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SUPPLEMENTARY INFORMATION

Copper Nanowire Based Transparent Conductive Flims with High Stability and Superior Stretchability

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The reaction equation for platinum nanoparticle formation is described as follows.

$2HOCH_2\text{-}CH_2OH \rightarrow 2CH_3CHO + 2H_2O$; $2CH_3CHO + PtCl_2 \rightarrow CH_3CO\text{-}COCH_3 + Pt + 2HCl$

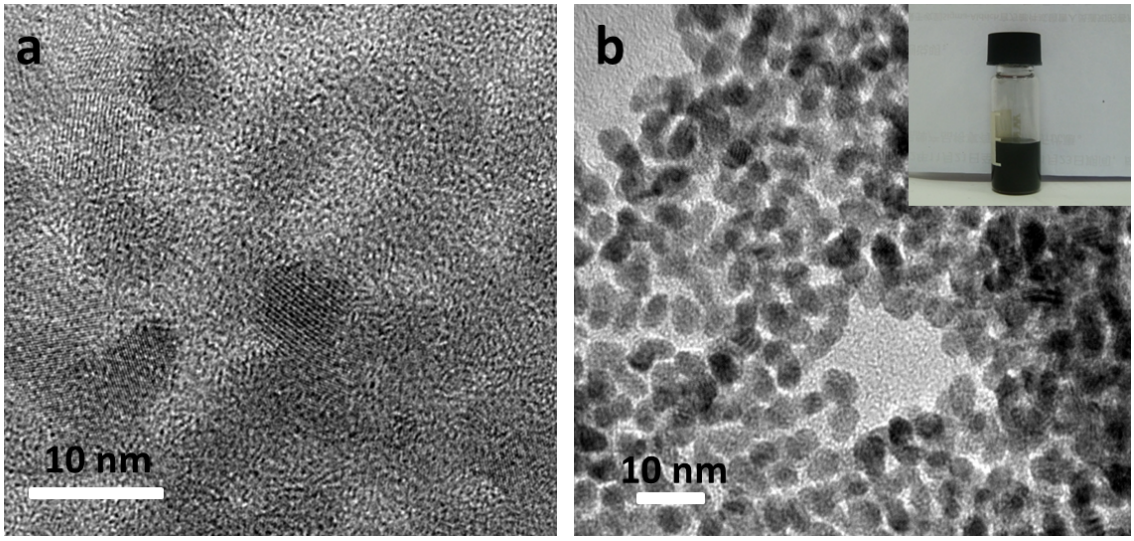

Figure S1. TEM images of synthesized Pt nanoparticles with different magnification (a) and (b); the upper-right corner of (b) is the photograph of 3 ml as-prepared Pt nanoparticle suspension in a glass vial.

In the evaluating method we proposed to access the purity of nanowires, typical TEM images for each sample was picked out. Then we counted the number of the nanowires and particles in the corresponding TEM image and made a calculation in terms of ***the number of particles per nanowire*** and ***the number of particles per micrometer of nanowire***. The result is presented in Table S1.

Table S1. The evaluating results of Cu nanowires synthesized with different catalyst amount

Sample	**Number of particles per nanowire**	**Number of particles per micrometer of nanowire [μ m^{-1}]**
4 mg-5 μL[a]	4.33	0.52
3 mg-5μL	2.18	0.35
2 mg-5μL	1.65	0.23

[a]5 μL of the 3mL Pt nanoparticle suspension synthesized from 4 mg platinum precursor.

To know the yield of Cu nanowires, after reaction, the product was washed with toluene for several times and a brownish red Cu nanowire blanket was obtained. After drying in vacuum, the final product was weighed with an electronic analytical balance.

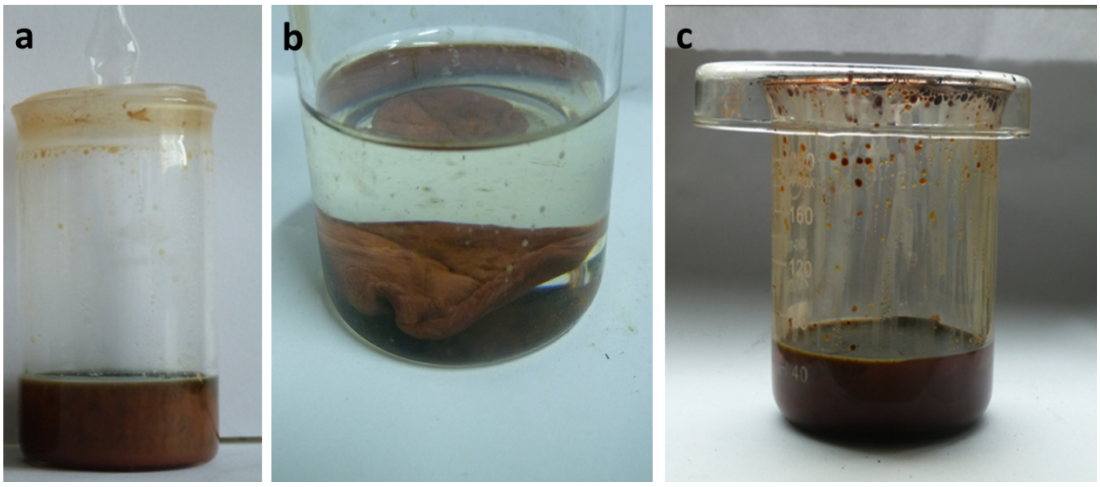

Figure S2. Pictures of (a) the reaction vial just after the synthesis reaction using the modified method; (b) the obtained blanket-shaped Cu nanowires in toluene after being washed from (a); (c) the reaction system scaled up by 5 times.

For the test of acid and alkali resistance, we adopted the standard industrial test for ITO to evaluate the acid and alkali resistance of the composite film, except that our testing was carried out at room temperature. For acid-resistance test, the glass slide-based film and the composite film were soaked in 6% HCl solution for 5 min and then rinsed with deionized water; the sheet resistance was measured before and after the dipping operation. For alkali-resistance test, similarly, the films were soaked in 10% NaOH solution for 5 min. **Table S2** shows the results of the tests.

Table S2. The results of the R_{sh} change of composite films and glass-slide films with similar R_{sh}.

Sample	**Acid-resistance test**		**Alkali-resistance test**	
	R_{sh} [Ω/□]	**Change percentage in R_{sh} [%]**	**R_{sh} [Ω/□]**	**Change percentage in R_{sh} [%]**
Flim on glass slide	10.5→20.2	+92.4	7.4→16.2	+118.9
Composite film	12.2→13.1	+7.4	12.5→14	+12

In the tape test, an ordinary adhesive tape was attached to a Cu NW film on glass slide and a composite film respectively and then peeled off. After that, the film on the glass slide was completed peeled onto the tape. While the composite film showed no macroscopic change and only a negligible sheet resistance increase which was within the error of measurement was found. For the friction test, we used a finger to wipe over the films. As a result, the conducting network on the glass slide was destroyed immediately. By contrast, no measurable R_{sh} increase and obvious macroscopic change occurred to the composite film.

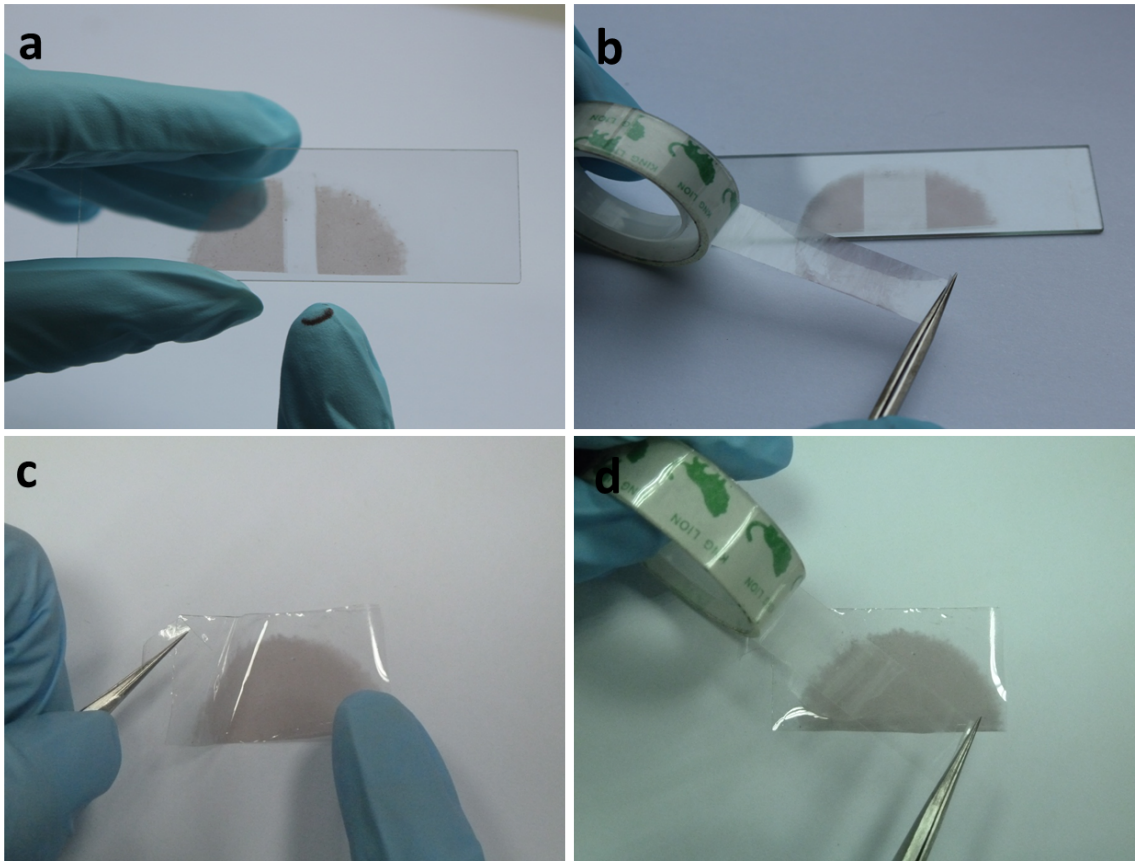

Figure S3. Cu NW film on glass slide (a) and composite film (c) after a moderate friction with a finger; Cu NW film on glass slide (b) and composite film (d) after peeling the adhesive-tape