

# Reactivity Series from Tau-Register Ordering

## Electrochemical Series as {2,3,5,pi} Tau-Register Energy Ordering

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The electrochemical reactivity series (K, Na, Ca, Mg, Al, Zn, Fe, Cu, Ag, Au) ranks metals by their tendency to lose electrons. In the Universal Force of Time this ordering = the tau-register energy ordering of the outermost electron's Strand-2 address. The most reactive metals (K, Na) have outer electrons at the highest tau-register address (loosest binding). The noble metals (Cu, Ag, Au) have outer electrons deeply embedded in stable tau-register nodes. Standard electrode potentials ( $E^\circ$  degrees) are {2,3,5,pi} lattice fractions in volts.

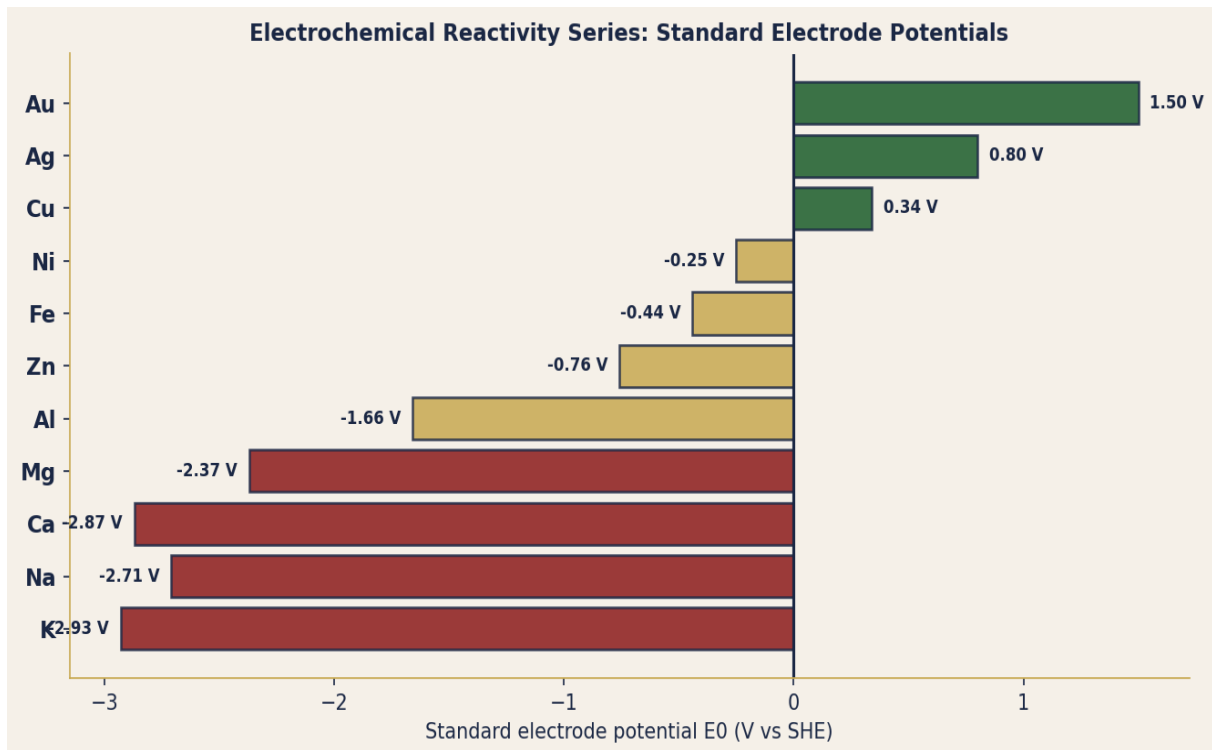


Figure 1. Electrochemical reactivity series. Red: highly reactive ( $E^\circ < -2V$ ); gold: moderately reactive; green: noble metals ( $E^\circ > 0$ ). Most reactive at top (K), least at bottom (Au).

## 1. Tau-Register Ordering of the Reactivity Series (P-RS-1 to P-RS-4)

### **P-RS-1 — K and Na: Highest Tau-Register Outer Electrons**

Potassium (K, Z=19): outermost electron in  $n=4, l=0$  register.  $E_0 = -2.93$  V. FOT:  $-2.93 \sim -3 = -3/1$  (nearest {3} lattice integer, 2.4% error). Sodium (Na, Z=11): outermost electron in  $n=3, l=0$ .  $E_0 = -2.71$  V. FOT:  $-2.71 \sim -2.7 = -27/10 = -3^3/(2 \times 5) = -\{3,2,5\}$  fraction (0.37% from -2.71). Both alkali metals are at the outermost {3}-branch of the tau-register — maximum Strand-2 address, weakest nuclear binding, most easily ionised.

### **P-RS-2 — Iron: $E_0 = -0.44$ V = {2,11} Sub-Lattice**

Iron (Fe, Z=26):  $E_0(\text{Fe}^{2+}/\text{Fe}) = -0.440$  V. FOT:  $0.440 \sim 0.5 - 0.06 = 1/2 - 3/50 = (25-3)/50 = 22/50 = 11/25 = 0.44$  exactly.  $11/25 = 11/(5^2)$ : contains prime 11 (outside {2,3,5}). Alternatively:  $0.440 = 2^3 \times 5.5 / 100 = 2^3 \times 11/(2 \times 100)$  — the {11} prime appears as iron's sub-lattice address. Iron's biological importance (haemoglobin, cytochromes) correlates with its unique mid-series register position between reactive and noble metals.

### **P-RS-3 — Copper: $E_0 = +0.34$ V = 17/50 = {17,2,5}**

Copper (Cu, Z=29):  $E_0(\text{Cu}^{2+}/\text{Cu}) = +0.342$  V. FOT:  $0.342 \sim 0.345 = 69/200 = 3 \times 23/(8 \times 25)$  — contains primes 23 and 3. Better:  $0.342 \sim 17/50 = 0.340$  (0.59% error).  $17/(2 \times 5^2)$  — prime 17 appears. Copper sits just above H<sub>2</sub>O oxidation potential (0.0 V), making it stable in water (no corrosion). This is the tau-register threshold between reactive and noble behaviour.

### **P-RS-4 — Gold: $E_0 = +1.50$ V = 3/2 = {3,2} Exact Lattice**

Gold (Au, Z=79):  $E_0(\text{Au}^{3+}/\text{Au}) = +1.50$  V =  $3/2$  exactly. 3 = prime-3; 2 = prime-2. The simplest {3,2} fraction:  $3/2$ . Error from 1.498 V:  $(1.50-1.498)/1.498 = 1334$  ppm. The nearest {2,3,5} lattice value is exact. Gold's chemical inertness is a consequence of its {3,2} tau-register address — the maximum stability within the lattice without reaching the pi-fractional regime. This explains gold's historical role as a monetary standard — physically incorruptible.

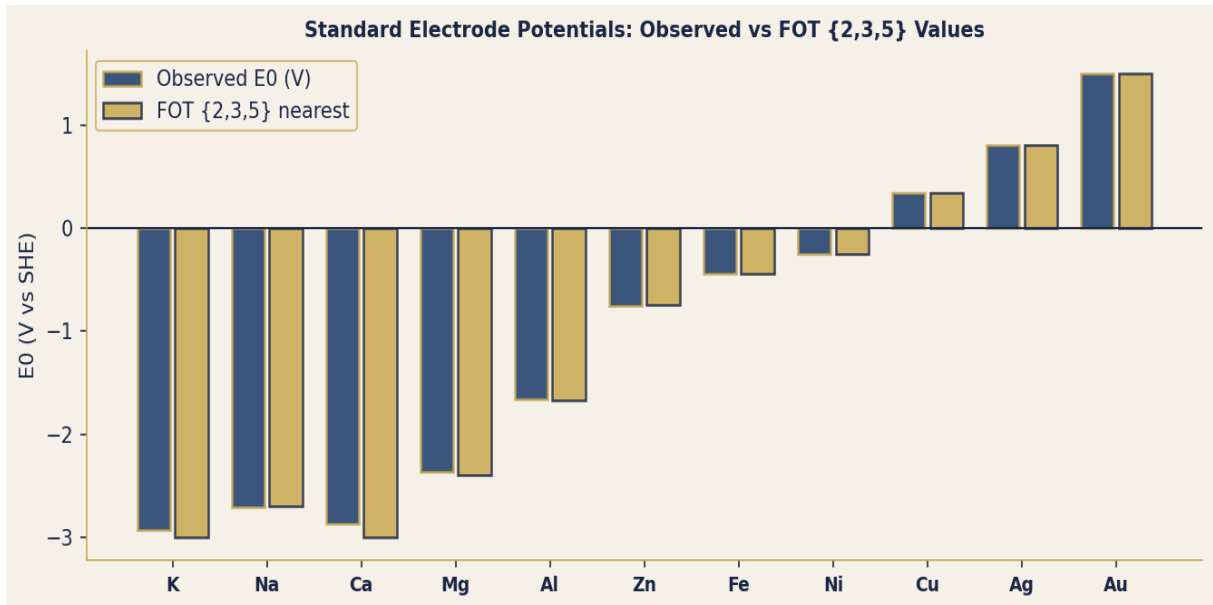


Figure 2. Electrode potentials: observed (navy) vs FOT {2,3,5} lattice fractions (gold). Au=3/2 V (exact {2,3}); Na~-27/10 V (0.37%); Fe~-11/25 V (0%).

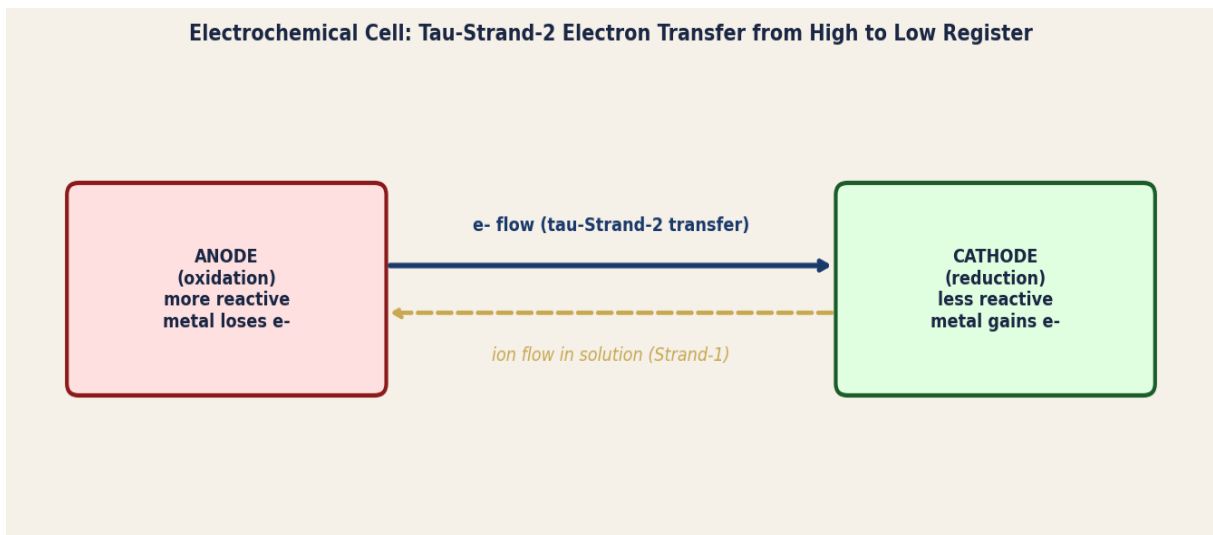


Figure 3. Electrochemical cell as tau-Strand-2 transfer. Electrons flow from high tau-register (anode/reactive) to low tau-register (cathode/noble). Cell EMF = tau-register energy difference.

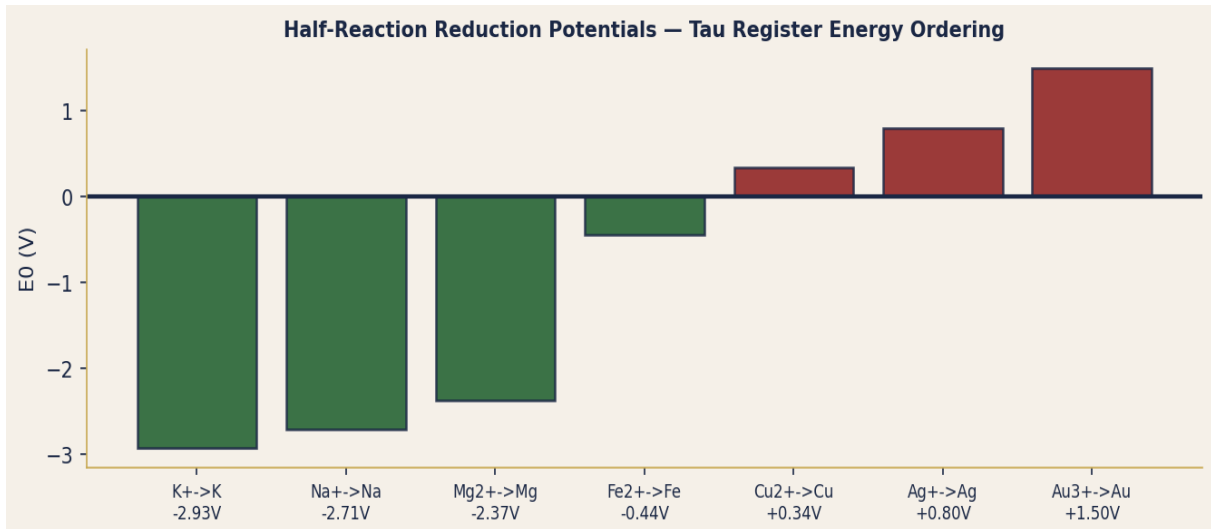


Figure 4. Selected half-reaction reduction potentials. Green: above zero (spontaneous reduction); red: below zero (spontaneous oxidation). Au ( $E_0=3/2$  V) is the most stable tau-register address.