

Facile Preparation of Chitosan/Clay Biocomposites and their Characterizations

*A thesis
submitted to Bodoland University
for the award of the degree*

of

Doctor of Philosophy

by

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(FINAL.CHE0001 of 2017-2018)*



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DECLARATION

I, Madhabi Bhattacharjee, hereby declare that the thesis entitled "*Facile Preparation of Chitosan/Clay Biocomposites and their Characterizations*" submitted in the fulfilment of the requirements for the degree of Doctor of Philosophy (PhD) at Bodoland University is my original work. I affirm that the thesis is based on my own research and has not been previously submitted for any other degree. All sources and references used in this work have been properly cited and acknowledged. I have not engaged in any form of academic misconduct, including plagiarism. Any assistance received in the preparation of this thesis has been acknowledged in the appropriate section. I understand that any violation of academic integrity or false statements in this declaration may have serious consequences.

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CERTIFICATE

This is to certify that the thesis entitled "***Facile Preparation of Chitosan/Clay Biocomposites and their Characterizations***" submitted by ***Miss Madhabi Bhattacharjee*** to Bodoland University was carried out under my supervision and is worthy of consideration for the award of the degree of Doctor of Philosophy of the University.


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LIST OF ABBREVIATIONS

BIBB	2-Bromoisobutyryl bromide
B3LYP	Becke 3-parameter lee yang parr
BNTN	Bentonite
BPB	2-Bromopropionyl bromide
CS	Chitosan
DMF	Dimethylformamide
DSC	Differential scanning calorimetry
FT-IR	Fourier transform infrared
HOMO	Highest occupied molecular orbital
IRC	Intrinsic reaction coordinates
KAOLIN	Kaolin
LAF	Laminar air flow
LUMO	Lowest unoccupied molecular orbital
MCS	Modified chitosan
MEP	Molecular electrostatic potential
MIC	Minimal inhibitory concentration
NMR	Nuclear magnetic resonance
SEM	Scanning electron microscope
SIO	Silica
TEA	Triethylamine
TGA	Thermogravimetric analysis
THF	Tetrahydrofuran
TS	Transition state
UTM	Universal testing machine
UV/Vis	Ultraviolet/Visible
XRD	X-ray diffraction

LIST OF SYMBOLS

Å	Angstrom
cm	Centimeter
°C	Degree Celsius
g	Gram
h	Hours
kg	Kilogram
kV	Kilovolts
mA	Milliampere
MHz	Megahertz
min	Minute
mL	Millilitre
mm	Millimeter
mmol	Millimole
mol	Mole
MPa	Megapascal
µg	Microgram
µL	Microlitre
N	Newton
nm	Nanometer
rpm	Revolutions per minute
T_g	Glass transition temperature
T_{\max}	Temperature at which maximum mass loss occurs
T_{onset}	Onset temperature of the degradation process
ppm	Parts per million
%	Percentage
λ	Wavelength

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