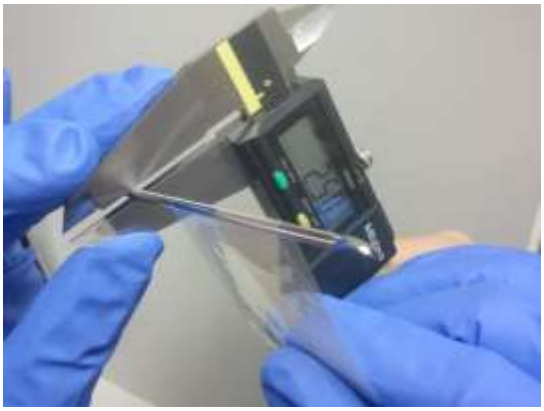


Figure S1. Optical image of Mandrel bending test of AgNW-GFRHybrimer film (bending radius = 2.5 mm). We confirmed that there was no degradation in the sheet resistance or film deformation such as cracks.

Surface topography of AgNW-GFRHybrimer film

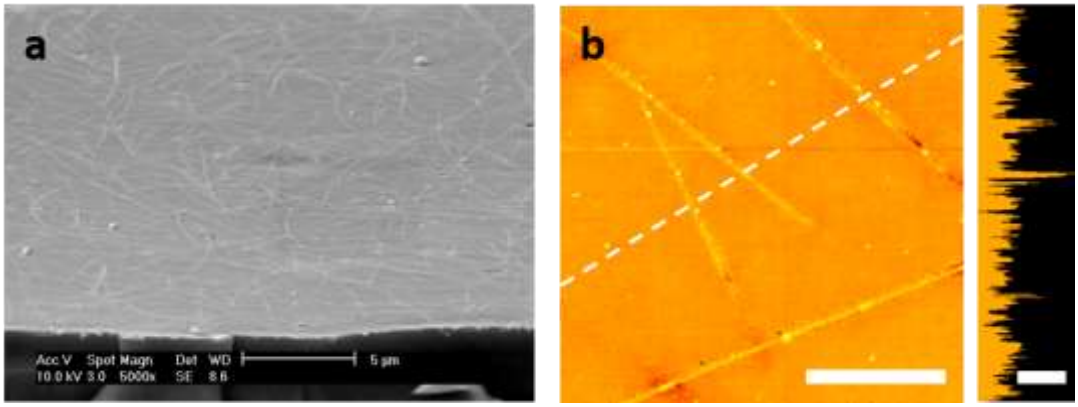
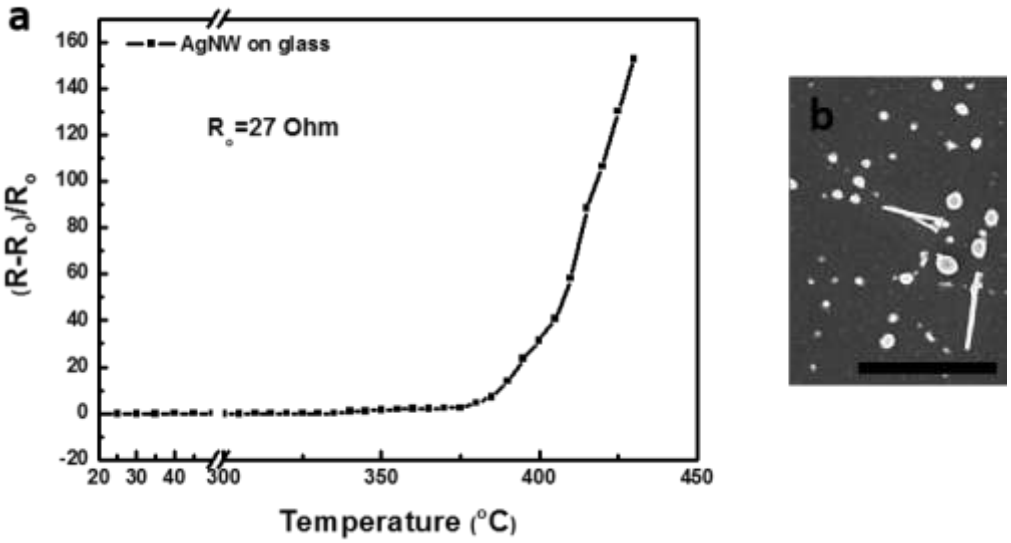
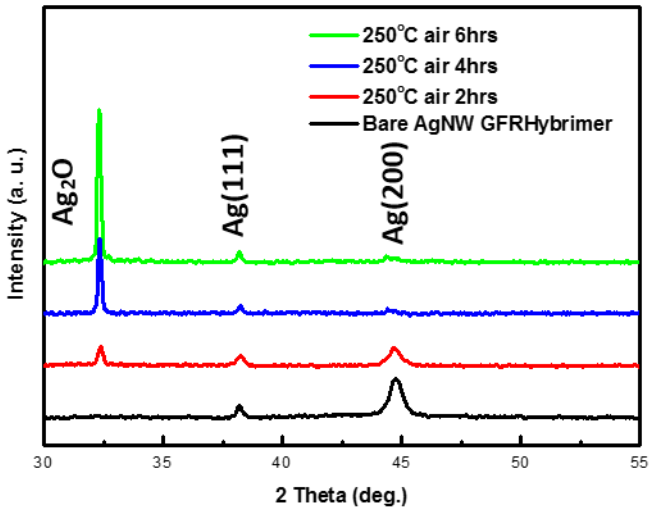


Figure S2. (a) Surface SEM image of AgNW-GFRHybrimer film, showing the embedded AgNW TCE on the surface. (b) AFM image of AgNW-GFRHybrimer film. The R_{RMS} and peak-to-peak values are 1 nm and 4 nm, respectively. The scale bars are 2 μm and 2 nm, respectively.



Thermal stability test using a "standard" AgNW TCE on glass substrate

Figure S3. (a) Normalized R_{sh} change values of AgNW on glass substrate vs. temperature (ramp rate = 5 °C min^{-1}). (b) SEM image of AgNW on glass substrate after the test. Note that the AgNW networks are melted and disconnected. The scale bar is 5μm.



Time-dependent thermal oxidation behavior of AgNW-GFRHybrimer at 250 °C/air condition (250A)

Figure S4. XRD patterns of AgNW-GFRHybrimer film during 250 °C/air annealing. The peaks at 2θ=44°, 2θ=38°, and 2θ=32.4° are assigned to Ag (200), Ag (111), and Ag_2O, respectively. As the annealing time increases, peaks of Ag(200) and Ag(111) gradually decreased. Ag_2O peak formed after 2 hours annealing become larger and larger as annealing time increased.