Supporting Information

Manufacture of Complex Pattern Flexible Copper Microcircuits Based on Silver Seeds Chemical Growth Welding

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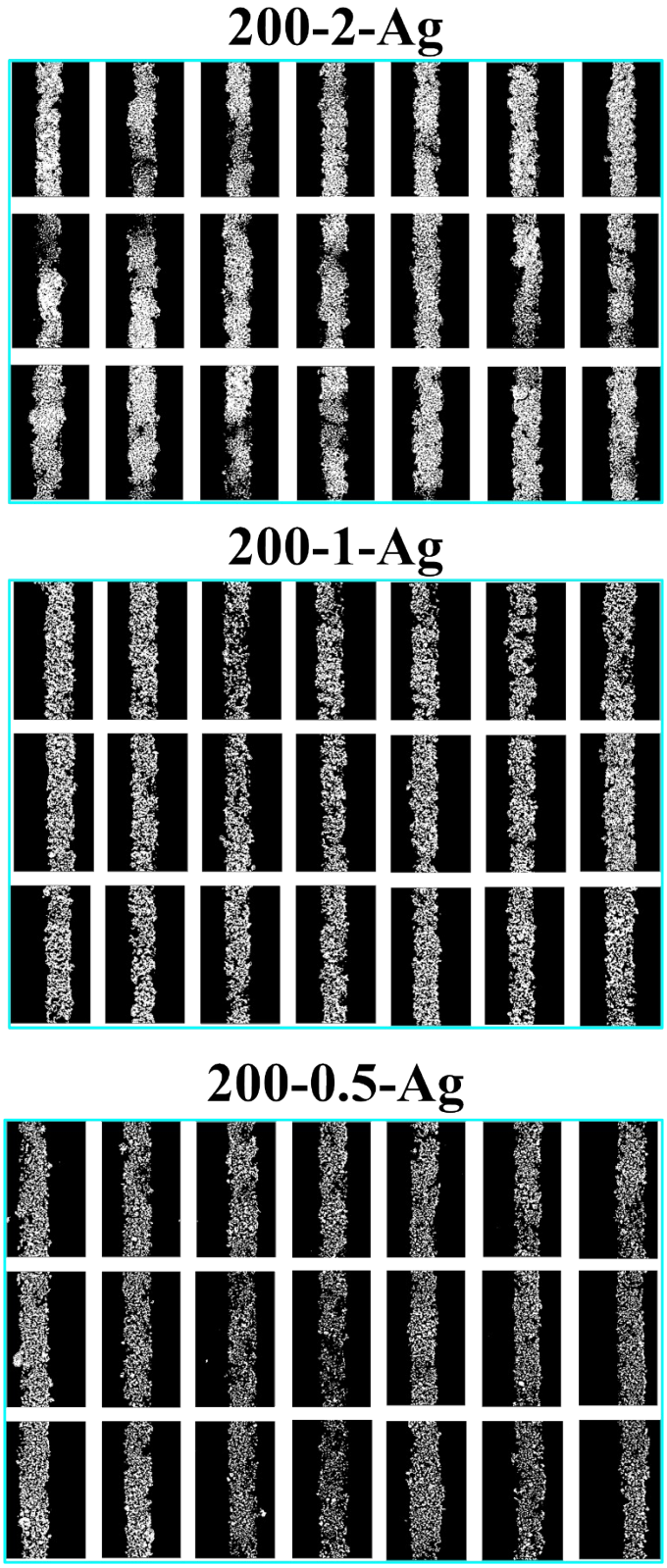

Fig. S1. Pixel calculation images of three density silver seeds. Twenty-one parallel samples were taken for each. Photoshop's "Color Range" selection at same parameters.

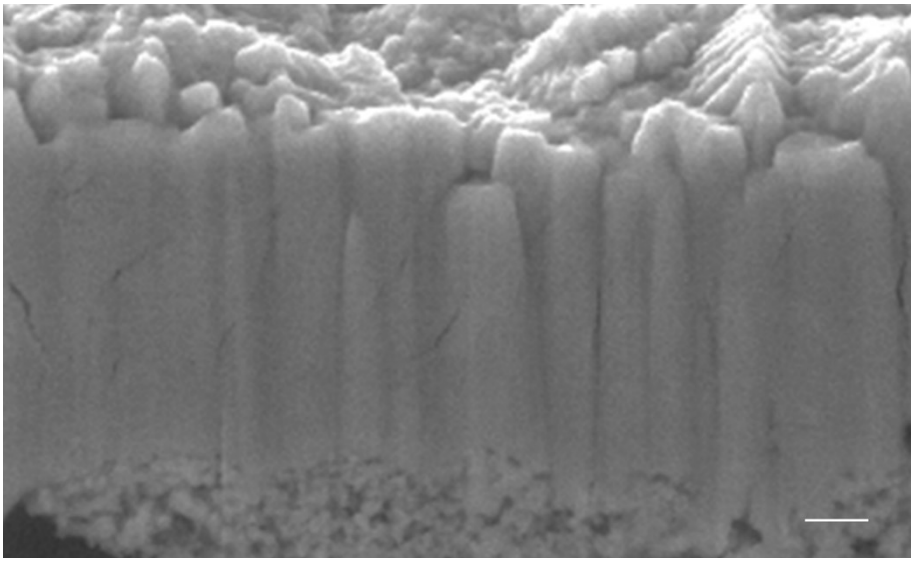

Fig. S2. 200-2-Ag /Cu scanning electron microscope morphology. The scale is 500nm.

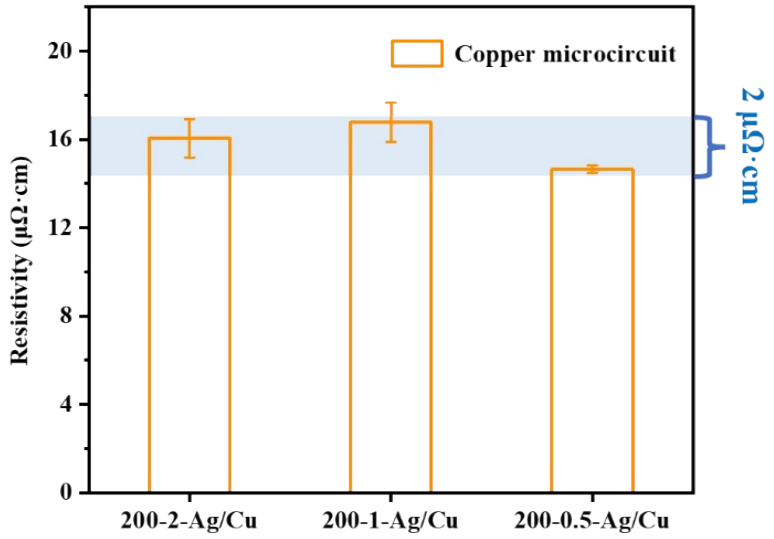

Fig. S3. Resistivity histogram of copper microcircuits with different parameters.

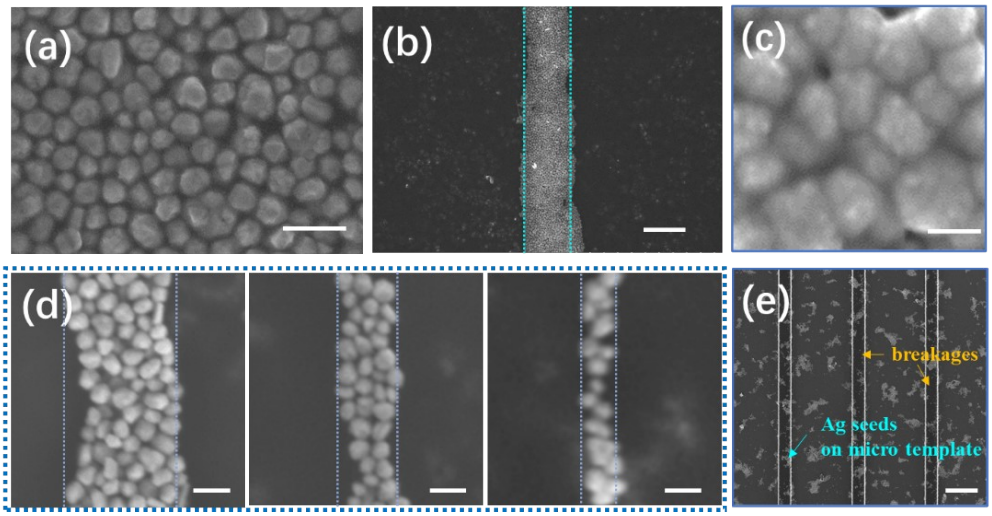

Fig. S4. SEM images of silver seeds and copper crystal. a) High-magnification and b) low-magnification SEM image of silver seeds; c) Morphology of copper crystal on the surface of silver seed layer., d) Different patterns of silver seeds; e) Wide pattern of silver seeds. Scale bars of figure a, b, c, d and e are 400nm, 3μm, 200nm, 200nm and 20μm respectively.

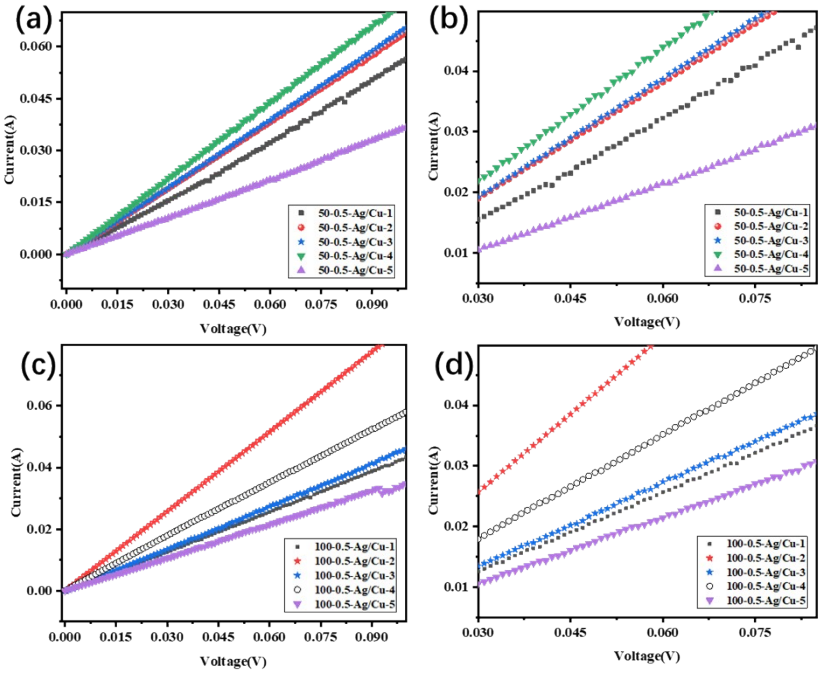

Fig. S5. I-V curve of copper microcircuit based on small particle size silver seeds and its local amplification. a) b) **50-0.5-Ag/Cu**; c) d) **100-0.5-Ag/Cu**.

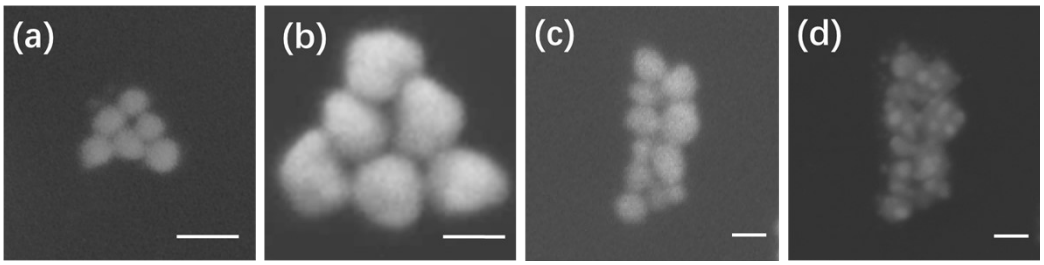

Fig. S6. a) and b) SEM images of silver seed patterns with different particle sizes. c) and d) SEM images of the silver seed pattern (50 nm particle size) and the corresponding copper microcircuit. The scale bars in the images are all 100 nm.

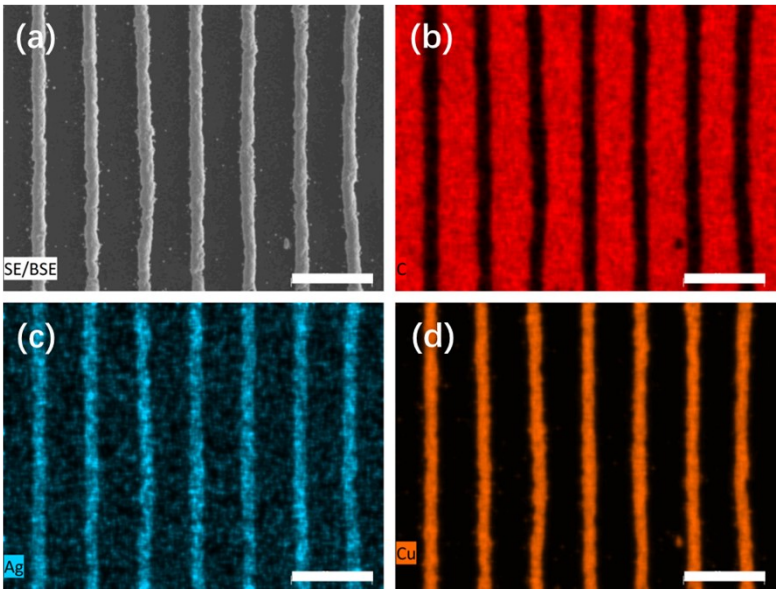

Fig. S7. Element mapping of 200-0.5-Ag/Cu. a) SEM image; b) C; c) Ag; d) Cu. The scale is 60μm.

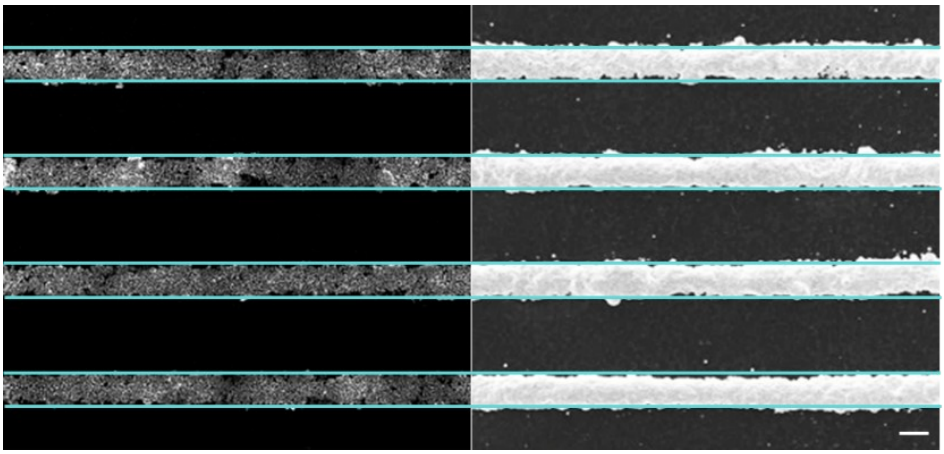

Fig. S8. Width measurement of **200-0.5-Ag** and **200-0.5-Ag/Cu**. The scale is 10μm.

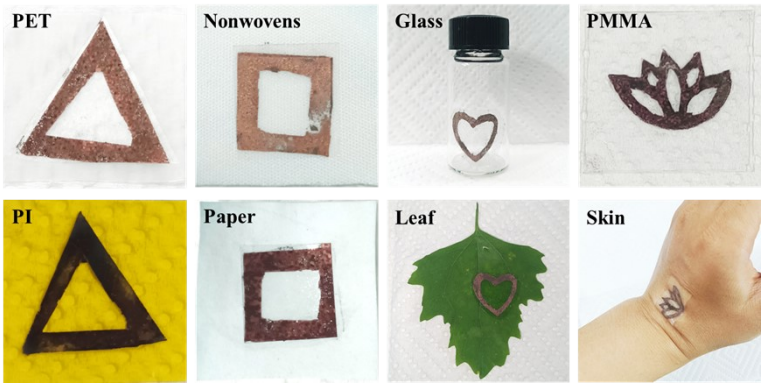

Fig. S9. Copper wires on different substrates.

Table S1. Related wire parameters measured by I-V curve.

	Ag seeds layer	**Cu layer**
Length/μm	400	400
width/μm	40	40
Thickness/μm	0.3477	2.0862