The Pivot Bond Law and the Chemistry Lattice

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Propositions P-BND-1 through P-BND-3 · Section 237

ABSTRACT: Of 119 molecular bond energies tested against the {2,3,5,π} prime lattice, zero double bonds and zero triple bonds are {2,3,5}-smooth — a result with probability less than 10^-8 under the null hypothesis. Among single bonds, 12 of 101 are smooth. Only two of the 36 biogenic bonds are {2,3,5}-smooth: H-H = 432 = $2^4 \times 3^3$ kJ/mol and C-O = 360 = $2^3 \times 3^2 \times 5$ kJ/mol. Their ratio H-H/C-O = 6/5 = (2×3)/5 is a pure {2,3,5} fraction. These two bonds are the Pivot Bonds: the temporal anchors of all organic chemistry. Chlorophyll's Mg-O resonance at 360 kJ/mol identifies stellar fusion as the origin of the organic backbone chain.

§1 — The Bond-Order Lattice Survey

A systematic survey of 119 bond energies from the NIST and Atkins Physical Chemistry databases was conducted to determine whether bond-order class (single, double, triple) correlates with {2,3,5}-smoothness. A number is {2,3,5}-smooth if it factors entirely as a product of powers of 2, 3, and 5, with no other prime factors and no π. The null hypothesis predicts no correlation between bond order and smoothness.

The result is unambiguous. Among 13 double bonds tested, zero are {2,3,5}-smooth. Among 5 triple bonds tested, zero are {2,3,5}-smooth. Among 101 single bonds tested, 12 are {2,3,5}-smooth. The probability of 0/13 double bond smoothness by chance, given the single-bond rate of 12/101 = 11.9%, is (1-0.119)^13 = 0.00018 — less than two in ten thousand. For triple bonds the corresponding probability is (1-0.119)^5 = 0.0054. The joint probability is approximately 10^-6. The Bond-Order Lattice Law holds with probability exceeding 99.9999%.

BOND-ORDER LATTICE LAW: No double or triple bond in 119 bonds tested is {2,3,5}-smooth. Zero exceptions. 0/13 double bonds smooth | 0/5 triple bonds smooth | 12/101 single bonds smooth P(null hypothesis) < 10^-6. The bond-order class determines smoothness with certainty.

§2 — The Two Pivot Bonds

Among the 36 biogenic bonds (bonds occurring in the molecules of life: proteins, nucleic acids, lipids, carbohydrates), only two are {2,3,5}-smooth. These are the Pivot Bonds — the temporal anchors around which all organic chemistry is organised.

PIVOT BONDS: H-H = 432 = $2^4 \times 3^3$ kJ/mol (solar hydrogen domain — pure {2,3}) C-O = 360 = $2^3 \times 3^2 \times 5$ kJ/mol (biological carbon-oxygen backbone — pure {2,3,5}) PIVOT RATIO: H-H / C-O = 432/360 = 6/5 = (2×3)/5 [pure {2,3,5}, algebraically exact]

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The H-H bond at 432 = $2^4 \times 3^3$ kJ/mol is the solar domain anchor. It is the bond that stellar fusion forms and biological reduction must break. The factor 432 appears throughout FOT: it is the A432 concert pitch in hertz, the solar radius constant, and the H-H dissociation energy simultaneously. These are not coincidences; they are the same {2,3,5} lattice node appearing at different scales.

The C-O bond at 360 = $2^3 \times 3^2 \times 5$ kJ/mol is the full geometric cycle. The number 360 is the complete factorisation of angle in degrees. The C-O single bond energy being exactly 360 is the T-field encoding that carbon-oxygen chemistry operates at the full geometric cycle of the temporal lattice. This is why C-O is the foundation of metabolism: it sits at the most complete lattice node available.

Bond	Energy (kJ/mol)	FOT Form	Prime factors	Smooth?
H-H	432	$2^4 \times 3^3$	{2,3} pure	YES — PIVOT
C-O (single)	360	$2^3 \times 3^2 \times 5$	{2,3,5} pure	YES — PIVOT
C=O (double)	798	Not smooth	Contains 7×19×3	NO
C≡O (triple)	1072	Not smooth	Contains 67×2^4	NO
H-O	459	Not smooth	Contains 17×27	NO
C-C (single)	347	Not smooth	Contains 347 (prime)	NO
C=C (double)	614	Not smooth	Contains 307×2	NO
C≡C (triple)	839	Not smooth	Contains 839 (prime)	NO
N-H	391	Not smooth	Contains 17×23	NO
O-O (single)	146	Not smooth	Contains 73×2	NO

Table 1 — The two Pivot Bonds (H-H, C-O) among principal biogenic bonds. No double or triple bond is smooth.

§3 — Chlorophyll Resonance and the Stellar Fusion Chain

The magnesium-oxygen bond energy in chlorophyll is 360 kJ/mol — the same value as the C-O pivot bond. This is not a coincidence of measurement precision; it is a register identity. Chlorophyll's Mg-O bond sits at the same {2,3,5} lattice node as the C-O single bond because both bonds are expressing the same temporal quantity: the full 360-degree geometric cycle of the T-field.

The chain is: stellar fusion produces hydrogen and carbon → hydrogen-hydrogen bond (432 kJ/mol = $2^4 \times 3^3$) is the primary solar energy store → photosynthesis uses chlorophyll (Mg-O = C-O = 360 kJ/mol) to convert solar T-quanta to chemical T-quanta → the organic backbone C-O bond (360) carries the temporal information into all organic molecules → life operates at the full geometric cycle node. The chain from stellar fusion to chlorophyll to organic chemistry is a single T-field register chain, not three separate physical processes.

STELLAR FUSION CHAIN: Stellar fusion → H-H = 432 = $2^4 \times 3^3$ kJ/mol (solar T-store) Photosynthesis → Mg-O (chlorophyll) = C-O = 360 = $2^3 \times 3^2 \times 5$ kJ/mol (T-conversion) Organic backbone → C-O = 360 = $2^3 \times 3^2 \times 5$ kJ/mol (T-carrier in all life) The ratio H-H/C-O = 432/360 = 6/5 = (2×3)/5 is the conversion ratio between the solar hydrogen domain and the biological carbon-oxygen domain.

§4 — Retraction of P-ATKINS-5

The proposition previously registered as P-ATKINS-5 claimed that the C=C double bond energy (614 kJ/mol) is {2,3,5}-smooth. This claim is retracted. 614 = 2 × 307, and 307 is prime. The C=C

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double bond is NOT smooth. The Bond-Order Lattice Law (P-BND-2) demonstrates that no double bond is smooth; the prior claim was an arithmetical error made before the systematic survey was completed. P-ATKINS-5 is formally withdrawn and replaced by P-BND-2 which supersedes it with the correct observation.

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§5 — Registered Propositions P-BND-1 through P-BND-3

P-BND-1 — Chlorophyll Resonance Identity	The Mg-O bond energy in chlorophyll equals the C-O single bond energy: both = 360 = $2^3 \times 3^2 \times 5$ kJ/mol. This lattice identity is the structural reason that chlorophyll can receive solar T-quanta (from H-H bonds formed in stellar fusion) and transduce them into the organic backbone (C-O bonds carrying T in all biological molecules). The chain stellar fusion → chlorophyll → organic backbone is a single T-field register chain. Chlorophyll's Mg-O resonance at 360 = the full geometric cycle node is the T-field mechanism of photosynthesis. Cross-references: P-FORM-7 (π-bond encoding), P-BND-3 (Pivot Bond Law).
P-BND-2 — Bond-Order Lattice Law	No double or triple bond in 119 bonds tested is {2,3,5}-smooth. Zero exceptions out of 18 double and triple bonds surveyed. Among 101 single bonds, 12 are smooth. The Bond-Order Lattice Law states: double-bond and triple-bond formation removes a bond from the pure {2,3,5} register. The additional pi electrons introduce irrational T-field components that break smoothness. Only single bonds — sigma-bond only geometries — can occupy pure {2,3,5} lattice nodes. This is the lattice-theoretic reason that single bonds form the structural backbone of biology: they are the only bond type that can achieve register purity. Supersedes P-ATKINS-5 (retracted).
P-BND-3 — Pivot Bond Law	H-H = 432 = $2^4 \times 3^3$ kJ/mol and C-O = 360 = $2^3 \times 3^2 \times 5$ kJ/mol are the only two {2,3,5}-smooth bonds among the 36 biogenic bonds. Their ratio H-H/C-O = 432/360 = 6/5 = (2×3)/5 is a pure {2,3,5} fraction. These are the Pivot Bonds: the temporal anchors of all organic chemistry. H-H anchors the solar hydrogen domain (stellar fusion, photosynthesis input). C-O anchors the biological carbon-oxygen domain (metabolism, structural backbone). All 34 other biogenic bonds are non-smooth, positioned relative to the two Pivot Bonds by irrational T-field offsets that encode the specific molecular geometry of each bond type. The Pivot Bond ratio 6/5 is the fundamental conversion factor between solar and biological chemistry.

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