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ORTHOGONAL REVIEW RECORD

The Enclosure via the Chrysene Cluster: Integrated Synthesis of Nucleic Acids and Phospholipids, and the Orientational Encoding of the Membrane

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Declared conflict

This report was prepared by the same system that drafted the manuscript. That is a conflict of the first order and no statement below should be read as independent confirmation. The report is offered as an adversarial pass over material the reporter is not disinterested about, and every point below is one a reader could check against the manuscript without trusting the reporter. Where the report defends the manuscript, discount accordingly. There is no author-reply section.

Scope of Review

The manuscript takes the corpus's encoded chrysene cluster at the point where a nucleic acid has been formed on tetrasubstituted units templated by disubstituted ones, and asks two questions the corpus has not put: what becomes of the templates, which remain tethered to the bases they shaped, and what becomes of the units of the same family never recruited into a complex. It answers that the unrecruited remainder yields a lamellar amphiphile by a cut set that is forced up to one edge among eighteen; that the tethered templates partition into the resulting membrane; that whether an anchored strand is enclosed is constancy of a $\mathbb{Z}/2$-valued map on its anchor set; and that the templating orientations the anchors still hold constitute a two-bit-per-anchor source whose passage into the membrane is lossless or half-lossy according to one conformational premise. A closure calculation returns a required pool ratio of order 10^{2}, independent of the length of the sequence enclosed.

Compiled disposition

Major revision. The finite content is sound and checkable and the register discipline is exemplary. Two premises carrying the paper's headline result are asserted without calculation and are in tension with one another; one framing device is used beyond what the paper concedes it can support. None of the three is fatal and all three are addressable within the paper's own conventions.

Required before print

Blocking before acceptance. State the possible antagonism between H7 and H8 explicitly, and either exhibit a rotamer population satisfying both or record that the conjunction is a stronger premise than either conjunct. Either redefine capacity as the entropy of an injection in the statement of the theorem, or restate Section 9.2 in the language of injectivity and fibres throughout. Promote H2 in the ordering of Section 14.1 and state the prior that the same interaction is load-bearing elsewhere in the corpus. Cite or compute the phosphate-burial cost, and attach the $E^{*} = 10\,k_{B}T$ stipulation wherever the pool-ratio figure is quoted.

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1 What the manuscript does well

Finite content, withdrawals, capacity form, refusals

The finite content is genuinely finite and is exposed. The cut-set enumeration, the carbon partition, the skeleton embedding and the channel fibres are computed by a script the manuscript ships, and every quantitative statement in the body is transcribed from a numbered block rather than asserted. The embedding in block V8 recovers eighteen carbons and recovers the locants from the chord pattern rather than assigning them, which is the right way to do it and caught a real error in an earlier draft. Appendix D is a model. Six withdrawals are recorded, each naming what the withdrawn claim was, why it failed, and what replaced it. Two of them, the bivalent reading of the anchor units and the face identity $\sigma = \omega + \lambda$, were principal results of earlier drafts. The capacity result is falsifiable and is stated as a dichotomy with both branches computed. The refusals are placed before the constructions. Section 3 disposes of five over-readings before any of them can be committed, and the manuscript does not subsequently help itself to any of them.

2 Major points

1 — H8 and H7 make competing demands on the same nine atoms

The paper's headline capacity result, two bits per anchor rather than one, rests entirely on H8, that the nucleoside arm permits a unit to present either face while delivering its nucleoside to the interface. H7, on which Sections 8 and 9 have a subject at all, requires the capped arm to fold so that the unit lies within one leaflet. The manuscript observes that the two are settled by the same enumeration of arm rotamers and recommends taking them together. It does not observe that they may compete. An arm constrained to fold back into the core has lost conformational freedom. The manuscript's own freely jointed estimate, $\sqrt{9} \times 1.27 = 3.8\,\text{Å}$ against 11.4 Å extended, is an estimate of a collapsed chain, and a collapsed chain is not obviously free to reach an interface from either face. If the folding required by H7 is what removes the freedom required by H8, the paper obtains its subject at the price of its capacity.

This is not shown, and the reverse is not shown either. What is objectionable is that the manuscript presents the two premises as complementary, a reason to take the two together, when they may be antagonistic. Requested: state the possible antagonism explicitly, in Section 7 where H7 is introduced and again in the hypothesis register. Either exhibit a rotamer population satisfying both, or record that the conjunction is a stronger premise than either conjunct and that the paper assumes it.

2 — "Channel" and "capacity" presume a decoder the manuscript concedes it does not have

Section 9.2 computes a capacity in bits per anchor, exhibits fibres, and distinguishes a lossless from a half-lossy branch. Scholium 9.x then concedes that nothing in the surface reads the pattern, that the manuscript exhibits no process that recovers it, and that a pattern is

information only relative to something that acts on it. The concession is correct and it is fatal to the vocabulary, not merely a caveat on it. Shannon capacity is defined for a channel with a decoder. What the manuscript has established is that a certain injection from sequences to surface configurations exists. That is a real and non-trivial result. Injectivity is exactly what could have failed, and does fail in the other branch. But it is a statement about a map, not about a communication.

The manuscript is not being dishonest here. It says the right thing in the scholium. The objection is that it says the right thing after spending a subsection in a vocabulary that implies otherwise, and that a reader who reads the theorems and skips the scholium will take away a claim the paper does not hold. Requested: either retain the vocabulary but move the concession from the scholium to the statement of the theorem, so that capacity is defined in the paper as the entropy of an injection and not as a communication rate; or restate Section 9.2 in the language of injectivity and fibres throughout, which costs nothing mathematically and removes the implication. The reporter prefers the second.

3 — H2 assumes away the interaction that holds the corpus's own architecture together

The cluster is held by π-stacking of chrysene units. The manuscript places those same units, unscissioned, in an acyl core at a footprint of 0.39–$0.43\,\mathrm{nm}^2$ with a face of $12.5 \times 7.0\,\text{Å}$ standing with the normal in its plane, that is, in the disposition in which aromatic faces contact one another laterally, and then assumes they do not aggregate. Remark 7.x states the tension honestly and does not resolve it. But H2 is not one premise among eight here. Aggregation would not weaken Sections 8 and 9; it would replace their subject, as the manuscript itself says. Given that the corpus's architecture is built on these units aggregating, dispersal is the surprising branch and should carry the burden.

Requested: promote H2 in the ordering of Section 14.1, ahead of the regime target where it currently sits third. State the prior explicitly: that the same interaction is load-bearing elsewhere in the corpus and that its absence here is assumed, not argued.

3 Further points

4 — The threading argument is an order of magnitude without a source

Proposition 8.x converts the parity condition from a criterion into a determination by asserting that burying a phosphate costs tens of kilocalories per mole. No citation, no calculation, and the figure is doing real work. It is what reduces enclosure from $m - 1$ bits to one. The manuscript's textbook sources would support a defensible number. Requested: cite or compute it, and state the threshold at which the argument would fail.

5 — $E^* = 10\,k_B T$ is a stipulation presented among constraints

The bending tolerance in Section 10 is set by the author, enters ν linearly, and moves the result from 22 to 219 over the swept range. The manuscript says so at block V7b, to its credit. But Corollary 10.x quotes $\nu_2 \approx 66$ in the body and the abstract quotes order 10^2 without the stipulation attached. Requested: attach the stipulation where the figure is quoted, including in the abstract.

6 — The minority macrocycle does not fit the office the manuscript gives it

Remark 5.x proposes the route-C bolaamphiphile as a species that spans and staples the leaflets of the route-A bilayer. It spans 15 Å against that bilayer's 27 Å. The manuscript says it would span a thinned or compressed region rather than the bilayer at rest, which is close to conceding that it does not span the bilayer. A 12 Å shortfall is not a thinning. Requested: either withdraw the stapling reading or give the mole fraction and local thinning at which it becomes geometrically available.

The source identification is imported and everything in Section 9 rests on it. Definition 4.x takes $(\alpha, \beta) \mapsto$ base as a bijection. If the map from templating orientation to base is not bijective, if two orientations give the same base, the source entropy is below two bits and the capacity theorem is measured against the wrong source. The manuscript marks the definition [C] and Remark 9.x notes that denying it denies the source rather than the channel, which is the right disposition. No change required, but the bijectivity should be stated as such in Definition 4.x rather than left implicit in "indexes base four."

Scholium 11.x overstates the absence of a trapdoor. It concludes that no failure leaves the account intact and the conclusion false, on the ground that H8 failing halves a capacity that is stated as a dichotomy with both branches computed, so the account reports its own loss rather than concealing it. Reporting both branches is not the same as being able to tell which obtains. The manuscript has no observation that discriminates them. The honest form is that the failure is stated but not detectable, which is weaker than the scholium implies and is in fact what the last paragraph of the same scholium says about compartment occupancy. Requested: reconcile the two paragraphs.

Section 9.3 is retained for a reason the manuscript itself undercuts. Remark 9.x concludes that the metric channel adds no capacity in either branch, contributing only redundancy on a bit already carried chemically and unconditionally by Lemma 9.x. A bit that cannot be lost does not need a second carrier. Requested: compress Section 9.3 to a remark, or state what the redundancy protects against given that the primary carrier is unconditional.

4 Minor and editorial

1. Remark 11.x counts seventeen register entries as four finite, eleven derived, one open, one refused. The reporter makes this four, eleven, one and one, seventeen. Consistent, but the arithmetic should be stated so a reader need not do it.

2. The $\Delta 9$ result and its coincidence with the commonest membrane unsaturation is disclaimed at Appendix C and then leaned on rhetorically in the abstract. The claim is defensible. The

sentence is doing more work than the disclaimer allows.

3. Section 7 reads as though written when the monolayer was the paper's object. The demotion of that material to a minority component has left the section's emphases slightly out of order.

4. One author note remains as a LaTeX comment at the patent figure attribution. Confirm before submission.

5. Article 54's pagination is now supplied. The reference list is otherwise complete.

On the standard of proof in this corpus

A closing observation, offered as comment rather than as a requested change. The manuscript's four-level convention, connectivity, chemical admissibility, geometric accessibility, physical realization kept apart, permits it to establish a great deal at the first two levels while asserting nothing at the fourth. That is legitimate and the manuscript is scrupulous about which level each statement occupies. The cumulative effect, however, is a paper in which the enumerations are certain, the geometry is computed, and every statement that would make the object exist is a premise. Section 11.2 says this itself. The thermodynamic content is confined to four premises, three of which have no calculation behind them. The reporter regards that as the honest outcome of the convention rather than a defect of the manuscript. But the corpus should be aware that it is accumulating a structure of considerable internal rigour resting, at every point where it touches matter, on hypotheses of the same four kinds. The targets of Section 14.1 are the right list. They are also, collectively, most of what would be needed to know whether any of this occurs.

Summary of requested changes

Points 1, 2 and 3 before acceptance. Points 4–9 at the author's discretion, with 4 and 5 recommended. The reporter would re-review points 1 and 2.

References

[Art54] C. D. Schaper. Cage-constrained chemical reachability. *Annals of the Chrysene Formalism* 1(2):935–1014, 2026. Article 54. DOI: `https://doi.org/10.68366/8dxwhm03`.

[Art61] C. D. Schaper. Configuration at the transannular centre. *Annals of the Chrysene Formalism* 1(3):1250–1278, 2026. Article 61. DOI: `https://doi.org/10.68366/qf0vze43`.

Revision history

Version	Date	Notes
v1.0	2026-10-15	Review record published with Article 62.

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