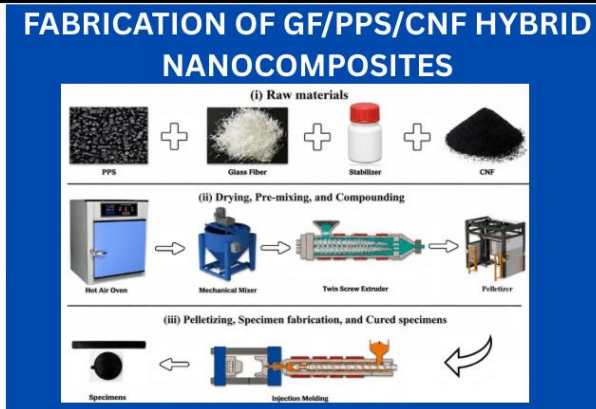


Parametric Analysis of Carbon Nanofiber Effects on Mechanical Properties and Abrasion Resistance of GF/PPS Hybrid Composites

Fabrication . Characterization . 2- Body Abrasive Wear . Performance Evaluation



KEY PROPERTIES

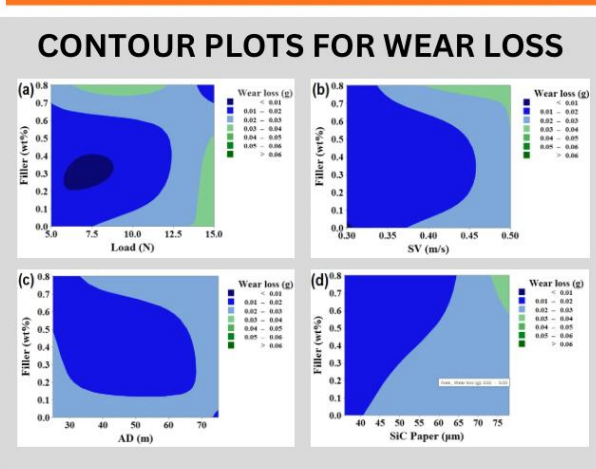
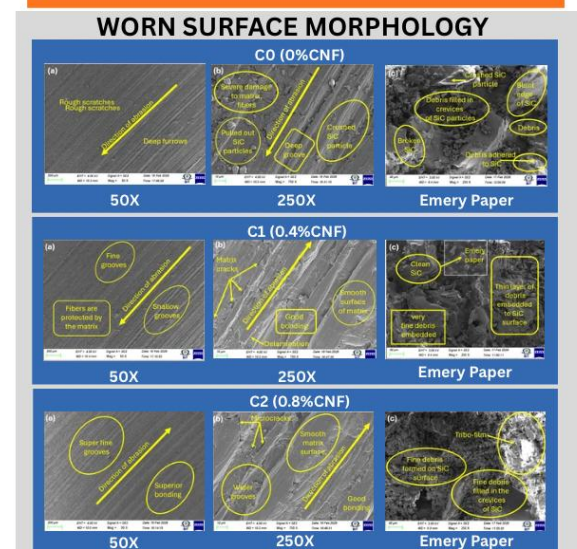
Composite (Codes)	Density (g/cm ³)	% Voids	Hardness (Shore D)	ILSS (MPa)
C0	1.624	0.31	77.5 ± 0.8	28.7 ± 1.3
C1	1.638	0.79	87.02 ± 0.5	31.3 ± 1.1
C2	1.667	0.48	93.03 ± 0.9	35.5 ± 1.2

2-BODY ABRASIVE WEAR TEST (ASTM G99)

Factors	Unit	Designation	Level		
			I	II	III
Applied Load	N	L	5	10	15
Velocity	m/s	V	0.3	0.4	0.5
Abrading distance	m	D	25	50	75
SiC emery paper	μm	E	36	53	78
Filler	wt%	F	0	0.4	0.8

COMPOSITE CODES AND CONSTITUTION (wt%)

Composites	Codes	PPS (wt%)	SGFs (wt%)	CNFs (wt%)
GF+PPS	C0	60	40	---
GF+PPS+ 0.4 wt% CNF	C1	59.6	40	0.4
GF+PPS+ 0.8 wt% CNF	C2	59.2	40	0.8



- ### KEY TAKEAWAYS
- CNF addition improved composite integrity, load transfer, and fiber-matrix adhesion.
 - CNF reinforcement reduced wear loss and friction, with 0.8 wt% CNF showing the best performance due to a stable tribo-film.
 - The regression models accurately predicted wear and friction behavior with strong agreement to experimental results.