MULTIFUNCTIONAL BEHAVIOR OF FERRITE BASED PEROVSKITES FOR ENERGY APPLICATIONS

THESIS SUBMITTED IN PARTIAL FULFILLMENT FOR THE AWARD OF DEGREE

Doctor of Philosophy

In

Physics

by

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UNDER THE SUPERVISON OF

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FC	Fuel Cell
SOFC	Solid Oxide Fuel Cell
PEMEC	Proton Exchange Membrane Fuel Cell
AFC	Alkaline Fuel Cell
PAFC	Phosphoric Acid Fuel Cell
MCFC	Molten Carbonate Fuel Cell
DMFC	Direct Methonal
OER	Oxygen Evolution Reaction
ORR	Oxygen Reduction Reaction
HER	Hydrogen Evolution Reaction
CV	Cyclic Voltammetry
LSV	Linear Sweep Voltammetry
LF	Lanthanum Ferrite
LSF	Lanthanum Strontium Ferrite
LSFT	Lanthanum Strontium Ferrite Titanate
ST	Strontium Tiatanate
DH-MIEC	Double Heterostructure Mixed-Ionic Electronic condcutor
VB	Valance Band
CB	Conduction Band
eV	Electron Volt
meV	Milli-electron Volt
E_g	Band Gap
E_a	Activation Energy
$h\upsilon$	Photon Energy
k_B	Boltzmann's constant
FWHM	Full Width at Half Maximum

g	Gram
K	Kelvin
T	Temperature
ICDD	International Center for Diffraction Data
JCPDS	Joint Committee on Powder Diffraction Standards
M,M′,M ″	Modulus,real and imaginary modulus
Z, Z′, Z″	Complex, real and imaginary impedance
σ	Conductivity
τ	Relaxation time
ω	Angular frequency (2πf)
η	Exponent
θ	Diffraction angle
RT	Room Temperature
Å	Angstrom
mg	Milligram
N	Avogadro's Number
nm	Nanometer
cm	Centimetre
µm	Micro-meter
Pt	Platinum
mV	Milli Volt
hz	Hertz
Ag	Silver
SEM	Scanning Electron Microscope
TEM	Transmission Electron Microscopy
XPS	X-Ray Photoelectron Spectroscopy
UV-Vis	Ultraviolet-Visible
DSC	Differential Scanning Calorimetric
PLD	Pulse Laser Deposition

CPE	Constant Phase Element
XRD	X-ray Diffraction
TGA	Thermogravometric Analysis
SSR	Solid State Reaction
F	Faraday's Constant
n	Number of electrons
ν	Scan rate
RHE	Reference Hydrogen Electrode
V	Voltage/Potential
HOMO	Highest Occupied Molecular Orbital
LUMO	Lowest Unoccupied Molecular Orbital