Supplementary Information

Large area nanoscale metal meshes for use as transparent conductive layers

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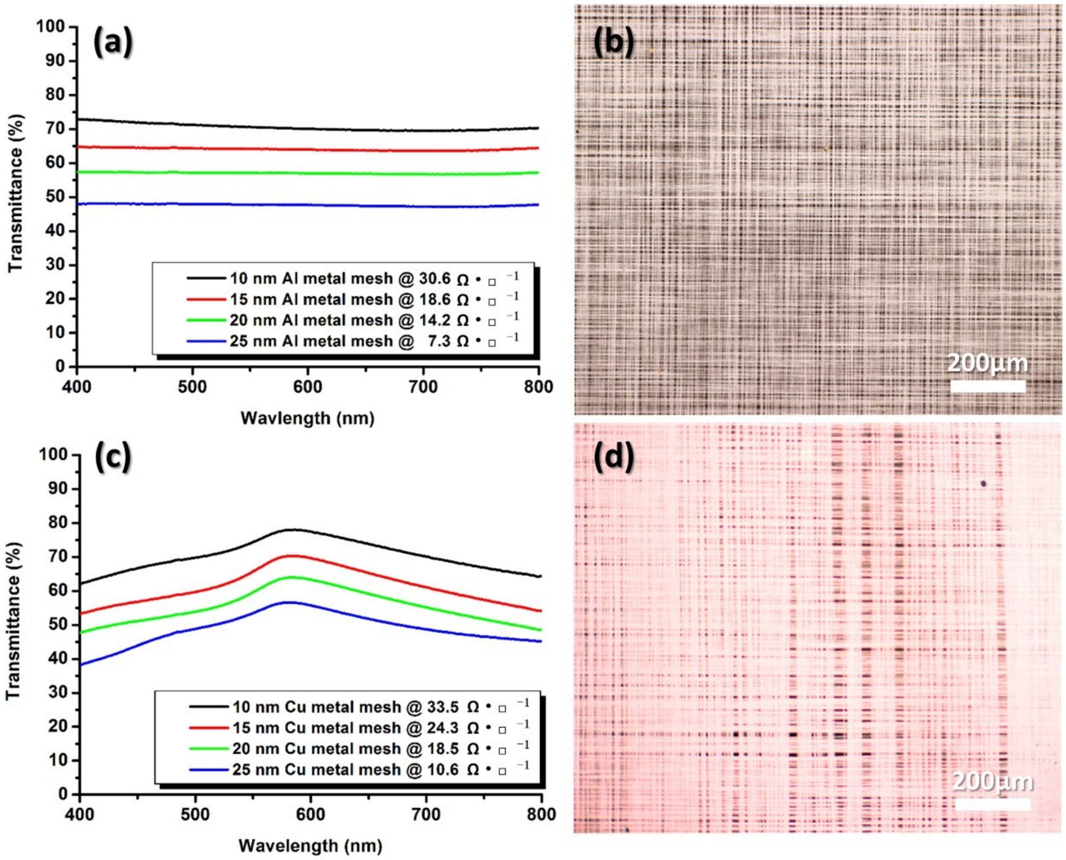

Fig. S1. (a) Optical transmittance as a function of wavelength for Al metal meshes on glass substrates fabricated from Al layers with thicknesses of 10, 15, 20 and 25 nm. The corresponding resistances are listed in the figure. (b) Microscope image of an Al metal mesh fabricated from an Al layer with a thickness of 10 nm. Al etching was performed with BCl_3 and Cl_2 plasma. (c) Optical transmittance as a function of wavelength for Cu metal meshes on glass substrates fabricated from Cu layers with thicknesses of 10, 15, 20 and 25 nm. The corresponding resistances are listed in the figure. (d) Microscope image of a Cu metal mesh fabricated from a Cu layer with a thickness of 10 nm. Cu etching was performed with $SiCl_4$ and Ar plasma.

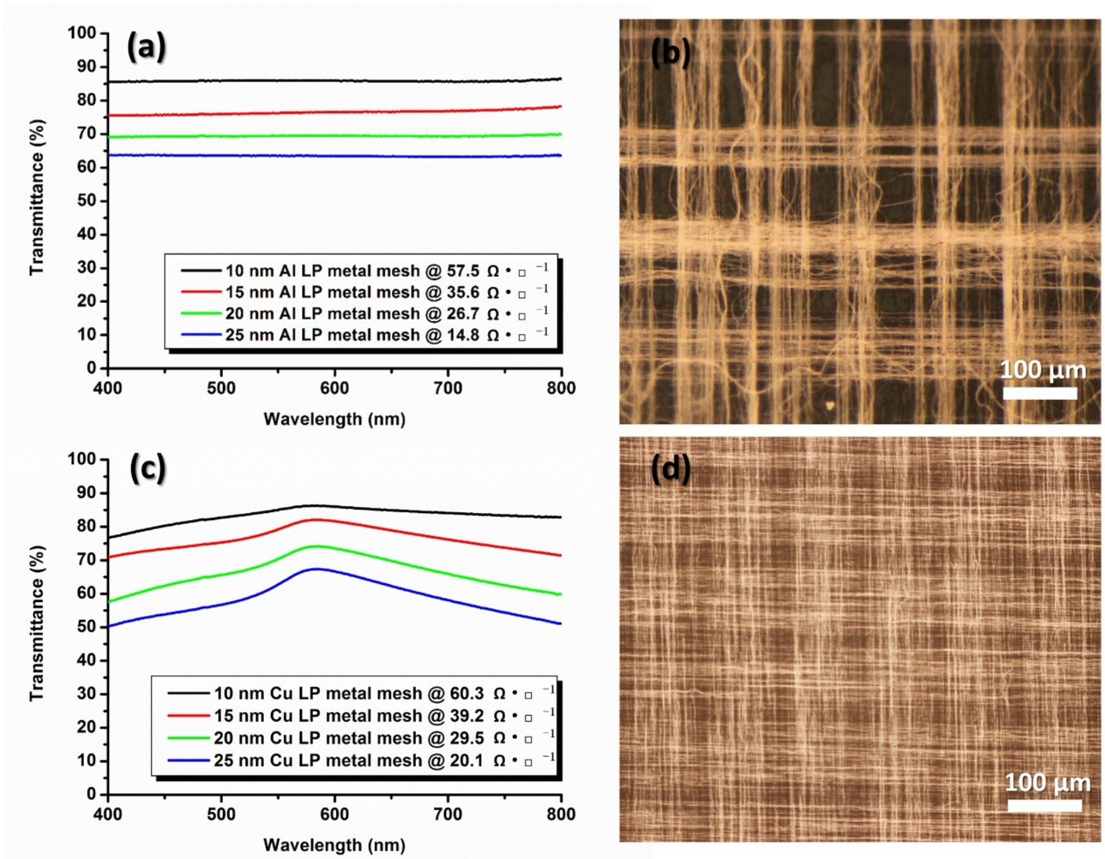

Fig. S2. (a) Optical transmittance as a function of wavelength for Al LP metal meshes on glass substrates fabricated from Al layers with thicknesses of 10, 15, 20 and 25 nm. The corresponding resistances are listed in the figure. (b) Microscope image of an Al LP metal mesh fabricated from an Al layer with a thickness of 10 nm. (c) Optical transmittance as a function of wavelength for Cu metal meshes on glass substrates fabricated from Cu layers with thicknesses of 10, 15, 20 and 25 nm. The corresponding resistances are listed in the figure. (d) Microscope image of a Cu metal mesh fabricated from a Cu layer with a thickness of 10 nm.

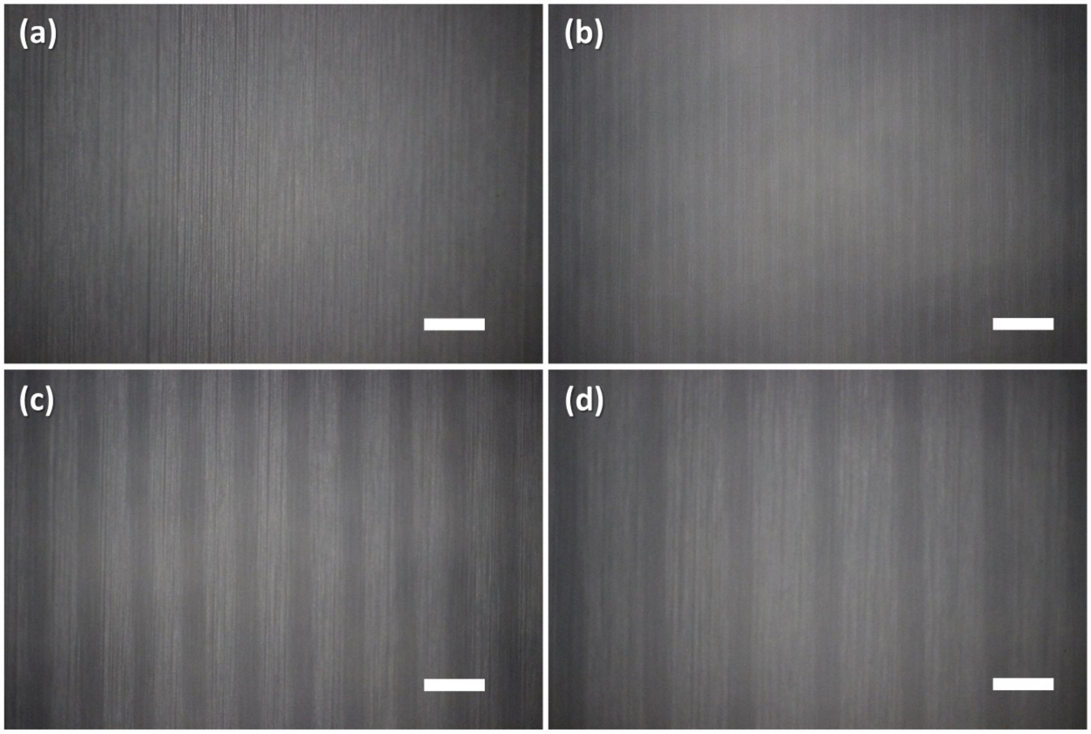

Fig. S3. (a) Microscope images of a single-layer SACNT film in dark-field mode, (b) Microscope image of a SACNT film after laser process (LP) treatment. The interval was 0.1 mm. (c) Microscope image of a SACNT film following LP with a 0.2-mm interval. (d) Microscope image of SACNT film following LP with a 0.5-mm interval. The scale bar in these images is 0.5 mm.

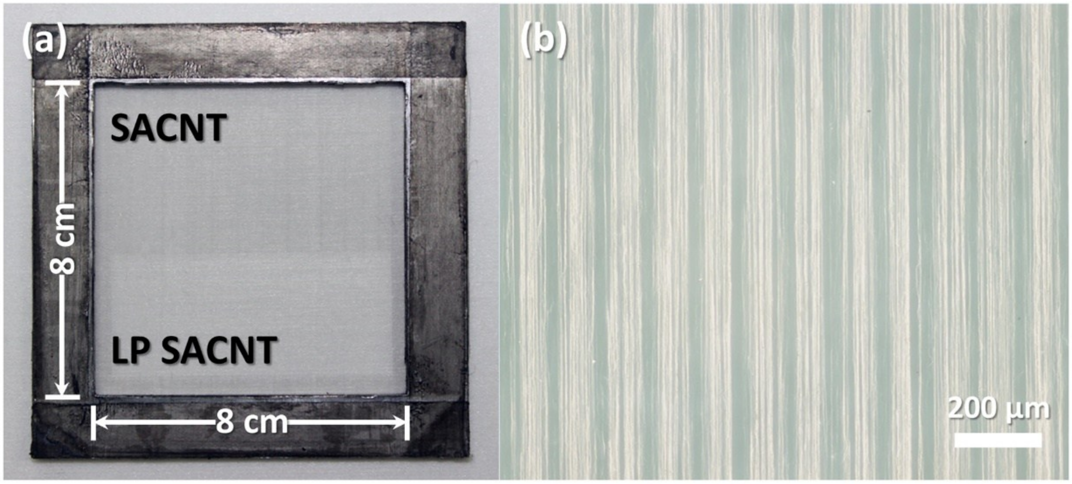

Fig. S4. (a) Photograph of a SACNT film on a metal frame. The upper half is the original single-layer SACNT film, and the lower half of the SACNT film was processed by LP with an interval of 0.1 mm. The transmittance of the SACNT film increased following LP, which could be attributed to the removal of carbon nanotubes. (b) Microscope image of Au nanowires fabricated using the LP-treated SACNT film with an interval of 0.1 mm. The as-prepared Au nanowires exhibited the same period as the LP-treated SACNT mask.

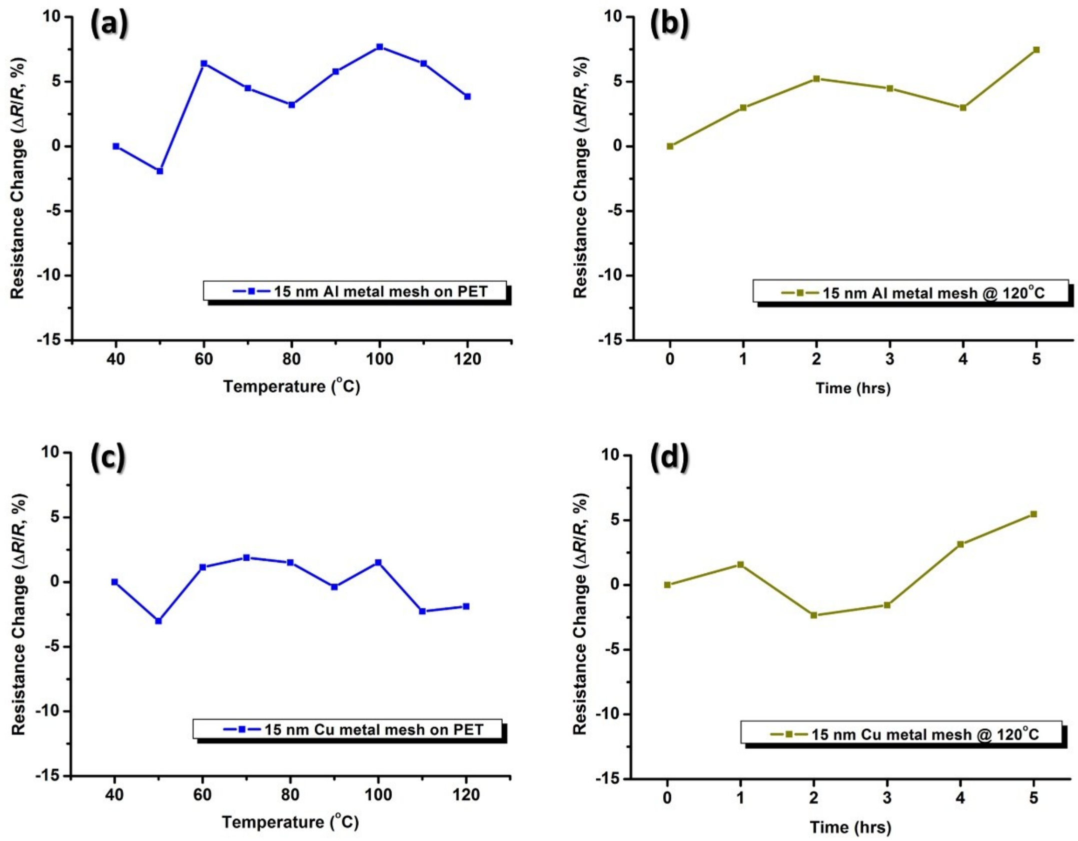

Fig. S5. (a, c) Resistance change plotted against heating temperature for Al and Cu metal meshes on PET substrates fabricated using metal layers with a thickness of 15 nm. (b, d) Resistance change versus time at 120 °C for Al and Cu metal meshes on PET substrates fabricated using metal layers with a thickness of 15 nm.