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(Prof. S. Jit)

Supervisor

Department of Electronics Engineering

IIT (BHU), Varanasi

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Supervisor

Department of Electronics Engineering

IIT (BHU), Varanasi

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Date:

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**Dedicated To my Beloved
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My wife Parul and my
daughter Yamini**

**Whose blessings, love and sacrifice brought me here
up to.....**

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LIST OF ABBREVIATIONS

Abbreviation	Details
FETs	Field-effect transistors
BJT	Bipolar junction transistor
MOSFET	Metal oxide semiconductor field-effect transistor
TFT	Thin film transistor
TFs	Thin film
EBE	Electron beam evaporation
NMs	Nanomaterials
C ₃ H ₈ O	Isopropyl alcohol
p-Si	P-type silicon
HCL	Hydrochloric acid
SG	Sol-gel
PVDF	Polyvinylidene fluoride
DI	Deionized water
H ₂ SO ₄	Sulfuric acid
H ₂ O ₂	Hydrogen peroxide
MFC	Mass flow controller
CuO	Cupric oxide
Cr ₂ O ₃	Chromium oxide
AFM	Atomic force microscopy
SEM	Scanning electron microscopy
EDX or EDS	Energy dispersive X-ray spectroscopy
TEM	Transmission electron microscopy
XRD	X-ray diffraction
nm	Nanometre
MSM	Metal-semiconductor-metal

MOS	Metal-oxide-semiconductor
SPA	Semiconductor parameter analyser
HF	Hydrogen fluoride
E-nose	Electronic nose
MIS	Metal-insulator-semiconductor
RH	Relative humidity
RT	Room temperature
TiO ₂	Titanium dioxide
ZnO	Zinc oxide
CdSe	Cadmium selenide
QDs	Quantum Dots
SnO ₂	Tin oxide
μm	Micrometer
NO ₂	Nitrogen dioxide
Au	Gold
Ag	Silver
Pd	Palladium
Al	Aluminum
Pt	Platinum
Ti	Titanium
RMS	Root mean square
Si	Silicon
SiO ₂	Silicon dioxide
n-Si	N-type Silicon
ppm	Part per million
ppb	Part per billion
CO	Carbon monoxide
CO ₂	Carbon dioxide
SOI	Silicon-on-insulator

CMOS	Complementary metal-oxide-semiconductor
H ₂	Hydrogen gas
N ₂	Nitrogen gas
rpm	Revolution per minutes

LIST OF SYMBOLS

Symbol	Details
λ	Wavelength
θ	Diffraction angle
L	Liter
ml	milliliter
e	Charge of electron
$C-V$	Capacitance-Voltage
$I-V$	Current-voltage
$G-V$	Conductance-voltage
I_{air}	Sensor current without gas exposure
I_{H_2}	Sensor current under gas exposure
S	Gas response
n	integer
$0D$	Zero dimensional
$1D$	One dimensional
$2D$	Two dimensional
$3D$	Three dimensional
d	interplanar spacing
$^{\circ}C$	degree Celsius
K	Temperature in Kelvin
V	Voltage
I	Current
C	Capacitance
G	Conductance

q	Charge of electron
C_i	Gate-oxide capacitance
ΔC	Change in capacitance
ΔG	Change in conductance
T_{res}	Response time
T_{rec}	Recovery time
V_{FB}	Flat band voltage
Q_{SS}	Surface charge density
φ_{ms}	Work function difference