Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supplementary Information

Fast fabrication of copper nanowire transparent electrodes by a high intensity pulsed light sintering technique in air

Su Ding, [a, b] Jinting Jiu, [*b] Yanhong Tian, [*a] Tohru Sugahara, [b] Shijo Nagao, [b] Katsuaki Suganuma [b]

[a] *State Key Laboratory of Advanced Welding and Joining, Harbin Institute of Technology, Harbin, 150001, China. E-mail: tianyh@hit.edu.cn*

[b] *The Institute of Scientific and Industrial Research (ISIR), Osaka University, Osaka, Japan. E-mail: jiu@eco.sanken.osaka-u.ac.jp*

The home-made spray device is shown in Fig. S1. It includes air compressor (APC-001, AIRTEX) to generate airflow, a digital controlled dispenser (ML-606GX, MUSASHI) which is used to adjust the intensity of the airflow and a commercial sprayer with a nozzle of 0.3 mm. The CuNWs solution was sprayed on the surface of glass by the airflow. The glass substrates were fixed on a hot plate at 60°C.

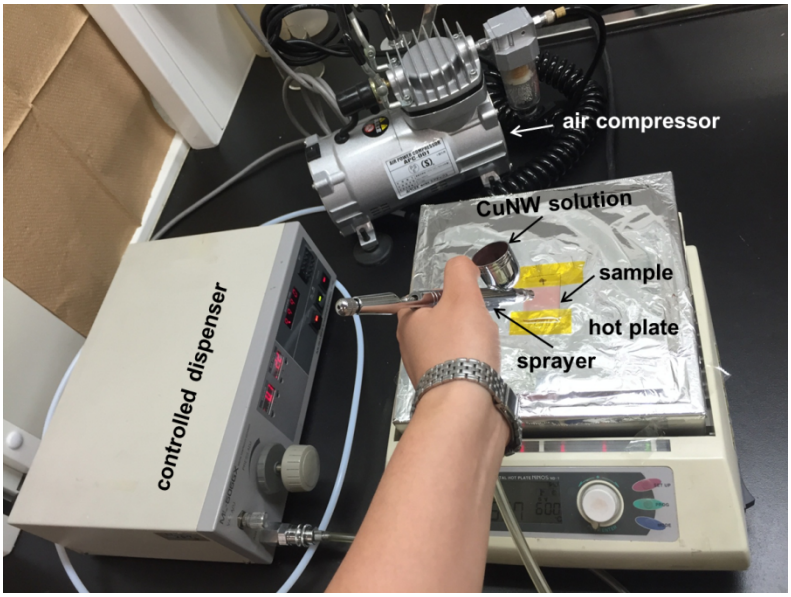

Fig. S1 Spray devices used in our experiment

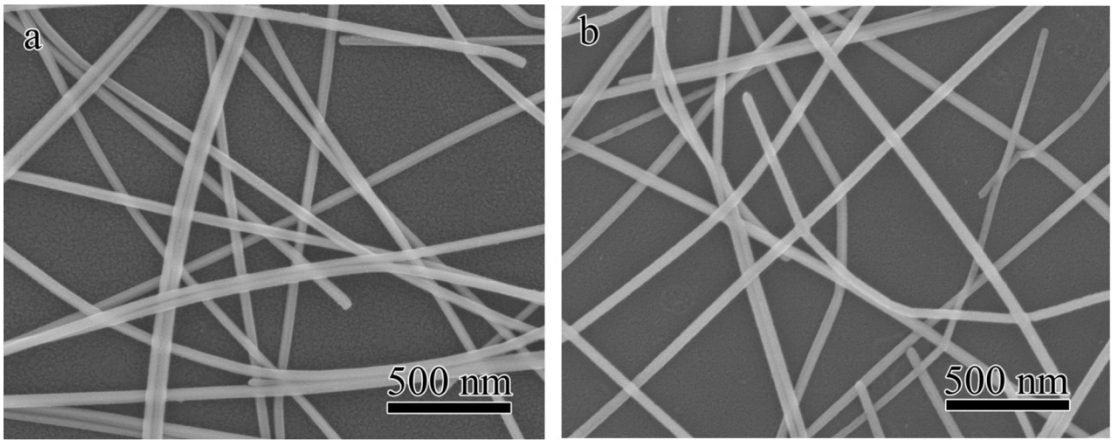

Fig. S2 Plan view of SEM images of CuNW TEs before (a) and after HIPL treatment (b).

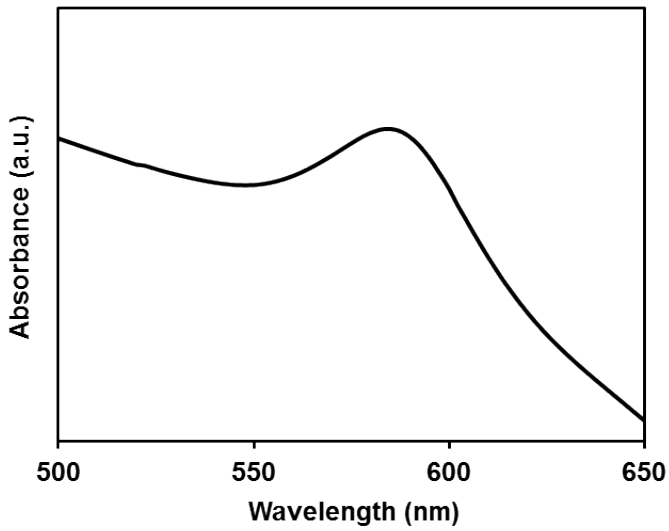

Fig. S3 UV-vis adsorption spectrum of Cu NWs.

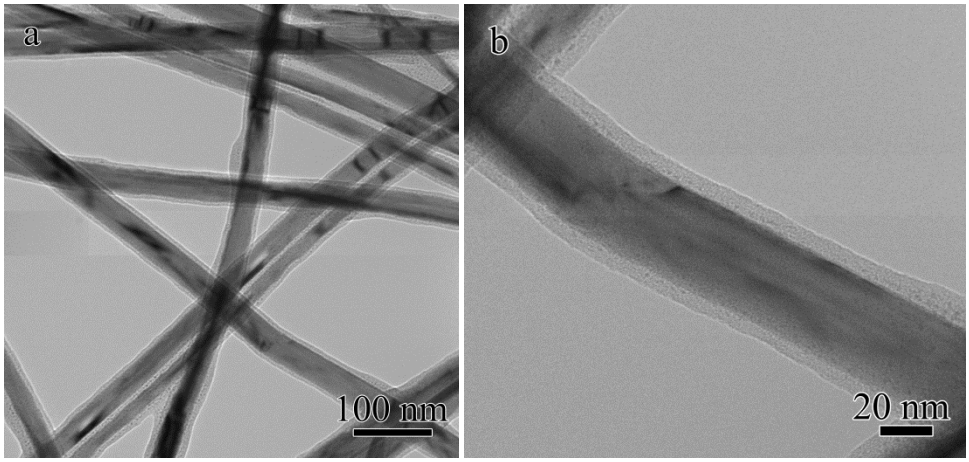

Fig. S4 TEM images of CuNWs with a clear residual of ODA on the surface and between nanowires.

Tab. S1 Parameters of Cu and glass used in the simulation

Material name	Thermal conductivity (W/mK)	Mass density (g/cm^3)	Specific heat (J/kg)	Melt temperature (Degree)
Cu	401	8.96	382.5	1084.6
glass	1.114	2.51	858	557

Tab. S2 Parameters of the HIPL machine

Voltage (V)	Pulse duration (μs)	Pulse number	Pulse frequency (Hz)
450	300	20	1

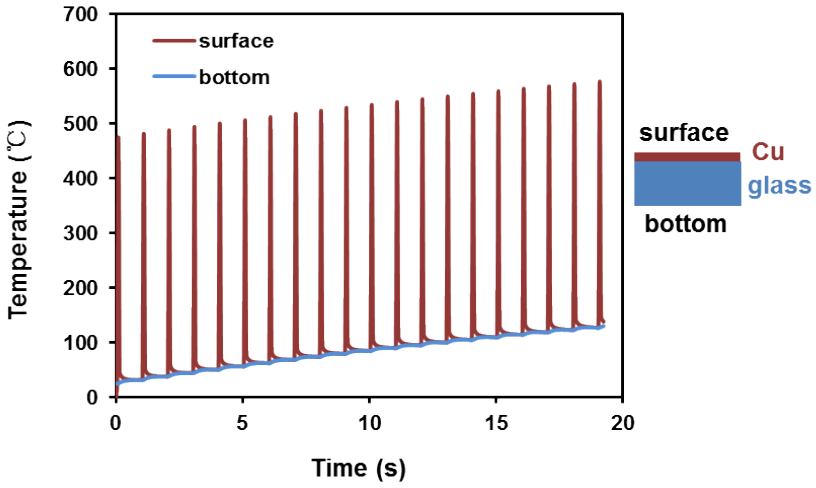

Fig. S5 Simulation result of the temperature evolution at the surface and the bottom of the CuNW-glass composite.

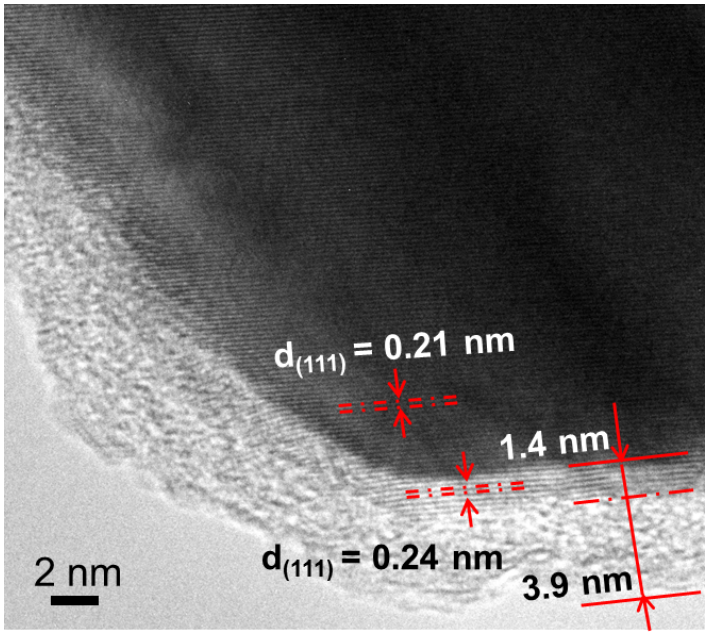

Fig. S6 TEM images of newly prepared CuNWs

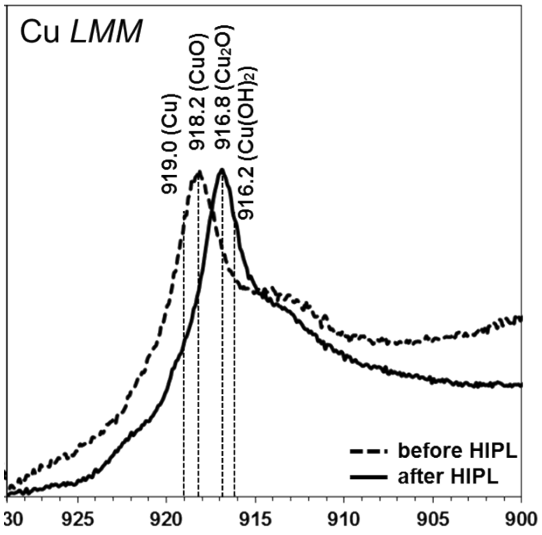

Fig. S7 Cu LMM XPS spectra of oxidized CuNW films before and after HIPL treatment.

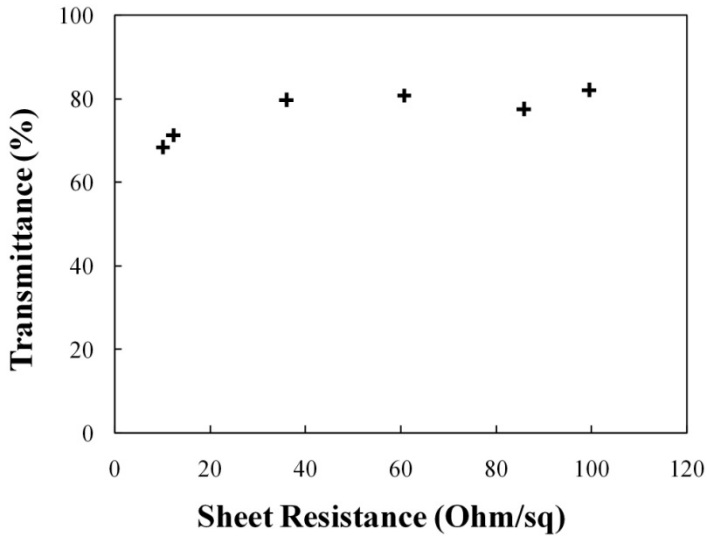

Fig. S8 Plot of transmittance verse resistance of CuNW TEs fabricated using CuNWs stored for two months.