ANNALS OF THE CHRYSENE FORMALISM

AI-AUGMENTED PEER-REVIEWED | VOL. 1, NO. 3 | ISSN 3144-2021 | OCTOBER 2026

ORTHOGONAL REVIEW RECORD

The Chrysene-Reachable Material Ledger: Species, Properties, and the Allocation of a Single Pool

Compiled by the Editorial Office
Annals of the Chrysene Formalism
Schaper Systems Press

Paper ID: ACF-1.3-065
Issue: Volume 1, Number 3
ISSN: 3144-2021
Review architecture: Author-side check by the drafting system
Review focus: Source theorem, chirality transfer, additivity of demands
Acceptance date: 2026-10-16
Online publication: 2026-10-16
Pages: 1371–1383
Document version: v1.0
Last audited: 16 October 2026

Citation: Schaper, C. D. (2026). The Chrysene-Reachable Material Ledger: Species, Properties, and the Allocation of a Single Pool. *Annals of the Chrysene Formalism*, 1(3), 1371–1383. ISSN 3144-2021. `https://chrysene.com/index.php/acf/article/view/65` • © 2026 Charles D. Schaper. Distributed under the CC Attribution-NonCommercial-NoDerivatives 4.0.

Declared conflict

This report was prepared by the same system that drafted the manuscript. Nothing below is independent confirmation. The three substantive points are framed as arithmetic or as comparisons against cited articles, so that a reader may check them without trusting the reporter. There is no author-reply section.

Scope of Review

The manuscript is the materials companion to the cycle paper. It tabulates ten species against eight properties, gives seven transformations as partial maps, computes what each preserves, and generates a reachability digraph whose sources are the species produced by nothing and whose sinks are those consumed by nothing. Its result is that every sink partitions into the

bilayer except the residue, which is zwitterionic and impermeant. The residue is therefore the architecture's only osmolyte, and it supplies the impermeant particles the cycle paper required and could not locate. The demands on the pool are then argued additive, and a feasibility inequality is computed.

Compiled disposition

Major revision. The paper's method is sound and its central observation, that the residue is the architecture's only impermeant sink, appears to be correct and consequential. But two of its theorems are false as written, and a third is weaker than stated. One of the false ones is the source theorem, which the paper advertises as a finding. The other is a property claim that contradicts the residue account it cites. Neither error touches the central observation, which is why the recommendation is revision.

Required before print

Blocking before acceptance. State the source set as the three chrysene species together with a heteroatom feedstock. Add the sugar-bearing species to the inventory and restate the chirality entry as transfer rather than creation. Either show that an arm-excised unit is not a scission substrate, or weaken the additivity theorem to sub-additivity and recompute. The reporter would re-review points 1 and 3.

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1 What the manuscript does well

Retention distinction, polarity, figure inventory, trapdoor

The retention/production distinction is the right observation and is handled properly. That a species retained by a transformation is not produced by it sounds pedantic and is not. Modelling it otherwise empties the source set and hides the entire input requirement. The manuscript records the error it made and explains why the wrong version looked right. That is the most useful paragraph in the paper. Polarity is the correct property to have added. No earlier paper records it, and the central result is invisible without it. The figure inventory is settled carefully and the discrepancy is recorded rather than resolved. Declining to amend a published article silently is correct practice. The trapdoor scholium is precise. It identifies exactly which statements survive the failure of H1 and does not overstate the robustness of the rest.

2 Major points

1 — The source theorem is false: the heteroatom feedstock is omitted

Theorem 7.x states that the species produced by no transformation are exactly the three chrysene species, and the manuscript calls this the architecture's entire input requirement. It is not. Every edge of the digraph consumes a heteroatom the chrysene skeleton does not carry. The templating produces a nucleotide, which carries phosphorus. The azo conversion takes C_{18} to C_{14} and two nitrogens. The polymerisation requires an activated phosphate. And the excision produces an amino acid, which carries nitrogen. The enclosure paper admits nitrogen from outside as a named premise and places oxygen and hydrogen rather than counting them, so the corpus already knows this and the manuscript has not carried it across.

The correction is small and its consequence is not. The input requirement is not a list of three carbon skeletons. It is three skeletons plus a heteroatom supply, and the supply is not obviously available. Requested: state the source set as the three chrysene species together with a heteroatom feedstock, and add that feedstock to the inventory as a species or as an explicitly excluded input. If the second, say why a ledger may exclude an input it consumes.

2 — The chirality claim contradicts the residue account

Theorem 6.x reads the table entry D (achiral) $\rightarrow$ R (chiral) as chirality being created at excision, the residue being the only chiral product of an achiral source. An achiral precursor does not yield an enantiomerically defined product without a chiral influence. The residue account, which this manuscript cites and relies on, obtains the configuration by transfer from the D-ribose through the tether. The manuscript therefore records as a creation what its own source records as a transfer. The reason it can do so is that the sugar is not in the inventory. Ten species are listed and the chiral source of a property the table asserts is not among them.

Requested: add the sugar-bearing species to the inventory, restate the chirality entry as transfer

rather than creation, and check the property-preservation theorem for any other entry whose source lies outside the ten.

3 — The additivity theorem overstates the exclusion

Theorem 8.x argues that no unit serves two demands, because excision spends the arm the anchor requires and scission consumes the whole unit. The first clause is right. The second does not follow. Excision removes an arm, not a skeleton. A unit whose arm has been excised to a residue is a chrysene bearing one substituent fewer, and the scission routes act on the skeleton. If such a unit can still be scissioned to a lipid, then residue and lipid are not exclusive, the demands are sub-additive, and the feasibility requirement falls, by up to the smaller of the two terms, which at $\alpha = 0.10$ is 13,200 of 42,200 units, a third of the total.

The manuscript may be right that the spent unit is not scissionable. It does not say so, and the inference it draws requires it. Requested: either show that an arm-excised unit is not a scission substrate, or weaken the theorem to sub-additivity and recompute Theorem 8.x with the overlap carried.

3 Further points

4 — "Polarity is not functorial" is weaker than it reads

Corollary 6.x establishes that polarity is not determined by the source's polarity. That is true and is true of many properties. It does not follow that polarity is unpredictable. It is determined by the source's polarity together with the transformation type, which is exactly what the manuscript's own table demonstrates. Requested: state what is actually shown, that polarity is not a function of polarity alone, and drop the functorial framing, which claims more.

The abstract mischaracterises the cycle paper. It says that paper's lineage was bounded only because residues belong to a different article. The cycle paper's boundedness follows from a conservation argument over the processes within its scope, correctly conducted. Adding a process changes the system, not the argument. Requested: rephrase to say the scope excluded the residue, not that the paper overlooked it.

The peptide tension is in the appendix and belongs in the body. Appendix C records that if residues condense the particle count falls by the degree of polymerisation, and that the architecture has been proposed elsewhere as a scaffold for exactly that condensation. The body asserts free residues without argument. Since the whole result turns on it, an appendix is the wrong place. Requested: move the tension into Section 8 beside Theorem 8.x and state the free-residue reading as the assumption it is.

The pool rate is undetermined and the feasibility theorem is therefore untested. Theorem 8.x gives a requirement on R and the manuscript supplies no value. The requirement, some 42,200 units per cycle at $\alpha = 0.10$, and over a forty-generation lineage of order 10^6, is large, and whether any environment delivers it is not addressed. Requested: state the lifetime total as well as the per-cycle figure, so that a reader can see the scale of what is being asked of the environment.

The register claims seven of eleven entries are finite computation. Two of those seven, the source theorem and the property preservation, are affected by points 1 and 2. The count should be revised after the corrections rather than carried across.

On the value of the central observation

A closing comment, since the three major points may give a misleading impression of the paper's standing. None of them touches the central observation. That the residue is the only zwitterionic sink, that it therefore does not partition into the bilayer, and that it is consequently the architecture's only candidate osmolyte, these follow from the polarity column alone and survive every correction requested above. The heteroatom omission changes the source set. The chirality error changes one row of a table. The additivity error changes a coefficient. The observation stands. That is worth saying because the observation is the most consequential thing the corpus has produced in several articles. It converts a bounded reproducer into a candidate steady one, and it does so by noticing a property that no paper had thought to record. The errors above are the ordinary cost of a first draft written quickly around a good idea, and the idea is not among them.

Summary of requested changes

Points 1, 2 and 3 before acceptance. Points 4–8 at the author's discretion, with 5 and 6 recommended. The reporter would re-review points 1 and 3.

References

[Art64] C. D. Schaper. The photoentrained cycle. *Annals of the Chrysene Formalism* 1(3):1348–1370, 2026. Article 64. DOI: `https://doi.org/10.68366/h9rzkd75`.

Revision history

Version	Date	Notes
v1.0	2026-10-16	Review record published with Article 65.

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