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Peer Review

Review of: "A Review on the Mechanical, Thermomechanical Properties and Crystallinity Aspects of 3D-Printed Nanocomposites Used for Fabricating Electronic/Structural Parts"

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General Overview

The paper provides a comprehensive review of recent literature (last six years) on the mechanical and thermomechanical properties, as well as the crystallinity, of 3D-printed thermoplastic nanocomposites. It covers a wide range of materials, summarizes key findings in detailed tables, and discusses the implications for sustainability and engineering applications.

- The review covers a wide variety of thermoplastic matrices (PLA, ABS, PA, PC, etc.) and nanofillers (graphene, CNT, TiN, etc.), providing a broad perspective on the field.
- The inclusion of multiple tables summarizing tensile, flexural, impact, and thermal properties across different studies is very helpful for readers seeking comparative data.
- The discussion on how additive manufacturing aligns with UN Sustainable Development Goals is a valuable addition, highlighting the relevance of the topic beyond technical aspects.
- The paper is logically organized, moving from introduction and background to detailed property discussions, and finally to conclusions and recommendations.

Areas for Improvement

- The review is largely descriptive, summarizing results from various studies. It would benefit from deeper critical analysis—discussing, for example, why certain nanofillers perform better, or the

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limitations and challenges in translating lab-scale results to industrial applications.

- More discussion on the mechanisms behind observed property changes (e.g., why some fillers increase impact strength while others decrease it) would add value.
- Some sections, especially those with dense tables, can be overwhelming. Consider summarizing key trends or insights after each table to help readers interpret the data.
- The paper includes a few figures, but more schematic diagrams or conceptual illustrations (e.g., showing how nanofillers interact with the polymer matrix) would enhance understanding, especially for readers less familiar with the field.
- As a review, the paper does not present new experimental data, which is fine. However, it could be strengthened by offering more original synthesis or meta-analysis of the compiled data (e.g., identifying gaps, proposing new classification schemes, or highlighting underexplored material combinations).
- The conclusions are brief and could be expanded to more clearly articulate the main takeaways from the review, as well as the broader implications for research and industry.

Specific Suggestions

- After each major table, add a short paragraph summarizing the most important trends or anomalies.
- Proofread for minor language issues to improve professionalism and readability.
- Expand the discussion on the challenges of scaling up 3D-printed nanocomposites for real-world applications (e.g., cost, reproducibility, regulatory issues).
- Consider adding a graphical abstract or summary figure to visually encapsulate the main findings.
- Standardize reference formatting and ensure all citations are complete and consistent.

Rating: 3/5 — Good coverage and organization, but room for improvement in analysis, clarity, and presentation.

Declarations

Potential competing interests: No potential competing interests to declare.