

**FABRICATION AND PERFORMANCE ANALYSIS OF NATURAL  
EXTRACT (SOLANUM PROCUMBENS, SOLANUM TORVUM,  
ARTABOTRYS HEXAPETALUS, GALINSOGA PARVIFLORA AND  
JASMINUM GRANDIFLORUM L) BASED DYE SENSITIZED SOLAR  
CELLS USING GRAPHENE OXIDE/ METAL OXIDE (NiO, Y<sub>2</sub>O<sub>3</sub>, SnO<sub>2</sub>)  
NANOCOMPOSITES AS COUNTER ELECTRODES**

**THESIS**

Submitted to the Bharathiar University in partial fulfillment of the  
requirements for the award of degree of

**DOCTOR OF PHILOSOPHY IN PHYSICS**

Submitted by

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Under the Guidance of

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**T. SHANMUGAPRIYA**



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## ABBREVIATIONS

DSSC	Dye sensitized solar cell
CE	Counter Electrode
GO	Graphene oxide
rGO	Reduced Graphene oxide
NiO	Nickel Oxide
Y <sub>2</sub> O <sub>3</sub>	Yttrium oxide
SnO <sub>2</sub>	Tin Oxide
H <sub>2</sub> SO <sub>4</sub>	Sulphuric Acid
KMnO <sub>4</sub>	Potassium permanganate
H <sub>2</sub> O <sub>2</sub>	Hydrogen peroxide
NH <sub>4</sub> OH	Ammonia solution
SP	Solanum Procumbens
ST	Solanum Torvum
AH	Artabotrys Hexapetalus
GP	Galinsoga Parviflora
JG	Jasminum Grandiflorum L
FTO	Flurine doped tin oxide
Pt free	Platinum free
XRD	X – Ray Diffraction
FTIR	Fourier transform infrared spectroscopy
UV- VIS	Ultra violet Visible spectroscopy
FESEM	Field Emission Scanning Electron Microscopy
FT IR	Fourier transform infrared spectroscopy
EDAX	Energy dispersive X-ray analysis
HR TEM	High resolution transmission electron microscopy