PREPARATION AND CHARACTERIZATION OF GRAPHENE FILLED EPOXY THIN FILM NANOCOMPOSITE FOR ELECTRONIC APPLICATIONS

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PREPARATION AND CHARACTERIZATION OF GRAPHENE FILLED EPOXY THIN FILM NANOCOMPOSITE FOR ELECTRONIC APPLICATIONS

by

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DECLARATION

I hereby declare that I have conducted, completed the research work and written the thesis entitles **"PREPARATION AND CHARACTERIZATION OF GRAPHENE FILLED EPOXY THIN FILM NANOCOMPOSITE FOR ELECTRONIC APPLICATIONS".** I also declare that it has not been previously submitted for the award of any degree or diploma or other similar title of this for any other examining body of University.

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LIST OF SYMBOLS

°C	Degree Celsius
T_m	Melting temperature
Ω	Ohm
cm	Centimeter
m	Meter
W/mK	Watts per meter kelvin
psi	Pounds force per square inch
mil	Military
µm	Micrometer
T_g	Glass transition temperature
wt%	Weight percentage
vol%	Volume percentage
nm	Nanometers
GPa	Giga pascal
S/m	Siemens per meter
2-D	Two dimensional
3-D	Three dimensional
Å	Angstrom
kV	Kilovolt
m^2/g	Square meter per gram
E	Young's modulus
σ_{ts}	Tensile strength
TPa	Terapascal

kHz	kilohertz
E	Amount of energy
P	Power
t	Time
mm	Millimeter
phr	Parts per hundred
mPa.s	Milli pascal second
g/ml	Gram per milliliter
g/l	Gram per litter
V_f	Volume fraction
ρ_f	Density of filler
ρ_m	Density of matrix
M_f	Weight of filler
M_t	Total weight of composite
rpm	Revolutions per minute
g/cm^3	Gram per cubic centimeter
mW	Milliwatts
kN	Kilo newton
V	Volt
Rv	Volume resistance
ρ	Electrical resistivity
σ	Electrical conductivity
d	Diameter of the sensor
T	Thickness of the sample
R	Resistance

E’	Storage modulus
δ	Tan delta

LIST OF ABBREVIATIONS

ACA	Anisotropically conductive adhesives
ACF	Anisotropically conductive film
AFM	Atomic force microscopy
Ag	Silver
ASTM	American society for testing and materials
Au	Gold
BADGE	Bisphenol-A diglycidylether
BGA	Ball grid array
Bi	Bismuth
CNTs	Carbon nanotubes
COF	Chip on flex
COG	Chip on glass
CSP	Chip scale package
Cu	Copper
CVD	Chemical vapor deposition
DC	Direct current
DGEBA	Diglycidyl ether of bisphenol A
DMA	Differential mechanical analysis
DMF	Dimethyl formamide
DSC	Differential scanning calorimetry
DWCNT	Double-walled carbon nanotubes
ECAs	Electrically conductive adhesives
Et_3N	Triethylamine