# Article information:

High mechanical and tribological performance of polyimide nanocomposites reinforced by chopped carbon fibers in adverse operating conditions - ScienceDirect
<https://www.sciencedirect.com/science/article/pii/S0266353816309216?via%3Dihub>

# Article summary:

1. The effects of nano-SiO2 and solid lubricants (SLs) such as PTFE and WS2 on friction and wear behavior of polyimide (PI) composites reinforced by carbon fibers were investigated in extremely wide PV (the product of velocity and pressure) factors.

2. The incorporation of nanoparticles leads to a significant reduction in the friction coefficient, while the addition of 15% solid lubricants deteriorates the mechanical properties due to weak interface between fillers and matrix.

3. The synergistic effect of solid lubricants and nano-SiO2 improves the wear resistance of PI composites under high PV conditions, which is attributed to protection of fiber-matrix interface by nanoparticles, higher mechanical properties, and high thermal stability of SiO2.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

This article provides an overview on the effects of nano-SiO2 and solid lubricants on friction and wear behavior of polyimide composites reinforced by carbon fibers under different PV conditions. The article is well written with clear structure, providing detailed information on materials preparation, mechanical properties analysis, tribological tests, results discussion, etc., which makes it easy for readers to understand the content.

The authors have provided sufficient evidence for their claims made in the article through experiments conducted using a pin-on-disc apparatus. The SEM pictures presented also support their findings that nanoparticles can reduce friction coefficient significantly under all conditions and improve wear resistance under high PV conditions.

However, there are some potential biases in this article that should be noted. Firstly, only two types of polyimide nanocomposites reinforced by chopped carbon fibers are studied in this work without considering other types or combinations that may lead to different results. Secondly, only two types of solid lubricants are used in this study without exploring other possible options that may lead to different outcomes as well. Thirdly, no counterarguments are presented in this article which could provide a more balanced view on the topic discussed here. Lastly, no risks associated with incorporating nanoparticles into polyimide composites are mentioned in this article which could be important for readers to consider when making decisions based on these findings.

In conclusion, this article provides useful insights into the effects of nano-SiO2 and solid lubricants on friction and wear behavior of polyimide composites reinforced by carbon fibers under different PV conditions but potential biases should be noted when interpreting these findings due to limited scope explored here

# Topics for further research:

* Polyimide nanocomposites reinforced by other fibers
* Tribological properties of polyimide nanocomposites
* Different types of solid lubricants
* Risks associated with nanoparticles in polyimide composites
* Counterarguments for friction and wear behavior of polyimide composites
* Effects of PV conditions on tribological properties of polyimide nanocomposites

# Report location:

<https://www.fullpicture.app/item/e240e9afccf8671415cb083228883a51>