Guide: Writing the Perfect Conclusion Section of a Scientific Paper

In a top-tier journal, the **Conclusion** is your final chance to define the legacy of your work. It is not just a summary of the results; it is a statement of how the field has changed because your paper now exists.
Using the **PRL Letter** and the **Acta Materialia** paper, we can see how to wrap up a scientific argument with authority.

The Executive Comparison: Conclusions

Feature	The Letter (e.g., PRL)	Full-Length Article (e.g., Acta Mater)
Philosophy	**The Final Blow:** Reiterate the solution to the mystery.	**The Future Framework:** Define the new rules for the field.
Length	Usually 1 punchy paragraph.	2–3 structured paragraphs.
Logic	Connects the breakthrough back to the "Hook."	Synthesizes complex variables into a single "Law."

Part 1: The "Letter" Conclusion

Example: *Cold Self-Lubrication of Sliding Ice*
In a Letter, the conclusion must be high-impact. The authors of the ice paper don't just say they simulated ice; they redefine what "slippery" means.

1. **Direct Answer:** They conclude that ice slipperiness isn't just about heat, it's about "displacement-driven amorphization."
2. **The New Rule:** They state that for truly low friction, you need a hydrophobic counterface.
3. **Universal Insight:** They conclude that this mechanism likely applies to other materials undergoing high-speed shearing, not just ice.

Part 2: The Full-Length Conclusion

Example: *Plasticity of metallic glasses...*

website : www.aatila.com
Intsgram: @achraf_atila
Email: dr.achrafatila@gmail.com

In a full-length article, the conclusion is systematic. It often uses bullet points or clear thematic breaks to ensure the reader remembers the key takeaways.

1. **Summary of the "State":** They conclude that the glass's history (whether it was quenched from a fragile or strong liquid state) is more important than the cooling rate alone.
2. **Physical Mechanism:** They confirm that "fragile" glasses promote shear-band proliferation, which leads to better plasticity.
3. **Industrial Application:** They suggest that by controlling the state at the fragile-to-strong transition (T_{fst}), engineers can design tougher metallic glasses for real-world use.

Part 3: The "Perfect Conclusion" Guide

1. The Big Picture Bookend

Your first sentence in the conclusion should mirror the first sentence of your introduction. If you started with "Skidding on ice is dreaded," end with "Our findings provide a new physical basis for managing ice friction in extreme environments."

2. Avoid "New Data"

Never introduce a new graph or a new citation in the conclusion. This is the time for synthesis, not for new evidence.

3. The "Visionary" Ending

End with a sentence that looks 5–10 years into the future.

- **Weak:** "More studies on Al-alloys are needed."
- **Strong:** "This framework enables the computational design of ultra-tough glasses, bypassing decades of trial-and-error experimentation."

Final "Perfect Paper" Checklist for Your Lab

- [ ] **The Loop:** Does the conclusion answer the specific question asked in the first paragraph of the intro?
- [ ] **The "So What":** Is the real-world or fundamental significance stated one last time?
- [ ] **No Fluff:** Have you removed phrases like "It is hoped that" or "We believe"? (Use "Our results demonstrate" instead).
- [ ] **The Future:** Does the last sentence point to a new frontier?

website : www.aatila.com
Intsgram: @achraf_atila
Email: dr.achrafatila@gmail.com