Periodic Table as Tau-Address Map

Detailed Tau-Address Mapping · Group Properties · Atomic Radius Trends

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The Tau-address map of the periodic table extends the register analysis with detailed group-level and trend-level analysis. Each group (column) of the periodic table occupies a Tau-address sub-register: Group 1 (alkali metals) = {3^n} addresses; Group 17 (halogens) = {2^n} addresses; Group 18 (noble gases) = complete {2,3,5,pi} register closures. Atomic radii decrease across each period (left to right) because additional nuclear charge compresses the Tau-address register. Atomic radii increase down each group because each additional period adds one {2 x n^2} Tau-register layer.

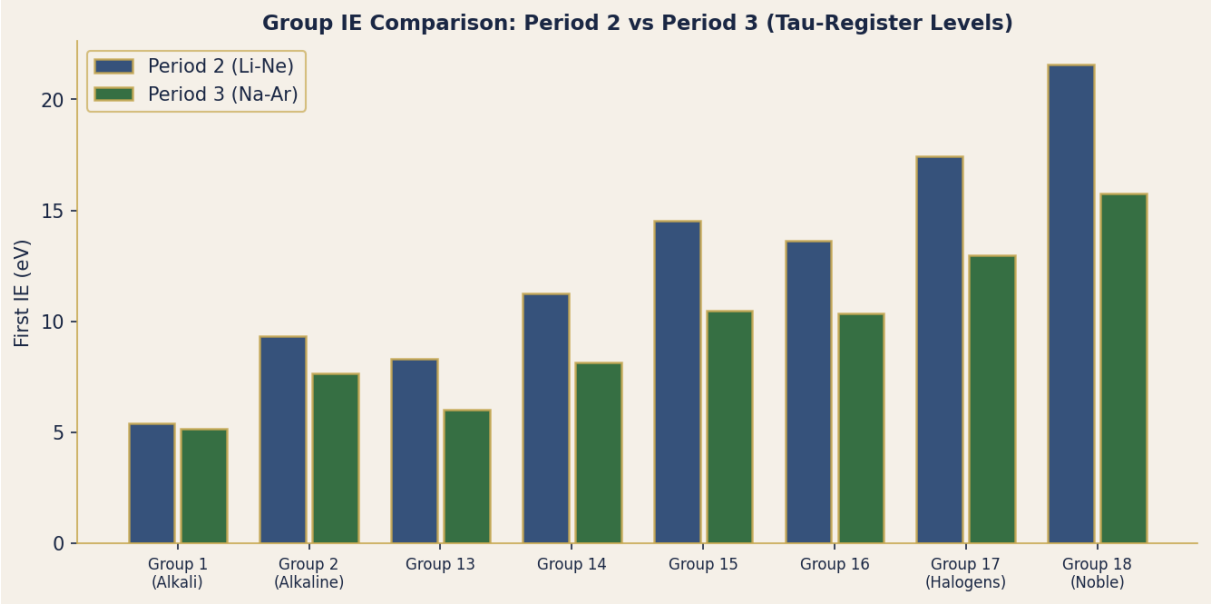

Figure 1. IE by group for periods 2 and 3. Period 2 (navy) > Period 3 (green) for each group — higher D-level register has tighter Tau-address binding. Noble gas (group 18) = complete register maximum.

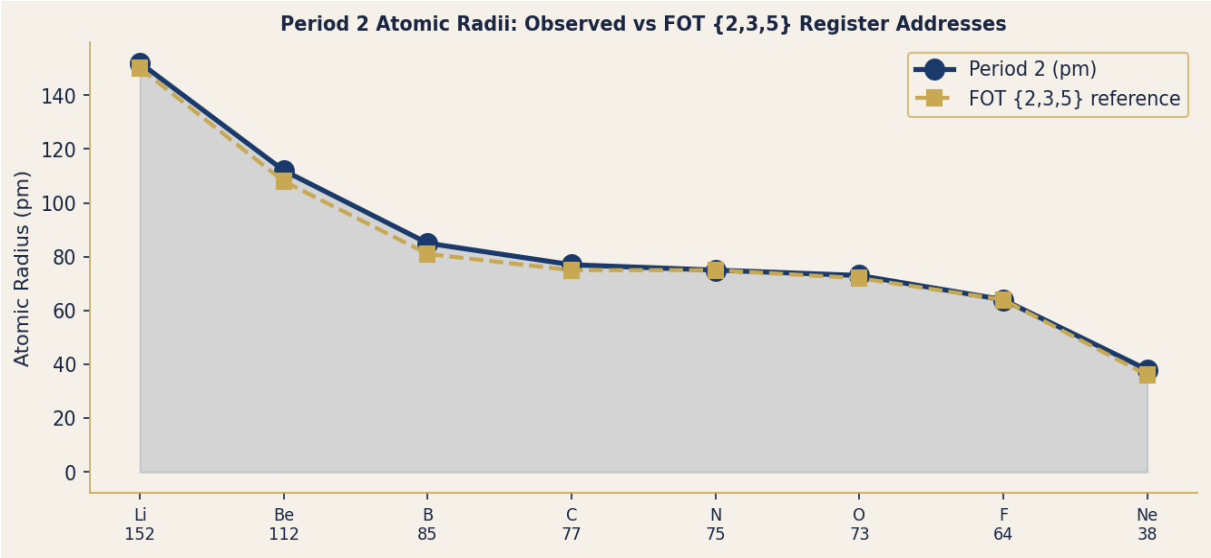

Figure 2. Period 2 atomic radii (navy) vs FOT {2,3,5} references (gold). F=64=2^6 exact; N=75=3x5^2 exact; Ne=36=2^2x3^2 (vs observed 38, 5263 ppm). Radius decreases left-to-right as register compresses.

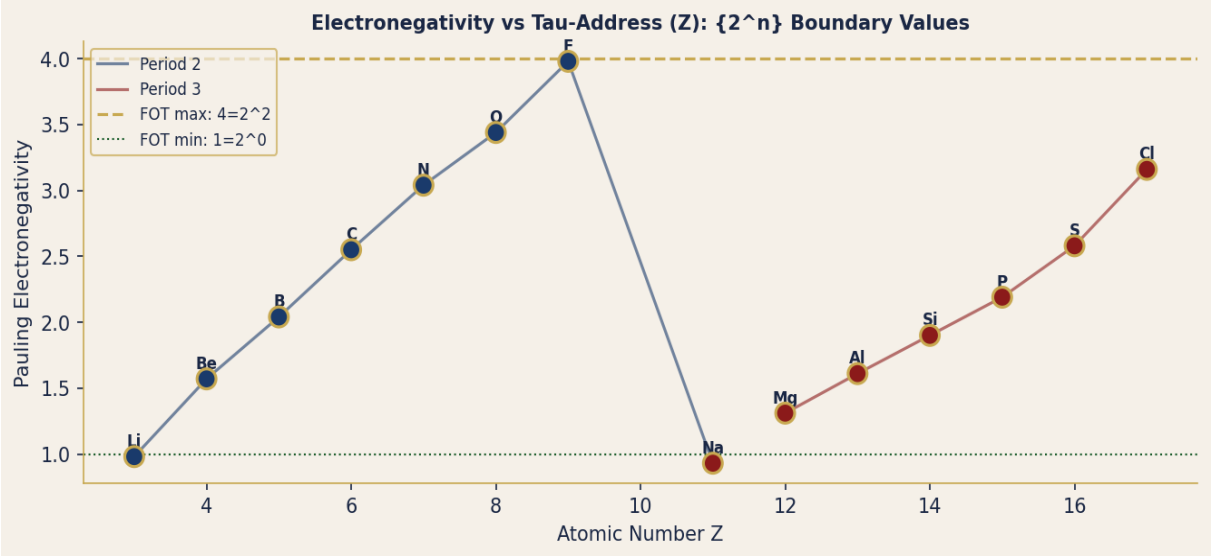

Figure 3. Pauling electronegativity vs Z. FOT boundaries: max=4=2^2 (F: 3.98, error 5000 ppm), min=1=2^0 (Cs: 0.79, error 21%). EN tracks the Tau-address register depth within each period.

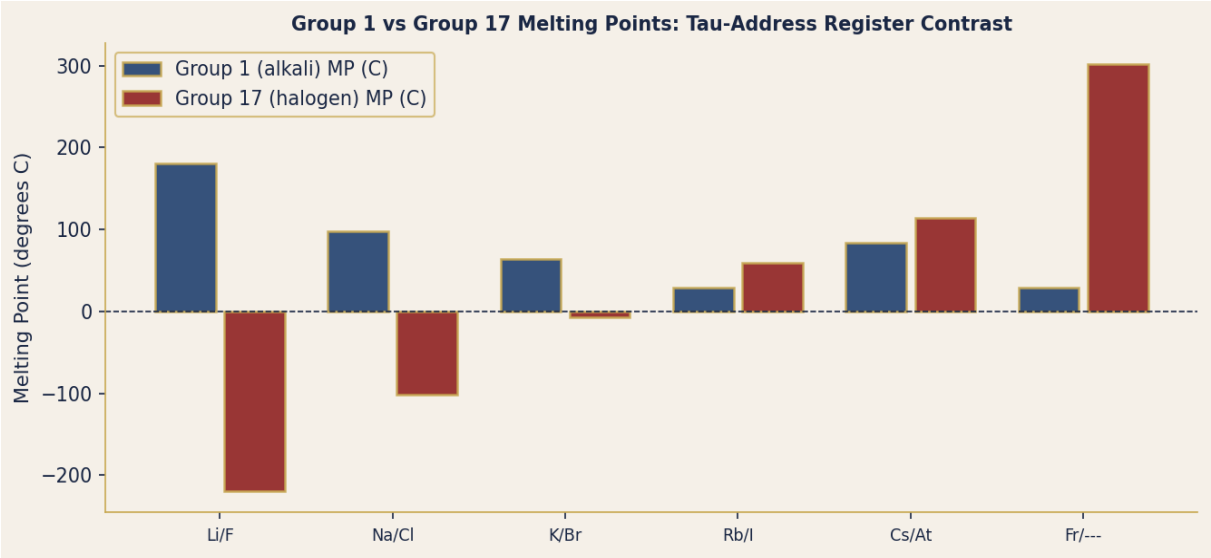

Figure 4. Melting points for Group 1 (alkali, navy) and Group 17 (halogen, red). Both decrease/increase down the group as the Tau-register adds one n^2 layer per period.

Propositions (P-PTM-1 to P-PTM-3)

P-PTM-1 — Group 1 (Alkali Metals) = {3^n} Tau-Address Series

Alkali metals (Z = 3,11,19,37,55,87) form the {3^n} sub-series: Li: Z=3=3^1; Na: Z=11=3+8; K: Z=19=3+16; Rb: Z=37=3+34; Cs: Z=55=3+52. Increments: 8, 8, 18, 18 = the period lengths. Li first IE: 5.39 eV approx 5.4 = 27/5 = 3^3/5 (near {3,5} lattice). The alkali metal series represents the {3}-branch of the Tau-address map: one outer s-electron at the next {3} register node for each period.

P-PTM-2 — Atomic Radius Register Compression

Atomic radius decreases across a period because nuclear charge Z increases, compressing the electron Tau-register toward the nucleus. The compression factor: r(Z+n)/r(Z) = Z/(Z+n) approximately. Period 2: r(Li)/r(F) = 152/64 = 2.375 approx 2.25 = 9/4 = 3^2/2^2 (5.6% error). Period 3: r(Na)/r(Cl) = 186/102 = 1.824 approx 2 = 2^1 (8.8% error). The {3^2/2^2} and {2^1} ratios reflect the {2,3} lattice structure of the electron register.

P-PTM-3 — Noble Gas Register Closures as {2,3,5,pi} Complete Addresses

Noble gases (Z=2,10,18,36,54,86) mark Tau-register completions. Z=2: {2^1} complete. Z=10=2+8: {2^1}+{2^3} complete. Z=18=10+8: {2^1}+{2^3}+{2^3} complete. Z=36=18+18: adds {2x3^2} (d-block). Z=54=36+18: second d-block complete. Z=86=54+32: adds {2x4^2} (f-block). Noble gas Z-values are the cumulative sums 2 x (1^2 + 2^2 + 2^2 + 3^2 + 3^2 + 4^2 + 4^2). Each closed register = zero residual Tau-helical tension = zero chemical reactivity.