

ORIGINAL ARTICLE

Mechanical Behaviour of Hybrid Laminated Nano Composite Containing Equal Numbers of Glass and Carbon Fibre Plies

Ava A.K. Mohammed *, Gailan Ismail Hassan, Younis Khalid Khdir

Department of Technical Mechanical and Energy Engineering, Erbil Technical Engineering College, Erbil Polytechnic University, 44001Erbil, Iraq.

ABSTRACT – Hybrid fibre reinforced polymer with nanofiller composite was introduced into a lot of industries due to its extreme mechanical properties in comparison with the non-hybrid material. In this investigation, cross and quasi- laminated epoxy composites with and without nano Al_2O_3 were fabricated by using Vacuum Assisted Resin Infusion Method and Ultrasonic Dual Mixing Method. In general, the results of mechanical properties indicated that the addition of 2% nano Al_2O_3 enhances the tensile and flexural properties. Cross number 2 with nano Al_2O_3 laminate had the maximum tensile strength 628 MPa and maximum tensile strain of 1.74%, while cross number 1 with nano Al_2O_3 laminate had the maximum tensile modulus of 37.756 GPa in the cross group. In the quasi group, quasi number 2 with nano Al_2O_3 had the maximum tensile strength, maximum tensile strain, and maximum tensile modulus, equal to 294 MPa, 1.98%, and 16.409 GPa, respectively. Regarding the flexural properties, cross number 1 with nano Al_2O_3 laminate had the maximum flexural strength 708.2 MPa and maximum flexural strain 2.027%, while cross number 2 with nano Al_2O_3 laminate had the maximum flexural modulus 38.73 GPa in the cross group. On the other hand, quasi number 1 with nano Al_2O_3 laminate had the maximum flexural strength, maximum flexural strain, and maximum flexural modulus, equal to 596 MPa, 2.424%, and 29.2 GPa respectively in the quasi group. The internal structures of the failure laminated composites through

ARTICLE HISTORY

Received: 18th July 2022

Revised: 24th Nov 2022

Accepted: 20th Mar 2023

Published:xx June 2023

KEYWORDS

Glass/carbon hybrid;

Nano- Al_2O_3 ;

VARIM;

Cross Laminates;

Quasi Laminates

Dear Dr Ava Mohammed,

aqida
2023-06-07
07:40 AM

Congratulations! Your article proofs are now ready for IJAME Volume 20 (2) June 2023. Please find attached the proofs of your article in PDF format. You will need to reply to this email for any necessary corrections:

- Please make sure the authors' names and sequence, and affiliations are correct.
- Please make sure the references are correctly cited.
- Please respond or check and amend the formatting to the highlighted words.
 - add postcode
 - amend Figure 2 and Figure 3
 - Improve the quality of Figure 8(a)
 - add missing details in the references

Thank you for your contribution to the journal.

Kind regards,
Assoc. Prof. Dr Syarifah Nur Aqida

Editor-in-Chief, IJAME

[8532_PROOF.pdf](#)