Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Electronic Supporting Information

One-step extend strategy with ionic liquid assisted synthesis of Ni_3S_4-MoS_2 heterojunction electrodes for supercapacitors

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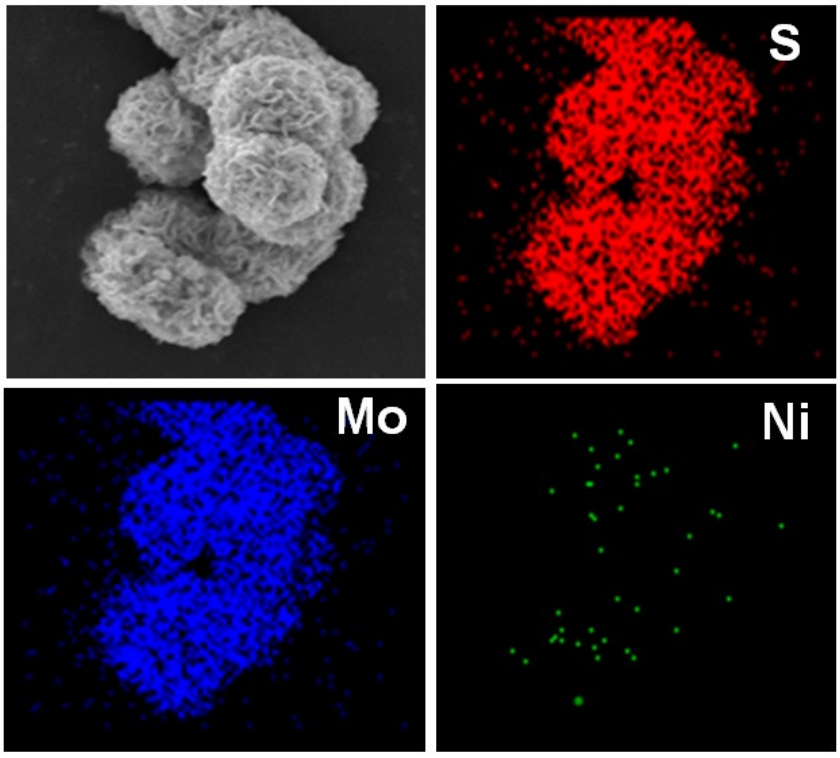
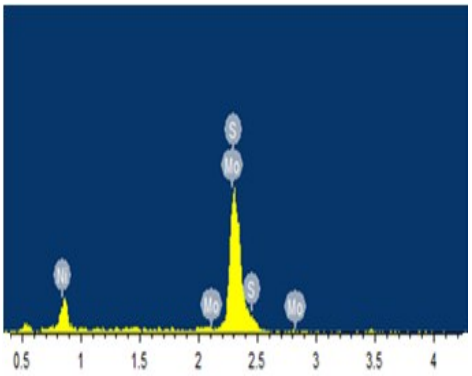


Figure S1. EDS mapping images of the whole Ni_3S_4-MoS_2 nanoflower.



Element	Wt %	Ratio %
S	29.05	50.7
Ni	21.24	20.26
Mo	49.75	29.05

Figure S2. EDS of Ni_3S_4-MoS_2

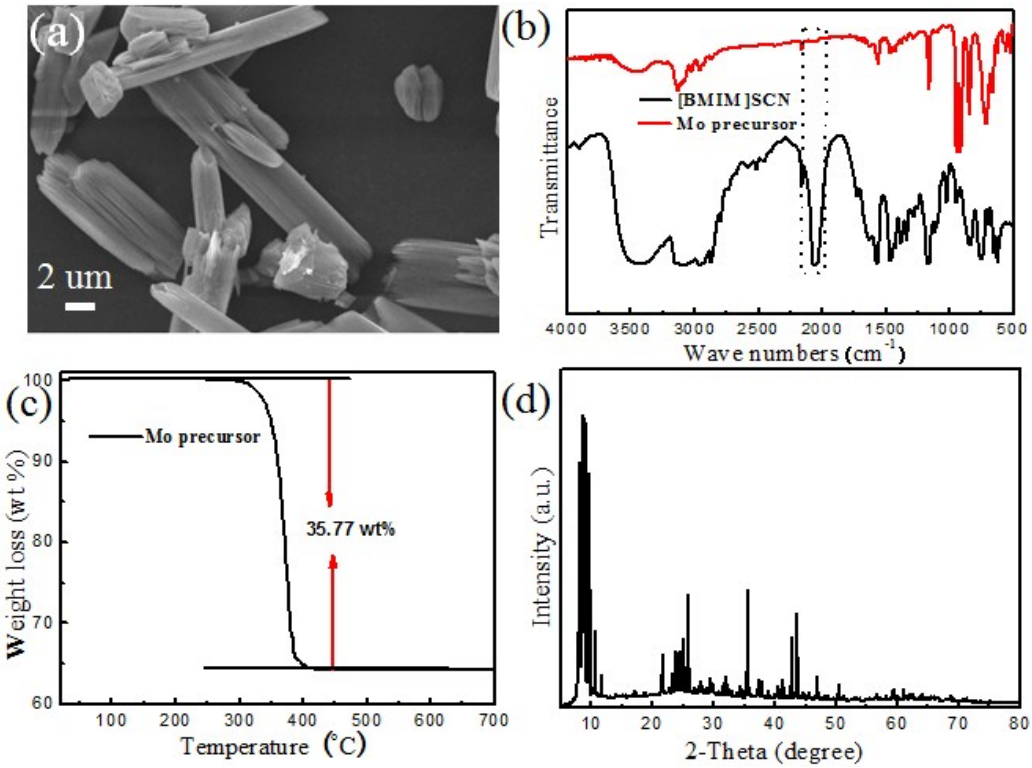


Figure S3. (a) SEM (c) TG (d) XRD of Mo precursor and (b) FT-IR of [BMIM]SCN and Mo precursor.

Table S1. Elemental analyzer result of Mo precursor

Element	Content (wt%)
N	6.54
C	22.32
H	3.72

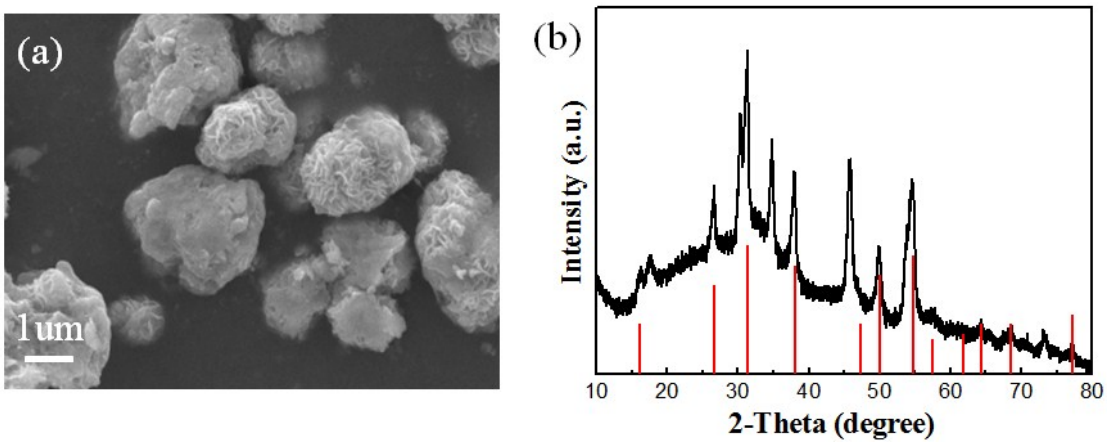


Figure S4. (a) SEM, (b) XRD of Ni precursor

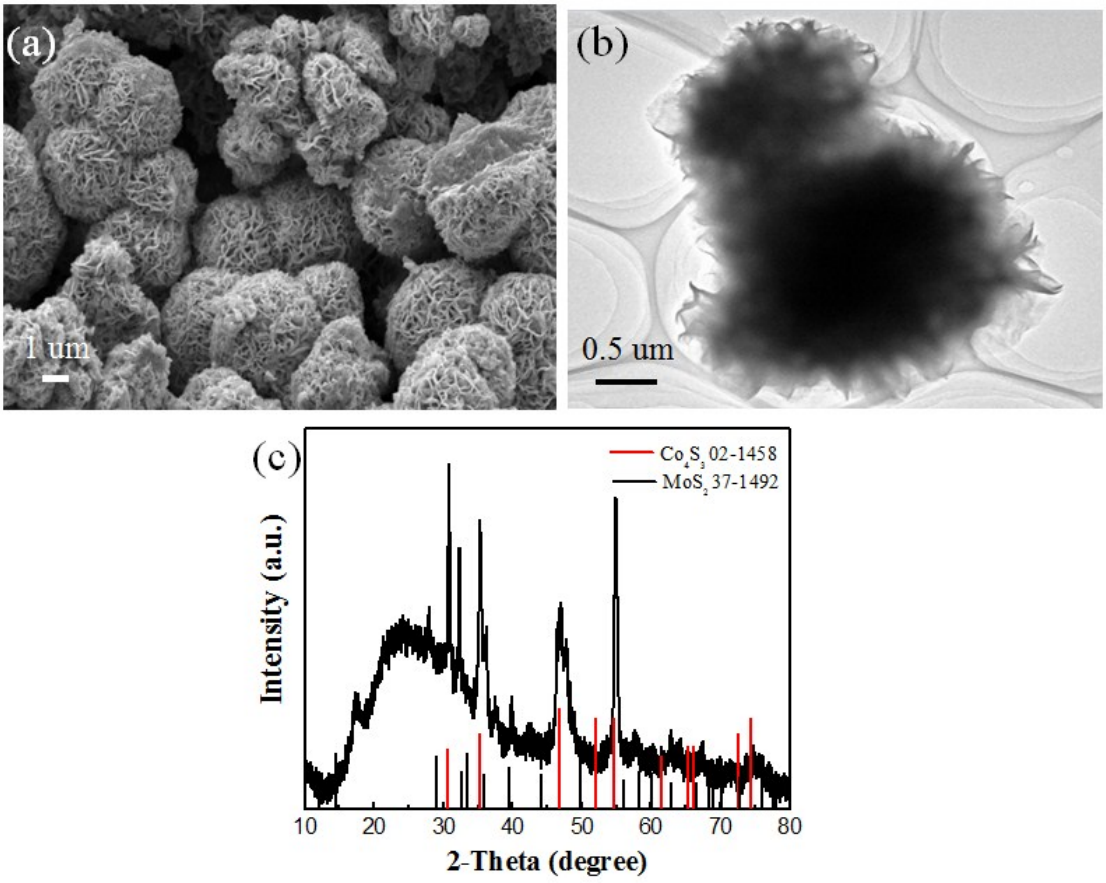


Figure S5. (a) SEM, (b) TEM and (c)XRD of Co_3S_4-MoS_2.

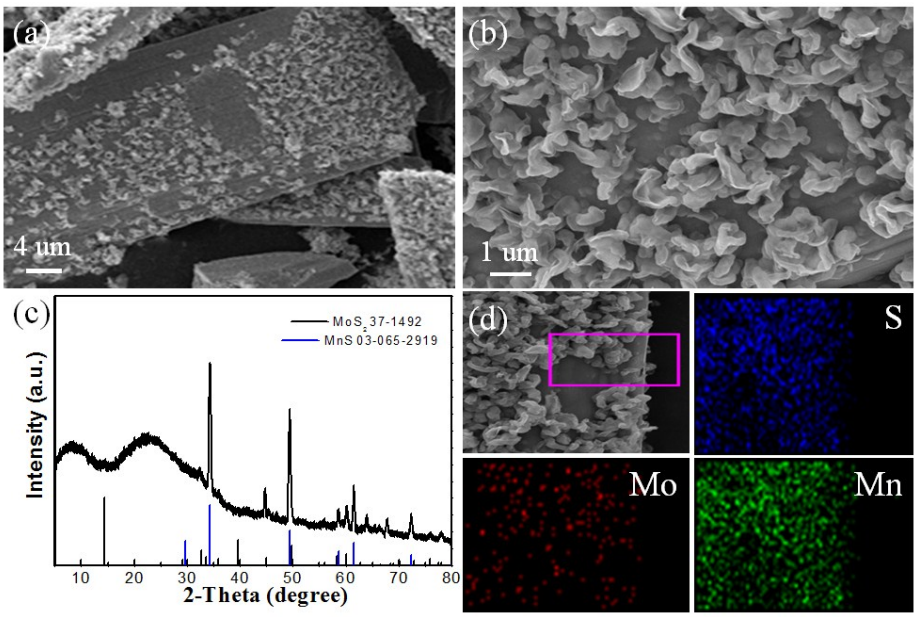


Figure S6. (a,b) SEM, (c) XRD and (d) EDS-mapping of MnS-MoS_2.

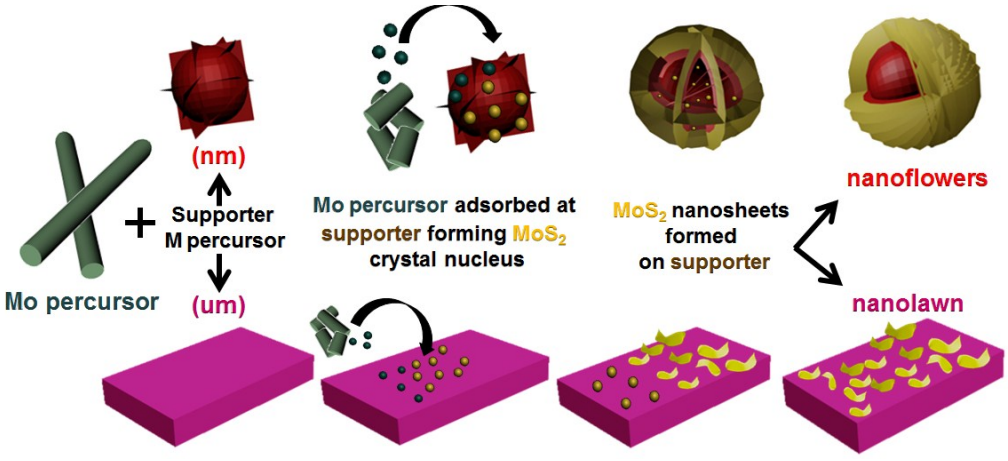


Fig.S7 The common reaction progress schematic of M_xS_y-MoS_2.

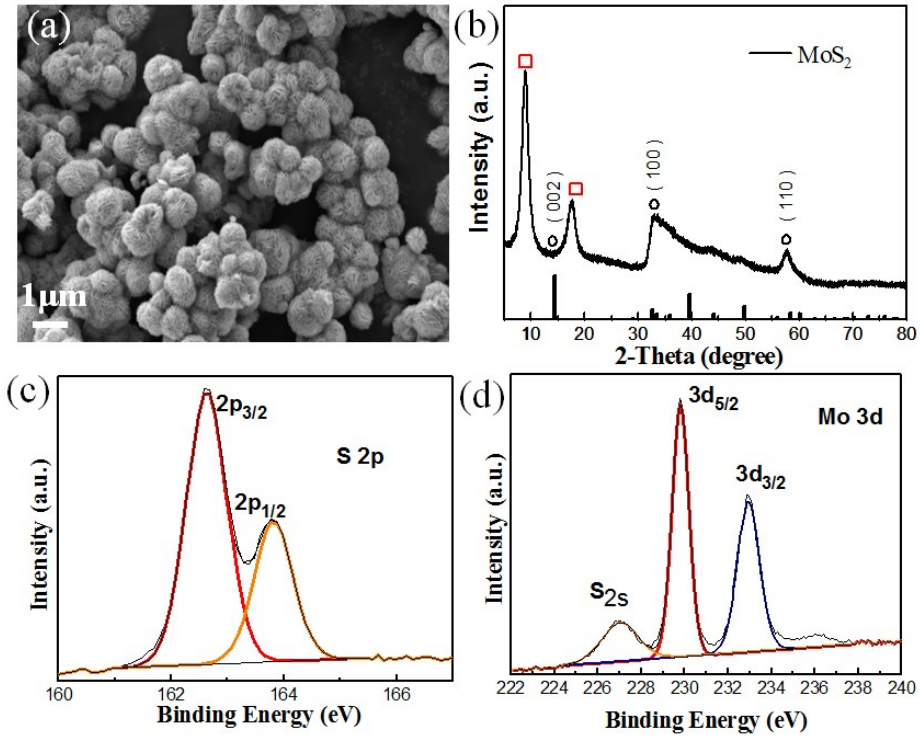


Figure S8. (a) SEM, (b) XRD, (c) XPS spectra of S 2p peaks, (d) XPS spectra of Mo 3d and S 2s peaks of MoS_2 for SCs performance comparison.

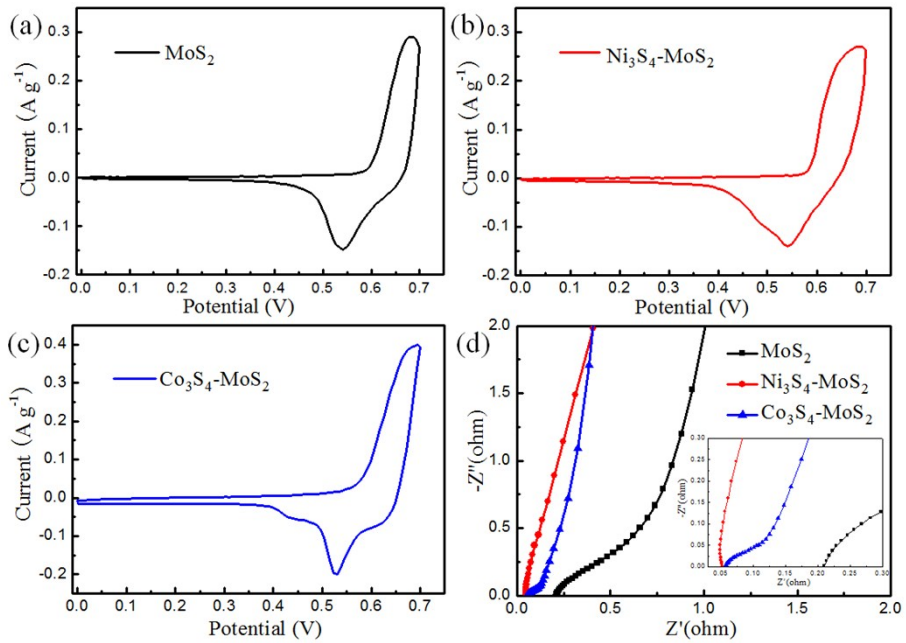


Figure S9. CV curves of (a) MoS_2 (b) Ni_3S_4-MoS_2 (c) Co_3S_4-MoS_2 at scan rate of 50 mVS^{-1} and (d) impedance Nyquist plots of MoS_2, Ni_3S_4-MoS_2 and Co_3S_4-MoS_2 at open circuit potential.

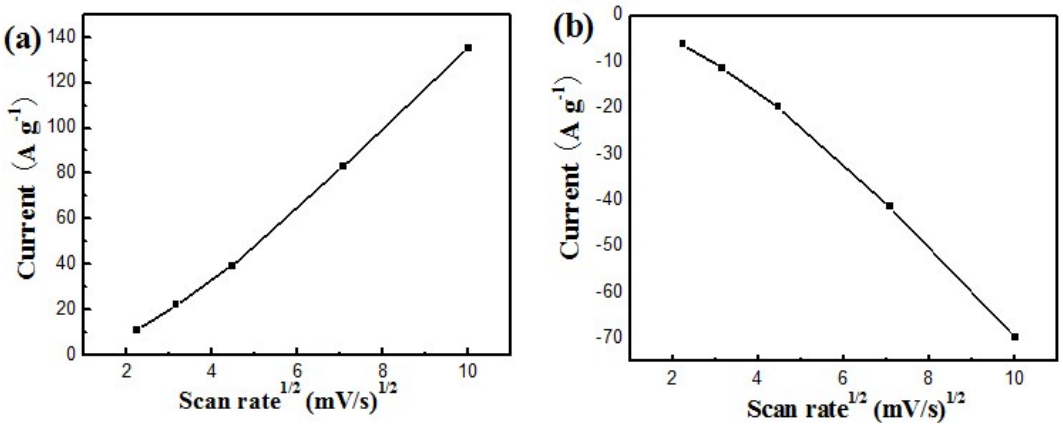


Figure S10. (a,b) Plots of anodic and corresponding cathodic peak current densities vs the square root of scan rate of the Ni_3S_4-MoS_2, respectively.

Table S2. Selected MoS_2, X-MoS_2 hybrid materials and its electrochemical performances

	Cycling stability	**Rate capability**	**Reference**
MoS_2/PANI	6000 cycles	496 F/g at 1A/g	ACS Appl. Mater. Interfaces 7 (2015) 28294-28302
MoS_2/rGO	50000 cycles	416 F/g at 1A/g	ACS Appl. Mater. Interfaces 8 (2016) 32842-32852
MoS_2/Oleylamine	5000 cycles	50.65 mF/cm^2 at 0.37 A/g	Chem. Mater.28 (2016) 657-664
MoS_2/Graphene	15min	4.29 mF/cm^{2}at 5 mV/s	ACS Appl. Mater. Interfaces 7 (2015) 17388-17398
MoS_2/C ball	5000 cycles	201 F/g at 1A/g	Int. J. Hydrogen Energy 40 (2015) 10150.
MoS_2/MWCNT	1000 cycles	452.7 F/g at 1 A/g	Energy 67 (2014) 234
MoS_2-C aerogel	1500 cycles	260 F/g at 1A/g	J. Electroanal. Chem. 752(2015)33
MoS_2	5000 cycles	368 F/g at 5mV/s	J. Power Sources 285(2015)63.

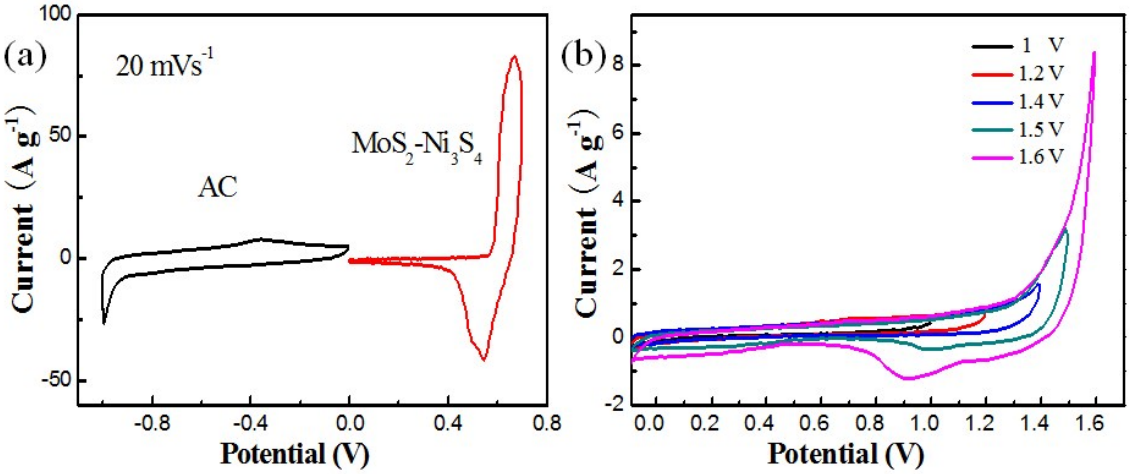


Figure S11. (a)Comparative CV curves of Ni_3S_4-MoS_2 and AC electrodes. (b) CV curves of the Ni_3S_4-MoS_2 //AC asymmetric supercapacitor at different potential windows at a scan rate of 20 mV s^{-1} in a two-electrode system.

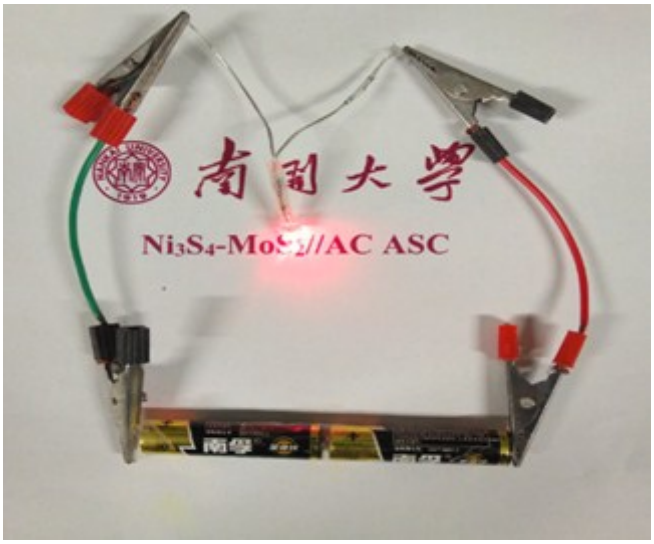


Figure S12. A LED lamp lighted by two new AA batteries.