SUPPOTING INFORMATION

CuS Nanotrough-Networks for Highly Stable Transparent Conducting Electrodes

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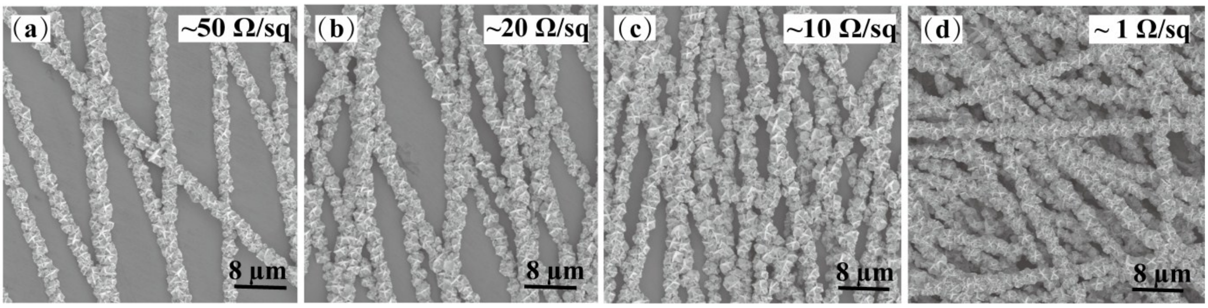

Fig. S1 SEM images of CuS NNs with different densities. The different densities of CuS NNs lead to different sheet resistances: (a) 50/sq, (b) 20/sq, (c) 10/sq, (d) 1Ω/sq.

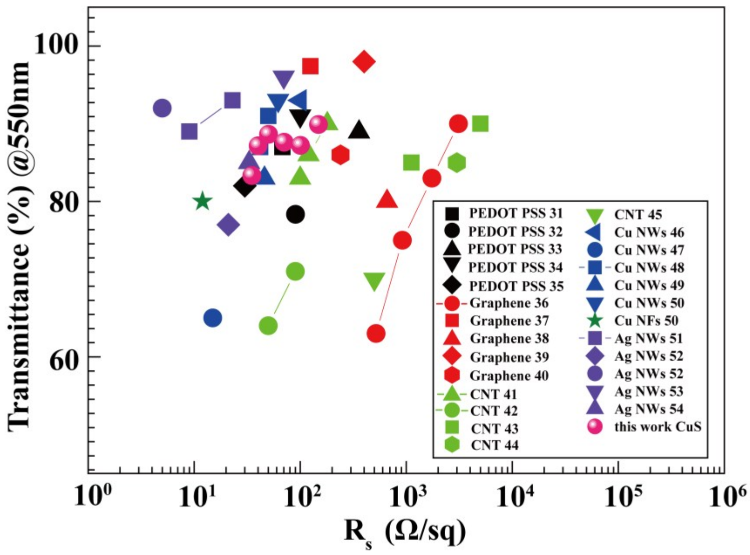

Fig. S2 Plot of transmittance versus sheet resistance for the various alternatives to ITO.

Table S1. Comparison of transparent conducting materials and their performance relative to ITO.

TCEs	T(at 550 nm)	R_s(Ω /sq)	ITO Level Performance	Example
Ag NWs	91	19	YES	52
Ag NWs-1	90.2	9	YES	51
Cu NWs	88	48	YES	49
CNT	79.3	70	NO	42
Graphene	86	242	NO	40
CuS TCE	**88.6**	**50.4**	**YES**	**This work**

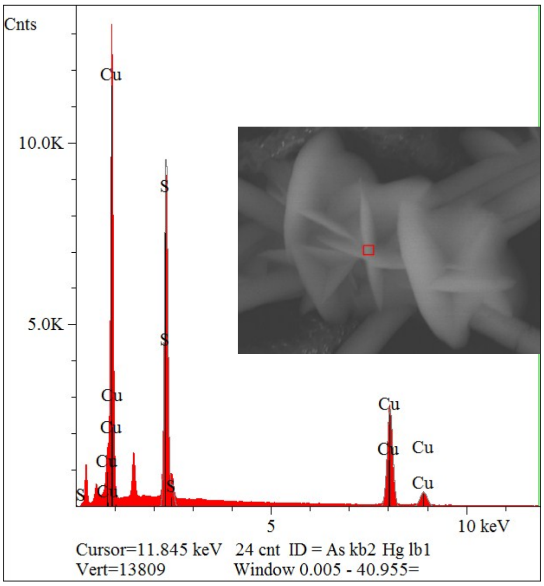

Fig. S3 EDS spectrum of The CuS NS after 12 h sulfur treatment.

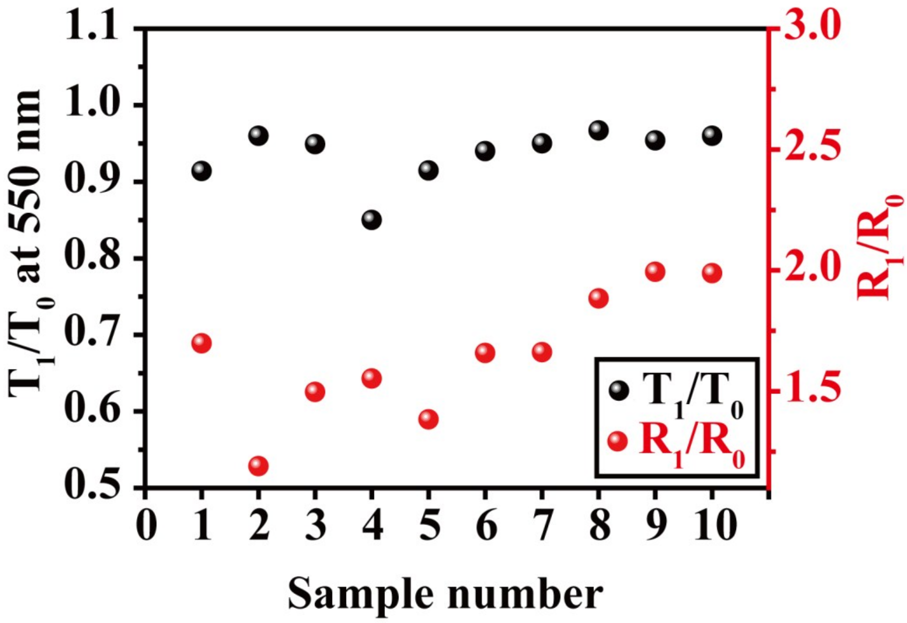

Fig. S4 The normalized sheet resistance (R_1/R_0) and transmittance (T_1/T_0) before and after 24h sulphur deposition of ten Cu NNs electrodes.

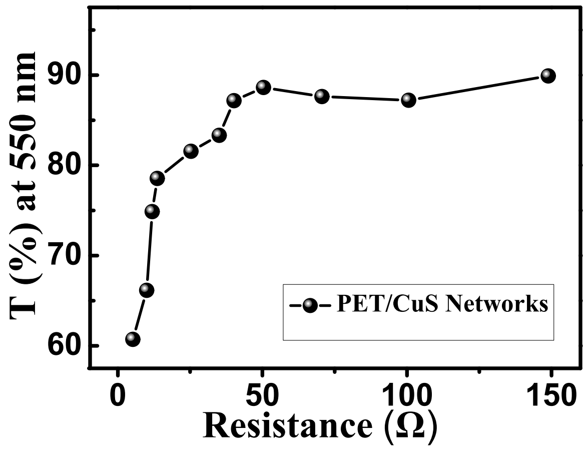

Fig. S5 Sheet resistance versus optical transmission (at 550 nm) of CuS NNs TCEs.

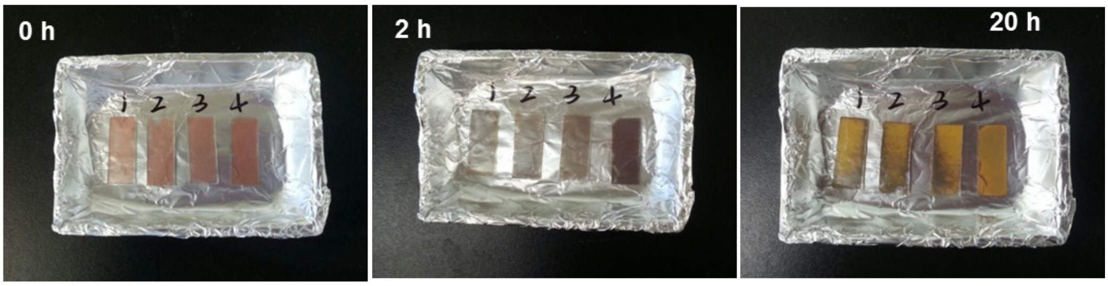

Fig. S6 The changes in colors of Cu NNs TCEs with different layers at 160 ℃ for 0 h, 2 h and 20 h.

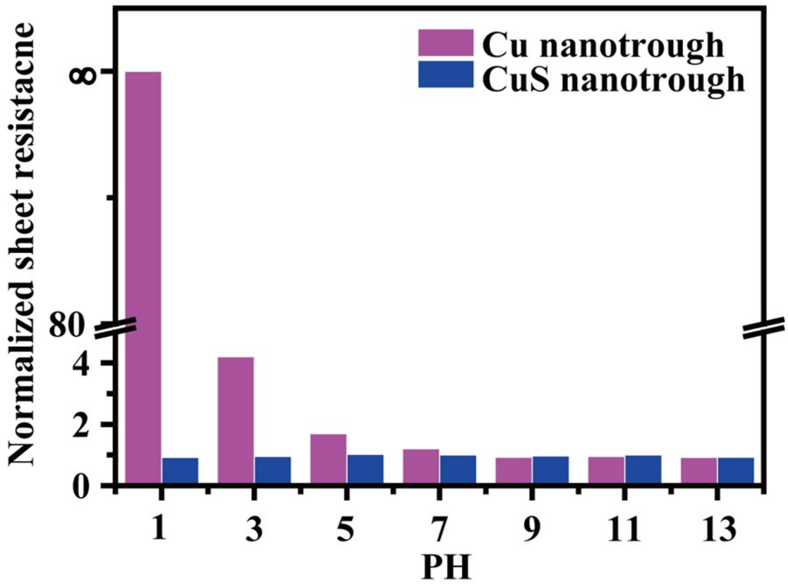

Fig. S7 Normalized sheet resistance vs different PH value of the Cu and the CuS NNs electrode.

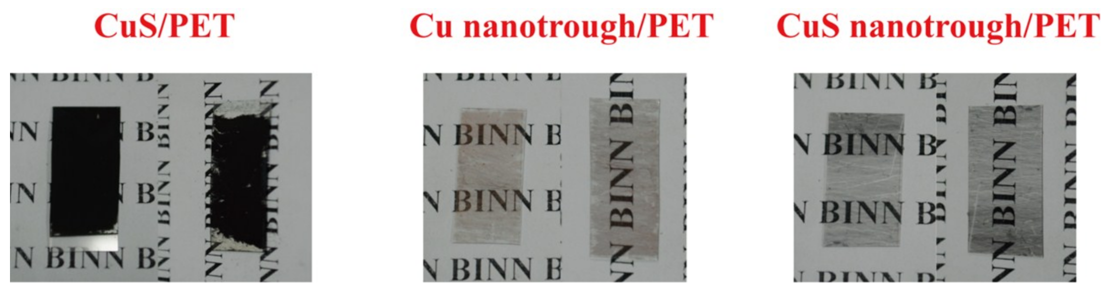

Fig. S8 the photographs before (left side) and after (right side) bend test of the CuS/PET, Cu nanotrough/PET and CuS nanotrough/PET electrode.