

Design and Fabrication of Plant Leaf-inspired Biomimetic Patterned Surfaces for Fog Harvesting, Sensing and Catalysis Applications

A thesis

submitted by

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(D12088)

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Doctor of Philosophy



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Dedicated

to

My Beloved

Mother and Father



INDIAN INSTITUTE OF TECHNOLOGY MANDI

MANDI- 175 005 (H.P.), INDIA

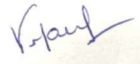
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Declaration by the Research Scholar

I hereby declare that the entire work embodied in this Thesis is the result of investigations carried out by me in the **School of Basic Sciences**, Indian Institute of Technology Mandi, under the supervision of **Dr. Venkata Krishnan**, and that it has not been submitted elsewhere for any degree or diploma. In keeping with the general practice, due acknowledgements have been made wherever the work described is based on finding of other investigators.

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Declaration by the Research Advisor

I hereby certify that the entire work in this Thesis has been carried out by **Mr. Vipul Sharma**, under my supervision in the **School of Basic Sciences**, Indian Institute of Technology Mandi, and that no part of it has been submitted elsewhere for any Degree or Diploma.

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Abbreviations

AA.....	Ascorbic acid
AFM.....	Atomic force microscopy
BDC.....	Bioinspired dip catalyst
CB.....	Conduction band
CTAB.....	Cetyltrimethylammonium bromide
CZ.....	Carbendazim
DRS.....	Diffuse reflectance spectroscopy
EDS.....	Energy dispersive X-ray spectroscopy
EF.....	Enhancement factor
FE-SEM.....	Field emission scanning electron microscopy
HPC.....	Hydroxypropyl cellulose
HR-TEM.....	High resolution transmission electron microscopy
IPA.....	Isopropanol
IR.....	Infrared
MB.....	Methylene blue
NB.....	Nitrobenzene
NP.....	Nanoparticles
NR.....	Nanorods
NS.....	Nanospheres
PVP.....	Polyvinylpyrrolidone
GNP.....	Gold Nanoparticles
PATP.....	p-aminothiophenol
PNTP.....	p-nitrothiophenol
3D.....	Three dimensional
RhB.....	Rhodamine B
SD.....	Standard deviation
SEM.....	Scanning electron microscope
SERS.....	Surface enhanced Raman scattering
SPR.....	Surface plasmon resonance
TDAA.....	titanium diisopropoxide bis(acetylacetonate)

TEM.....Transmission electron microscopy
TOF.....Turn over frequency
TON.....Turn over number
UV.....Ultra violet
VB.....Valence band
Vis.....Visible
XRD.....X-ray diffraction

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