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| Book Name: | [**Physical Science: New Insights and Developments**](https://bookstore.bookpi.org/product/physical-science-new-insights-and-developments-vol-1/) |
| Manuscript Number: | **Ms\_BPR\_5877** |
| Title of the Manuscript: | **Evaluation of Friction Durability of Extremely Thin Diamond-Like Carbon Films by Statistical Cluster and Regression Analyses of Friction Coefficient** |
| Type of the Article | **Book Chapter** |

**Special note:**

**A research paper already published in a journal can be published as a Book Chapter in an expanded form with proper copyright approval.**

**Source Article:**

**This chapter is an extended version of the article published by the same author(s) in the following journal.**

**Tribology Online, 16(2): 113-124, 2021.**

**DOI:** [**https://doi.org/10.2474/trol.16.113**](https://doi.org/10.2474/trol.16.113)

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| PART 1: Comments | | |
|  | Reviewer’s comment **Artificial Intelligence (AI) generated or assisted review comments are strictly prohibited during peer review.** | Author’s Feedback *(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)* |
| **Please write a few sentences regarding the importance of this manuscript for the scientific community. A minimum of 3-4 sentences may be required for this part.** | Presents a rigorous and novel approach to evaluating the friction durability of DLC coatings, providing valuable statistical tools for advanced tribological applications. Its findings can guide the optimised design of coatings for demanding operating conditions. The introduction of the manuscript is generally clear and provides appropriate context regarding the relevance of diamond-like carbon (DLC) thin films in tribological applications, particularly in head–disk interfaces. However, the writing would benefit from increased technical precision in certain sections. For example, the repeated use of phrases such as “To clarify...” creates redundancy and affects the overall fluency. It is recommended to consolidate recurring ideas and use more robust scientific connectors such as “In contrast,” “Consequently,” or “This indicates that” to enhance cohesion.While the authors clearly outline the aim of the study, a specific hypothesis regarding the comparative behaviour of the coatings is not explicitly stated. In my view, the introduction lacks sufficient detail on the tribochemical mechanisms that explain the observed lubricity at elevated temperatures. A brief explanation of transfer layer formation in DLC coatings and their relation to superlubricity—especially under vacuum or high-temperature conditions—would help reinforce the conceptual foundation. For instance, this information would allow readers, including myself, to better understand why certain coatings may perform better in terms of friction and wear. |  |
| **Is the title of the article suitable?**  **(If not please suggest an alternative title)** | The current title is appropriate and clearly reflects the scope, methodology, and focus of the manuscript. I do not consider any changes necessary.  The title of the manuscript has been carefully selected to reflect the scope and methodology of the study |  |
| Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here. | The abstract is comprehensive and effectively summarises the objective, methodology, and key findings of the manuscript.  I do not suggest any additions or deletions at this time. |  |
| **Is the manuscript scientifically, correct? Please write here.** | Yes, the manuscript is scientifically sound and methodologically well-structured. The experimental design, data analysis, and interpretation of results are consistent with current standards in the field.  Can be assured that the scientific content meets the expected level of rigour and reliability |  |
| **Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.**  **-** | Yes, the references cited in the manuscript are both sufficient and recent.  I do not have any additional references to suggest at this time. |  |
| Is the language/English quality of the article suitable for scholarly communications? | Yes, the English used in the article is clear and appropriate for academic purposes.  The writing flows well, and the terminology is correctly applied, so it works just fine for scholarly communication. |  |
| Optional/General comments | The introduction of the manuscript is clear and provides a suitable general context regarding the relevance of diamond-like carbon (DLC) thin films in tribological applications, particularly in head–disk interfaces. However, the writing could benefit from enhanced technical precision in certain segments. For instance, the repeated use of phrases such as *“To clarify...”* results in redundancy and detracts from the fluency of the text. To address this, it is recommended to consolidate recurrent ideas and adopt more robust technical connectors such as *“In contrast”, “Consequently”* or *“This indicates that”*, which would improve the scientific coherence of the narrative.  The authors adequately describe the aim of the study, although a clear hypothesis concerning the comparative behaviour of the coatings is not explicitly formulated.  In relation to the tribochemical mechanisms underlying the observed lubricity at elevated temperatures, the introduction lacks sufficient detail to fully clarify this aspect. A brief explanation regarding the formation of transfer layers in DLC coatings and their relation to superlubricity phenomena—particularly under vacuum or high-temperature conditions—would strengthen the conceptual foundation of the work. Such an inclusion would also aid readers, such as myself, in understanding why certain coatings might exhibit superior performance in terms of friction and wear.  It would be advantageous to highlight previous studies that have investigated the thermal degradation of DLC coatings on metallic substrates such as NiP or Si, as these provide a direct basis for the comparative analysis undertaken in the present work.  Concerning the results and discussion section, the article presents a substantial amount of valuable experimental data, including measurements of nanohardness, elastic modulus, and frictional properties under various thermal and environmental conditions. While the observed differences in friction and wear between coatings—particularly on NiP and Si substrates—are adequately documented, the practical implications of these findings are not explicitly discussed. For example, the selection of coatings for specific environments (e.g., vacuum versus air, or temperatures above 200 °C) remains unaddressed.  Although the statistical analysis via regression and clustering is appropriately applied, the manuscript would benefit from a more thorough interpretation of these models. Specifically, it would be valuable to discuss how the derived regression coefficients (a, b, c) not only characterise the system’s behaviour but might also serve as criteria for selecting or predicting performance under alternative operational conditions. This would transform the statistical analysis into a predictive design tool, rather than a purely descriptive one.  With regard to the friction maps and wear curves, a clear correlation is observed between increasing load and the onset of coating degradation, particularly for FCVA-DLC on NiP. However, the article does not propose any design recommendations or operational limits derived from these findings.  Finally, although the formation of tribochemical layers is mentioned in the case of the coating, there is no detailed discussion of the stability and persistence of these layers under prolonged use. | . |

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| **PART 2:** | | |
|  | Reviewer’s comment | Author’s comment *(if agreed with the reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)* |
| **Are there ethical issues in this manuscript?** |  | *Everything seems in good order from an ethical standpoint.* |

**Reviewer details:**

**Willian Arnulfo Aperador Chaparro, Colombia**