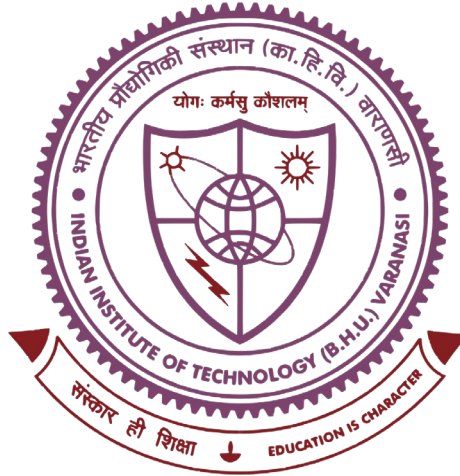


TRIBOLOGICAL EVALUATION OF 2D NANOMATERIALS AND THEIR HYBRID IN BIOLUBRICANTS



Thesis submitted in partial fulfillment for the
Award of Degree

Doctor of Philosophy

By

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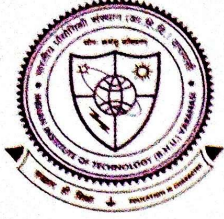
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Dedicated to my beloved father

Your values continue to inspire
me every day.

This work is a humble tribute to
your memory and the lasting
legacy you left in my life.

List of Tables

Table 2.1: Vegetable-based oil sources and their examples	17
Table 2.2 Fatty acid composition and properties of Karanja and castor oils	18
Table 2.3 Literatures available on tribological performance of nano lubricants	23
Table 3.1: List of chemicals used for different purposes	43
Table 3.2 Different test standards used for tribological investigation of nanolubricants ..	55
Table 5.1 Thermophysical properties of nanolubricants.....	100
Table 5.2 Factors and levels selected for the study	107
Table 5.3 Actual design with output response with run order	108
Table 5.4 ANOVA for test data with all variables specified.	109
Table 8.1 Comparison of different performance parameters of 2D hybrid additives	171
Table C.1 Pressure viscosity coefficient values used for film thickness calculation.....	199



List of Figures

Figure 1.1 Tribology and its constituent areas	1
Figure 3.1 Karanja oil at different stages of modification procedure	42
Figure 3.2 Synthesis procedure of MoS ₂ nano particles using hydrothermal method.....	45
Figure 3.3 Synthesis procedure followed for making of hybrid MoS ₂ -SiO ₂	47
Figure 3.4 Schematic presentation of synthesis procedure followed for AZnOGO	49
Figure 3.5 Dynamic shear rheometer MCR 102 along with ball on three plate geometry	54
Figure 3.6 Geometric representation of four ball setup for coefficient of friction calculation	56
Figure 3.7: Placement of accelerometer on ball pot	59
Figure 3.8 Setup used to collect vibration signature from the friction induced signals (a) digital image of actual setup, (b) schematic representation of the setup	60
Figure 3.9: (a) Scanning electron microscope EVO MA15/18 by CARL ZEISS MICROSCOPY LTD combined EDS system 51N1000 by Oxford Instruments Nanoanalysis (b) X-ray photoelectron spectroscopy by Thermo Fisher Scientific	63
Figure 4.1 XRD patterns of nanomaterials	66
Figure 4.2 SEM image of MoS ₂ sheets.....	68
Figure 4.3 SEM images of hybrid SiO ₂ -MoS ₂ particles	69
Figure 4.4 Shows the distribution of SiO ₂ particles along with the MoS ₂ sheets.....	69
Figure 4.5(a) EDS mapping (b) EDS Spectra (c) size distribution of hybrid particles	70
Figure 4.6 TEM images of hybrid particles	70
Figure 4.7: Digital images of formulation stability shown for various concentrations of hybrid nanolubricants.....	72
Figure 4.8 Tribological test results (test conditions as per ASTM D-4172): (a) COF versus time, (b) average COF versus concentration, (c) wear scar diameter (WSD) versus	

concentration, (d) wear volume plotted against concentration of nanoparticles, and (e) wear scar diameter of hybrid-lubricated ball at 0.05 wt% with varying load.....	76
Figure 4.9: Wear scar developed on the steel balls (test condition as per ASTM D-4172) with corresponding enlarged images for the case of (a) pure oil, (b) 0.05 wt% SiO ₂ , (c) 0.05 wt% MoS ₂ , and (d) 0.05 wt% SiO ₂ -MoS ₂	78
Figure 4.10 EDS-based elemental mapping of worn surfaces of steel balls after lubrication tests with: (a) silica-based lubricant, (b) MoS ₂ -based lubricant, and (c) hybrid material-based lubricant.....	79
Figure 4.11: AFM based 2D and respective 3D images of worn steel balls from the tribotest carried at 392 N for 1 h at elevated temperature of 75 °C: (a) pure castor oil (CO) lubricated, (b) CO + 0.05% SiO ₂ , (c) CO + 0.05 wt% MoS ₂ , and (d) CO + 0.05 wt% SiO ₂ -MoS ₂	82
Figure 4.12: Bearing ratio curve drawn on height features versus bearing length fraction for all cases taken transverse to the scratch lay direction (test as per ASTM D-4172): (a) pure castor oil (CO) lubricated, (b) CO + 0.05% SiO ₂ , (c) CO + 0.05 wt% MoS ₂ , and (d) CO + 0.05 wt% SiO ₂ -MoS ₂	83
Figure 4.13: XPS Mo 3d spectra of worn surface taken from the tribotest (as per ASTM D-4172) with (a) hybrid-lubricated and (b) pristine MoS ₂ -lubricated surface; Si2p spectra for wear surface of (c) hybrid lubricated and (d) pristine SiO ₂ lubricated steel balls	84
Figure 4.14 XRD patterns of wear debris	86
Figure 4.15 (a, b) SEM images of worn debris separated from the tested oil of hybrid lubricated system, (c) EDS spectra along with elemental analysis.....	87
Figure 4.16: EDS elemental mapping of wear debris	88
Figure 4.17: Lubrication mechanism of SiO ₂ -MoS ₂ hybrid lubricant	91
Figure 5.1 XRD results of hybrid particles	95

Figure 5.2: FTIR results of hybrid nano additives	96
Figure 5.3: Raman spectrum of AZnOGO hybrid	97
Figure 5.4: TEM images of hybrid nano additives AZnOGO	99
Figure 5.5: Digital images of lubricants mixed with pure castor oil	99
Figure 5.6: Tribological test results as per ASTM D 4172b of different wt% added hybrid additives	102
Figure 5.7: Wear scar images of a tested ball subjected to 200 N applied load, 50 °C temperature, and 0.2687 m/s sliding speed for (a, d) 0.025 wt%, (b, e) 0.0625 wt%, and (c, f) 0.1 wt% hybrid lubricant.....	102
Figure 5.8 EDX mapping of the worn surface of steel balls after tribo-tests using (a) 0.025 wt%, (b) 0.0625 wt%, and (c) 0.1 wt% concentrations of hybrid nanolubricant.....	103
Figure 5.9: Worn surface contour with corresponding RMS roughness (Rq)	106
Figure 5.10 Residual plot and predicted vs actual plot with different test data.....	111
Figure 5.11: Variation on coefficient of friction with respect to factors at different values with 95% confidence interval in dashed line	113
Figure 5.12 Load-speed interaction 3D graph and its contour plot	115
Figure 5.13 Load-temperature interaction 3D and contour plot	116
Figure 5.14 Concentration-temperature interaction 3D and contour plot.....	118
Figure 5.15 Concentration-speed interaction 3D and contour plot.....	119
Figure 5.16 Concentration-load interaction 3D and contour plot.....	120
Figure 5.17 Temperature-speed interaction 3D and contour plot.....	122
Figure 5.18 Schematic presentation of lubrication mechanism of AZnOGO nanolubricant	123
Figure 6.1: XRD scans from 5 to 60 of MAX Phase, MXene and fMXene.....	126
Figure 6.2: FTIR of powder samples in a spectral range of 4000 to 400 cm ⁻¹	127

Figure 6.3 Raman spectra of chemically functionalized f-Ti ₃ C ₂ T _x MXene at different synthesis stages, including the pristine Ti ₃ AlC ₂ MAX phase and Ti ₃ C ₂ T _x MXene	128
Figure 6.4 Transmission electron microscopic images and selective area electron diffraction of (a, b, c) MAX Phase; (d, e, f) MXene; (g, h, i) functionalized MXene (fMXene).....	130
Figure 6.5 Digital images of lubricants showing dispersion stability in castor oil with time	131
Figure 6.6: Average coefficient of friction of different lubricant at specified percentage weight (wt%).....	133
Figure 6.7: COF vs time plot of different nano lubricants.....	133
Figure 6.8: Change in (a) wear scar diameter and (b) wear volume with concentration of additives	134
Figure 6.9: SEM images of scar surface for worn steel balls lubricated with (a, d) Pure castor oil, (b, e) 0.025 wt% MXene nano lubricant, (c, f) 0.025 wt% fMXene nano lubricant	135
Figure 6.10: EDS mapping and spectrum of different worn surfaces tested with (a) pure CO, (b) 0.025 wt% MXene nanolubricant, (c) 0.025 wt% fMXene nanolubricant.....	136
Figure 6.11: Bearing ratio curve by R _k parameter and corresponding Fractal dimension (FD) of scar surface tested by (a, d) Pure castor oil, (b, e) 0.025 wt% MXene blended nano lubricant, (c, f) 0.025 wt% fMXene blended nano lubricant	138
Figure 6.12: 3D optical profilometry images along with line and surface roughness parameter values in table for worn scar surfaces lubricated with (a) Pure Castor Oil, (b) 0.025 wt% MXene nano lubricant, (c) 0.025 wt% fMXene nano lubricant	139
Figure 7.1 FTIR spectra of Karanja oil at different stages of modifications	142
Figure 7.2 ¹ H-NMR spectra of raw and modified Karanja oils	143

Figure 7.3 XRD Spectra of (a) f-h-BN, (b) h-BN.....	144
Figure 7.4 Raman spectra of (a) h-BN and (b) fh-BN, demonstrating the E2g band	145
Figure 7.5 FTIR spectra of h-BN and fh-BN along with the characteristic's vibrational features.....	147
Figure 7.6 Digital images of dispersion of nanolubricants functionalized h-BN fh-BN and h-BN.....	148
Figure 7.7 HRTEM images of (a, b) h-BN, (d, e) fh-BN, SAED pattern of (c) h-BN, (f) fh-BN, and FESEM images of (g) h-BN, and (h) fh-BN.....	149
Figure 7.8 Base oil and their blend properties (a) dynamic viscosity at various temperatures using rotational type viscometer, (b) coefficient of friction at different sliding velocities at room temperature, and (c) coefficient of friction with film parameter(λ) at room temperature with testing geometry (d) Dimension less film parameter and Hersey number plot for the lubricant and its modified blend	151
Figure 7.9 (a) Coefficient of friction versus time curve for different lubricated oil blends, (b) Wear volume and average coefficient of friction for different lubricants used. (ASTM D5183)	155
Figure 7.10 Starved lubrication test at Room Temperature (25 °C) 5 mm stroke length at 10 Hz frequency (a) Coefficient of friction as a function of time for different oil samples, (b) Friction hysteresis plot of 100 cycles with area per cycle (in N.mm) after 10 min of running-in.....	156
Figure 7.11 Worn tracks of the tribo-surfaces after reciprocating sliding test with (a, f) Pure Karanja oil, (b, g) 0.025 wt% h-BN +KO, (c, h) 0.025 wt% fh-BN + KO, (d, i) 50% MKO, (e, j) 100% MKO	158

Figure 7.12 (a) to (e) Worn profile of different worn surface and (f) Specific wear rate for different lubricated tests measured from average area of the worn profile taken at three different places by stylus type surface profilometer with corresponding film thickness 158

Figure 7.13 (a) The vibration signatures over time, (b) worn surface along with (c) STFT for pure Karanja oil.....160

Figure 7.14 (a) The vibration signatures over time, (b) worn surface along with (c) STFT for 0.025% hBN + Karanja oil.....161

Figure 7.15 The vibration signatures over time, worn surface along with STFT for 0.025% fhBN + Karanja oil162

Figure A.1 Subsurface stresses along the axis of symmetry with depth (Where σ_z is normal stress along z direction τ_1 is the principal shear stress at a given nondimensional depth)196

List of Symbol/Abbreviations

Abbreviation	Full form
COF	Coefficient of friction
SiO ₂	Silicon dioxide
MoS ₂	Molybdenum disulphide
GO	Graphene oxide
APTES	3-aminopropyltriethoxysilane
APTMS	3-aminopropyltrimethoxysilane
ZnO	Zinc oxide
h-BN	Hexagonal boron nitride
fh-BN	Functionalized- hexagonal boron nitride
f-MXene	Functionalized-MXene
CO	Castor Oil
KO	Karanja Oil
MKO	Modified Karanja oil
HRC	Hardness Rockwell C
P _{max}	Maximum Hertzian contact pressure
h _{min}	Minimum film thickness
ICSD	Inorganic crystal structure database
JCPDS	Joint committee on powder diffraction standards

Ra	Average roughness
Rq	Root mean square roughness
R _{pk}	Peak height
R _{vk}	Valley depth
R _k	Core roughness depth or bearing area or working region
FD	Fractal Dimension
S _a	Average surface roughness
S _q	Root mean square roughness
Fe	Iron
Cr	Chromium
Mo	Molybdenum
Ti	Titanium
Al	Aluminum
C	Carbon
wt%	Weight percentage
S _{sk}	Skewness
S _{ku}	Kurtosis
S _m	Mean spacing of peaks
Δa	Mean slope of profile
LNL	Last non seizure load

WSD	Wear scar diameter
WV	Wear volume
AFM	Atomic force microscopy
SEM	Scanning electron microscopy
TEM	Transmission electron microscopy
FTIR	Fourier transformed infrared spectroscopy
XPS	X-ray photoelectron spectroscopy
EDS	Energy dispersive spectroscopy
NMR	Nuclear magnetic resonance spectroscopy
XRD	Xray diffraction spectroscopy

