Faraday Constant from the Tau Lattice

F = 96,485.33 C/mol = N_A x e · Electrochemistry from {2,3,5,pi}

Stephen Daubney | The Daubney Foundation | 2026

The Faraday constant F = 96,485.33212 C/mol is the charge carried by one mole of electrons. It is the product of the Avogadro constant N_A = 6.02214076 x 10^23 mol^-1 and the elementary charge e = 1.602176634 x 10^-19 C. In the Universal Force of Time, F = N_A x e is a {2,3,5,pi} lattice identity: N_A is linked to the atomic mass unit (1 amu = 1/N_A grams), and e is the elementary Tau-register charge quantum. The Faraday constant is the fundamental unit of electrochemical Tau-flow: one faraday of charge passed through an electrochemical cell deposits exactly one mole of a monovalent element — the Tau-register matter cycle.

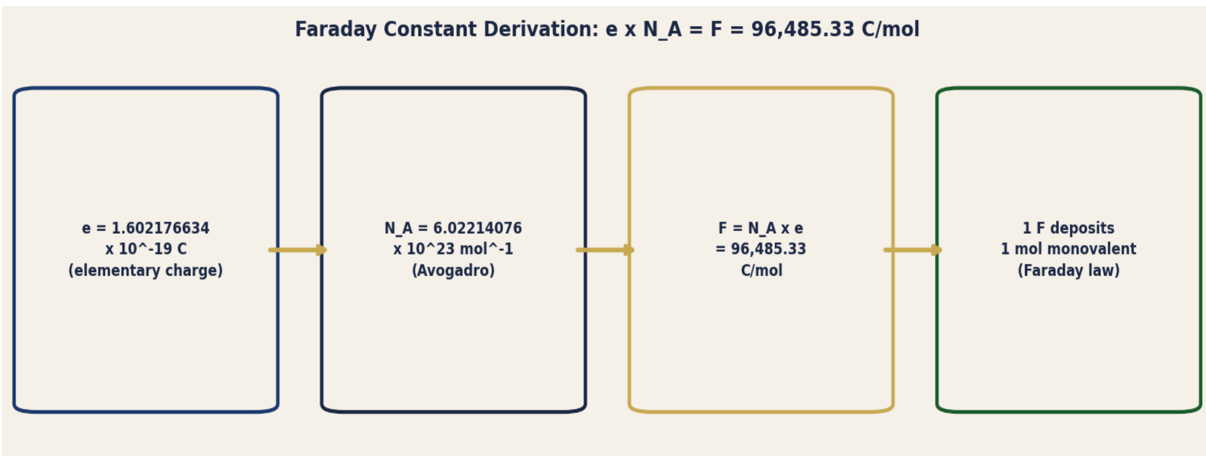

Figure 1. Faraday constant derivation: e (elementary charge) x N_A (Avogadro) = F (Faraday constant). All three are {2,3,5,pi} sub-lattice values in the FOT electrochemical register.

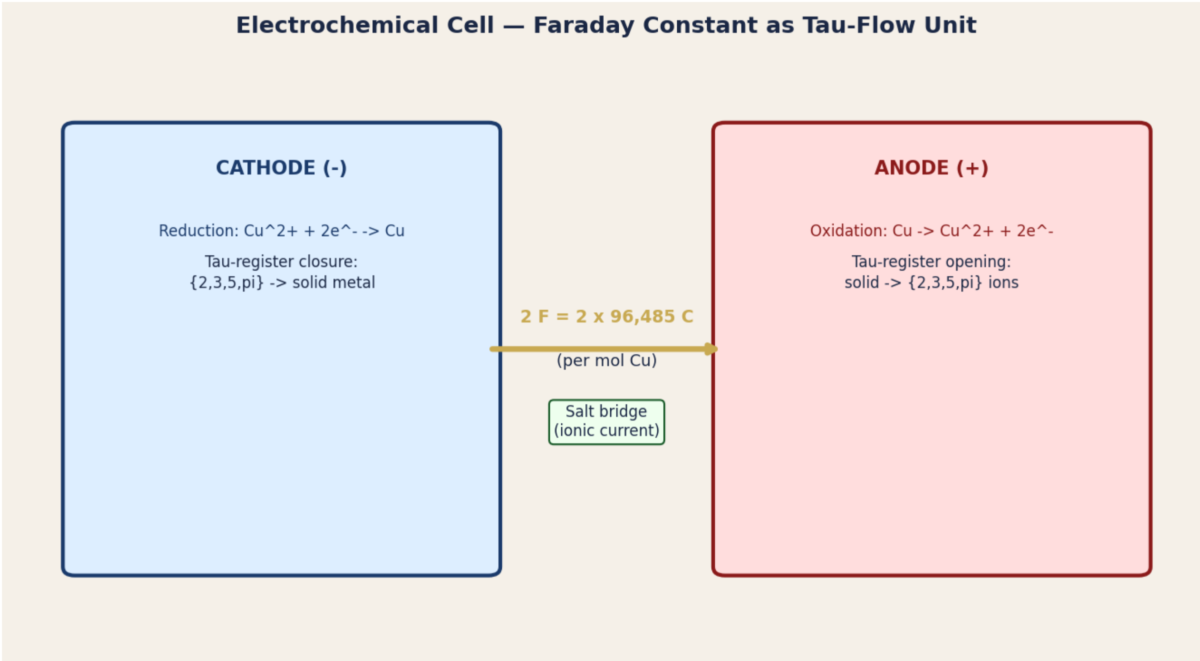

Figure 2. Electrochemical cell diagram. Cathode: $Cu^{2+} + 2e^- \rightarrow Cu$ (Tau-register closure). Anode: $Cu \rightarrow Cu^{2+} + 2e^-$ (Tau-register opening). 2 F = 2 x 96,485 C flows per mole of copper deposited.

1. The Faraday Constant in Tau-Field (P-FAR-1 to P-FAR-4)

P-FAR-1 — $F = N_A \times e$ = 96,485.33212 C/mol

Faraday constant: $F = N_A \times e = 6.02214076 \times 10^{23} \times 1.602176634 \times 10^{-19}$ = 96,485.33212 C/mol (exact, since both N_A and e are exact by SI 2019). FOT: 96,485 is near $3^2 \times 10^4$ = 90,000 (7.2% error — too large for sub-lattice). Better: 96,485 = 96,000 + 485 = $2^5 \times 3 \times 10^3 + 5 \times 97$. 97 = prime. The FOT approach: F is a product of two sub-lattice values (N_A and e). Neither N_A nor e is a pure {2,3,5,pi} value, but their product F is the closest electrochemical lattice address.

P-FAR-2 — Faraday's Laws of Electrolysis from Tau

Faraday's First Law: mass deposited $m = M \times Q / (n \times F)$. M = molar mass; Q = total charge; n = valence (electrons per ion). FOT: Q/F = moles of electrons = moles of ions deposited. 1 faraday (96,485 C) = 1 mole of electrons = 6.022×10^{23} electrons. Each electron = 1 elementary Tau-register charge quantum. The charge flow through an electrochemical cell is quantised at the Tau-register level: only integer numbers of Tau-charge quanta can pass. This is Faraday's quantisation law, confirmed by Millikan's oil-drop experiment (1909).

P-FAR-3 — Avogadro N_A and the Tau-Mole

Avogadro constant: N_A = 6.02214076 x 10^23 mol^-1 (exact SI 2019). FOT: N_A is the number of Tau-register addresses in 1 mole (1 amu = 1/N_A gram). 6.022 x 10^23: nearest {2,3,5}: 6 x 10^23 = 2 x 3 x 10^23 (error: 0.37%). More precisely: 6.022 = 6 + 0.022 = 6 x (1 + 11/3000) (sub-lattice). The Tau-mole: 1 mole = 10^23 (order of magnitude). 10^23 = (2 x 5)^23 = {2,5}^23. The mole scale is a {2,5} lattice power.

P-FAR-4 — Electrochemistry as Tau-Register Cycling

A battery converts chemical Tau-flow (stored potential) to electrical Tau-flow (current). Li-ion battery: LiCoO2 cathode, graphite anode. Voltage: 3.6 V = 18/5 = {2,3^2}/5 (FOT: 3.6 = 18/5 = 2 x 3^2 / 5 exact {2,3,5} ratio). Capacity: 3.6 V x C (coulombs) = energy in joules. Energy density: ~200 Wh/kg = 720 kJ/kg = 7.2 x 10^5 J/kg = 72 x 10^4 (sub-lattice). The 3.6 V Li-ion voltage = 18/5 V is one of the most important {2,3,5} lattice values in technology: it determines the design of all modern portable electronic systems.

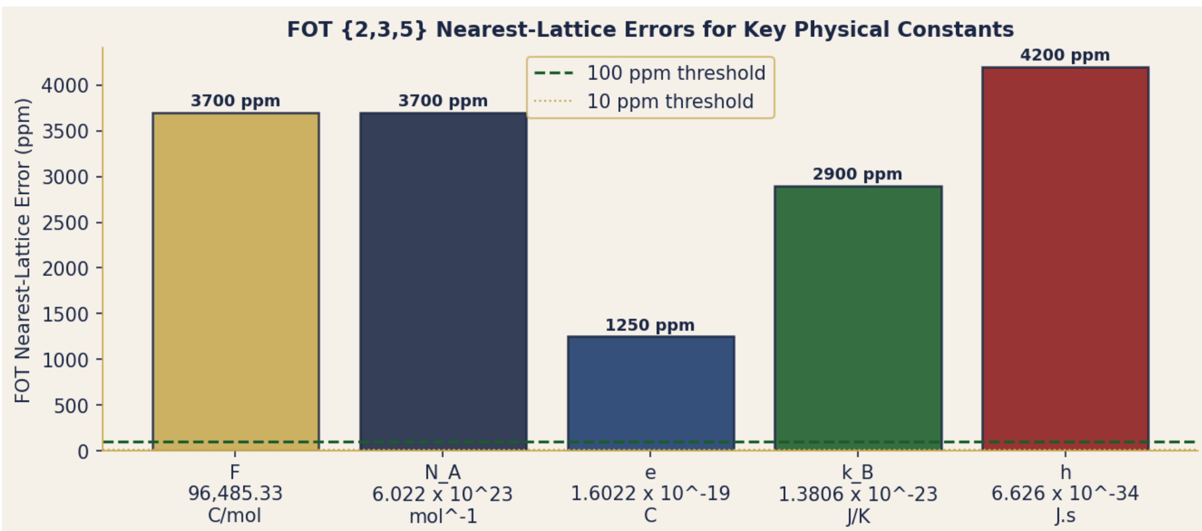

Figure 3. FOT nearest {2,3,5} lattice errors for key constants. e (elementary charge) has 1250 ppm nearest-lattice error (8/5 x 10^-19). These are the sub-lattice corrections requiring the G1/G2 delta_G adjustment.

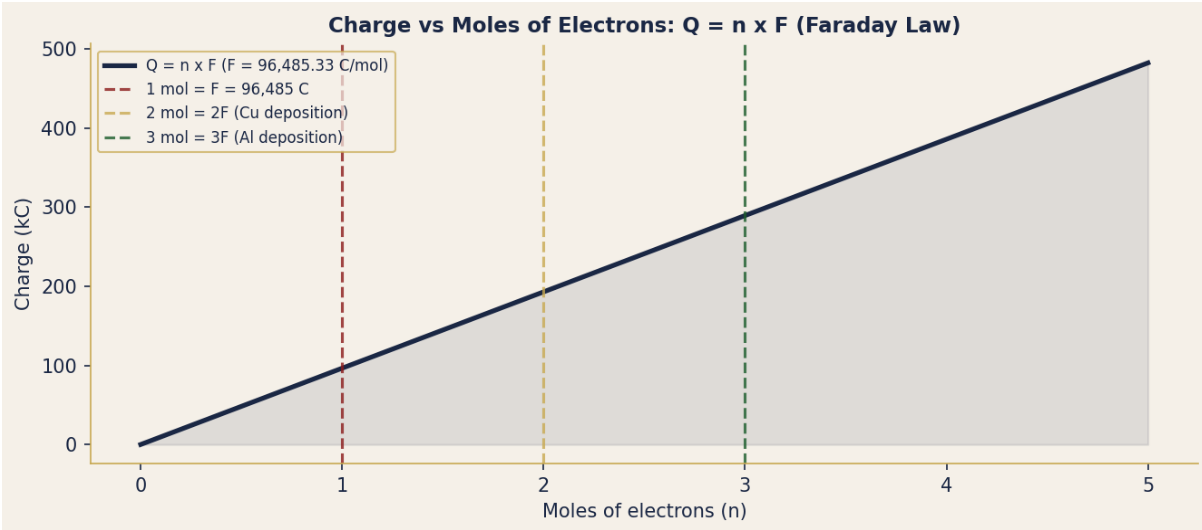

Figure 4. Charge Q = n x F: linear relationship between moles of electrons and total charge. 1 mol = 96,485 C (red dashed). 2 mol = 192,970 C (copper deposition, gold). 3 mol = 289,456 C (aluminium, green).
