Supplementary information

Table S1: Collated voluntary reporting checklist for similar metrics recommended by >1 journal and/ or referred to directly in main text. The checklist entries shown here are summarised from specific requirements listed individually on each list, grouped together as overarching categories where appropriate. Note that the Batteries Europe document is not presented in explicit checklist format, and efforts have been made to summarise the recommendations for comparison here.

Topic	JPS [1]	Joule [2]	ACS [3]	Wiley [4]	Batteries Europe [5]
Positive/ working electrode					
Scale of synthesis	✓		✓		
Supplier and purity of reagent	✓		✓		✓
Reaction conditions for synthesis	✓				
Mass composition of electrode	✓	✓	✓	✓	
Areal mass loading of electrode	✓	✓	✓		
Calendering pressure		✓			
Cell components					
Cell type and configuration	✓	✓	✓	✓	✓
Number of separators used	✓			✓	
Electrode thickness/ component thickness	✓	✓		✓	
Electrolyte volume vs. active material	✓	✓			
N/P ratio or active material excess	✓	✓	✓		✓
Mass of all components		✓			
Cell type (half/ full)		✓	✓	✓	
Current collector	✓			✓	
Electrochemical testing					
Environmental temperature	✓	✓	✓	✓	✓
Pressure applied to cell			✓		✓
Voltage range used for galvanostatic	✓		✓		✓
Nominal capacity	✓	✓	✓		✓
Capacity vs. full electrode/ full cell	✓	✓	✓		
Pre-activation	✓	✓	✓		
For CV: linearity of i_p vs v^12	✓				
Capacity for at least 3 cells		✓			

Table S2: Parameters collated from each article using graphical user interface, grouped by parameter category and data type. Default pre-filled values are shown underlined.

Parameter	Numerical	Free text	Boolean	Options
Cell format				
Anode materials		Other		Lithium metal, graphite, silicon
Cathode materials		Other		Sulfur, NMC811, NMC622, NMC532, NMC111, Other NMC, LFP/NMC blend, LCO
Cell type		Other		Coin, Swagelok, Pouch
Electrolyte volume (μL)	✓			
Electrolyte ratio	✓			
N/P electrode balance	✓		Reported?	
Electrode processing				
Production scale		Indicate scale	Reported?	
Commercial active material			Y/N	
Electrode composition reported				Binder, Additive, Active material, electrolyte solvent: solid ratio
Electrode thickness	✓			Coating setting, calendaring setting, direct measurement (e.g. micrometer), SEM, inferred from mass, precursor/ template thickness, other
Calendaring			Y/N	
Total electrode loading		Value with units		
Active material loading (mg cm^{-2})	✓			
Percentage active material in slurry	✓			
Galvanostatic				
Temperature				Not reported, Constant (non room temp), Room temp, under test
Theoretical capacity basis				Active material, areal/mass, cell, slow/ initial formation
Activation/ formation cycle	Rate, No. cycles	Other		
Voltage cutoffs	Min/ max		Multiple ranges	
C Rates	Min/Max			
Current density	Min/Max			mA g^{-2}, mA cm^{-2}
CC/CV step				CV during charge, CV during discharge
Multiple cells with statistics				Yes (in article), Yes (in SI), No
Cyclic voltammetry (CV)				
CV reported?			Y/N	
Voltage range	Min/ Max			
Sweep/ scan range	Min/ Max			
Diffusion by Randles-Sevcik and demonstration of linear relationship				Reported and checked, Reported not checked, Not reported
Electrochemical impedance spectroscopy				
EIS reported			Y/N	
Equivalent circuit model				None, 2 component, 3 component, 4 component, 5+ component

Table S3: Characterisation techniques recorded using checkboxes for each article for each measurand. micr. = microscopy, diffr. = diffraction, spectr. = spectroscopy
Measurands: Raw materials, composite (Li-S only), Electrode, In-situ/ operando, Post-mortem

Morphology	**Structure**	**Vibration**	**Electrode properties**	**Area/ porosity**
• SEM: Scanning electron micr. • SEM+EDX: Scanning electron microscopy+Energy dispersive X-ray spectr. • TEM: Transmission electron micr. • TEM+EDX: Transmission electron micr. +Energy dispersive X-ray spectr. • Transmission electron micr. + diffrac. • Optical • XCT: X-ray computed tomography • Focussed ion beam+Scanning electron micr.	• lab XRD: X-ray diffrac. • lab XPS: X-ray photoelectron spectr. • lab XRF: X-ray fluorescence • NMR: Nuclear magnetic resonance • Neutron (imaging/ diffrac.) • XAS: X-ray absorption spectr. • EXAFS: Extended X-ray absorption fine structure • SR XRD: synchrotron X-ray diffr. • SR XRD: synchrotron radiography • SR XRF: synchrotron X-ray fluroescence • XANES: X-ray absorption near edge spectr.	• Raman spectr. • FTIR: Fourier transform infra-red spectr. • UV-vis spectr.	• 4-point conductivity • Other conductivity • TGA: Thermogravimetric analysis • DSC: Differential scanning calorimetry • ICP: Inductively coupled plasma • TOF SIMS: Time of flight secondary ion mass spectr.	• BET/ MBET (Brunauer Emmett Teller) • Density functional theory • BJH (Barrett Joyner Halenda) • HK (Horvath Kawazoe) • Unspecified pore size distribution

Table S4: Sources for rarely-specified parameters. Due to the different measurement techniques and different measurands, measured values are omitted to avoid inconsistent comparison between articles. References corresponding to the main text reference list are included as a directory for difficult to find information

Parameter	Value	Ref
Formation period at OCV before cycling	$\leq$ 6 hours	[6–9]
	6-12 hours	[10–14]
	12-24 hours	[15, 16]
	$>$ 24 hours	[17]
Conductivity	**Sulfur**	
	4-point probe	[18–21]
	DC polarisation	[22]
	Resistance quoted	[23]
	Impedance	[24]
	Other/ unspecified	[25–27]
	NMC	
	4-point probe	[28–30]
	DC polarisation	[31]
	Impedance	[32]
	Other/ unspecified	[33, 34]
Electrode thickness	**Sulfur**	
	Doctor blade coating setting	[35]
	Calendering	[22, 24, 36]
	Precursor/ template	[20, 37]
	Other, inc SEM	[6, 38, 39]
	NMC	
	Doctor blade coating setting	[12, 15, 40–44]
	Calendering	[45]
	Other inc. SEM	[7, 46, 47]

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