

SOLUTION-PROCESSED ORGANIC THIN FILM TRANSISTORS FOR HYDROGEN SUL- FIDE SENSING APPLICATION



**Thesis submitted in partial fulfillment
for the Award of Degree**

DOCTOR OF PHILOSOPHY

BY

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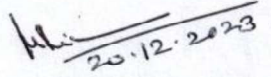
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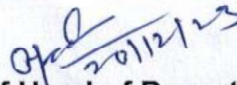
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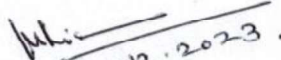
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**DEDICATED TO LORD SHIVA & SANKATMOCHANA
FOR THE SUPREMACY AND TO THE REDEEMER OF MY SOUL**

**DEDICATED TO MY FAMILY
FOR THEIR ENDLESS LOVE, SUPPORT, AND ENCOURAGEMENT**

**DEDICATED TO MY SUPERVISOR
FOR THEIR ENDLESS MOTIVATION, ENCOURAGEMENT, AND
TEACHING SKILL**

ACKNOWLEDGMENT

I would like to express my deepest gratitude to the individuals who have contributed to the completion of this thesis. Their support, guidance, and encouragement have played a crucial role in shaping this work.

First and foremost, I am indebted to my thesis advisor, Prof. V. N. Mishra, whose expertise and insightful feedback have been invaluable throughout the research process. Your dedication to excellence and commitment to academic growth have been a constant source of inspiration.

I would also like to extend my appreciation to the members of my thesis committee, Prof. K. K. Shukla, and Dr. Amritanshu Pandey for their valuable insights and constructive criticism that have significantly enriched the quality of this thesis.

I am grateful to Central Instrument Facility (CIF) for providing the necessary resources and environment conducive to research and learning. The Department of the Electronics Engineering and CRME lab has been a supportive academic home, and I appreciate the opportunity to be a part of such a vibrant scholarly community. I would like to express my gratitude to my esteemed seniors, Dr. P. K. Sahu, Dr. Abhishek Kumar Singh, Dr. Vijaya Kumar Devarakonda, Dr. S. N. Chaudhry, Dr. Ashutosh Dikshit, Dr. Tanushree Meena, Mr. A. P. Singh, as well as my colleagues, Dr. Ankit Verma, Mr. Prashant Kumar, Mr. Dharmendra Kumar, Mr. Ravi Saini, Mr. Jogendra Singh Rana, Mr. Bharat Bhushan Upadhyay, Mrs. Shikha Singh, Mrs. Richa Barnwal, Mr. Harshit Srivastav, and Mr. Surya Pratap Singh for their invaluable support and inspiring suggestions.

Special thanks go to my family and friends for their unwavering support and understanding during the challenges of this academic journey. Your encouragement has been my source of strength. Last but not least, I extend my gratitude to all those who, directly or indirectly, have contributed to the development of this thesis. Your influence, whether through discussions, suggestions, or moral support, has made a lasting impact. This thesis is the culmination of a collaborative effort, and I am thankful to each person who has been a part of this endeavour.

Varun Kumar Singh

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LIST OF ABBREVIATIONS

Abbreviation	Details
AFM	Atomic Force microscopy
OTFT	Organic Thin film transistor
FETs	Field-Effect Transistors
HOMO	Highest Occupied Molecular Orbital
LUMO	Lowest Unoccupied Molecular Orbital
MOS	Metal-oxide-semiconductor
MOSFET	Metal Oxide Semiconductor Field-Effect Transistor
OFETs	Organic Field-Effect Transistors
OLED	Organic Light-Emitting Diode
P3HT	Poly(3-hexylthiophene)
ppm	Part per million
ppb	Part per billion
SEM	Scanning Electron Microscopy
TEM	Transmission electron microscopy
TFT	Thin Film Transistor
UV-Vis	Ultraviolet-Visible
XRD	X-ray Diffraction

LIST OF SYMBOLS

Symbol	Abbreviation
E_G	Energy Bandgap
E_C	Bottom of the Conduction Band
E_V	Bottom of the Valence Band
α	Absorption Coefficient
C_{ox}	Capacitance per unit area of Insulator
CV	Capacitance-Voltage
L	Channel Length of Transistor
W	Channel Width of Transistor
R^2	Correlation Coefficient
ϵ_r	Dielectric Permittivity of SiO_2
I_{DS}	Drain to Source Current
V_{DS}	Drain to Source Voltage
E_F	Fermi Energy Level
S	Gas Response
V_{GS}	Gate to Source Voltage
μ	Mobility
t_{ox}	Oxide Gate Thickness
SS	Subthreshold Swing
V_{th}	Threshold Voltage
g_m	Transconductance

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