Synthesis and characterization of La-doped and La-I co-doped TiO_2 photocatalysts for photocatalytic degradation of Methylene Blue Dye from its aqueous solution

Thesis submitted in partial fulfillment

for the Award of Degree

DOCTOR OF PHILOSOPHY

by

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Dedicated to My Beloved

Parents &

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Veeresh Verma

Date: Veeresh Verma

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LIST OF ABBREVIATIONS

COD	Chemical Oxygen Demand
DDW	Double Distilled Water
DRS	Diffuse Reflectance Spectroscopy
FE-SEM	Field Emission Scanning Electron Microscopy
FTIR	Fourier Transform Infrared
GIN	Germination index
IDT	Iodine-doped TiO_2
IR	Infrared
LICT	Lanthanum (La) and Iodine (I) co-doped TiO_2
MB	Methylene Blue
PIN	Phytotoxicity index
QT	Quartz Tube
RG	Relative root growth
SAED	Selected Area Electron Diffraction
SCS	Solution Combustion Synthesis
SG	Relative seed germination
TEM	Transmission Electron Microscopy
UV	Ultraviolet
UV-Vis	Ultraviolet-Visible
UV-PCR	Ultra-Violet Photochemical Reactor
XPS	X-Ray Photoelectron Spectroscopy

LIST OF SYMBOLS

C_1	Initial concentration of dye.
C_2	Final concentration of dye.
C_3	Loss of dye in blank solution.
C_4	Concentration change due to adsorption.
C_o	Initial concentration of the dye solution.
D	Particle size.
d	Inter-planner spacing.
E_b	Electron Binding Energy
E_k	The kinetic energy
E_g	Bandgap energy.
F(Rα)	Kubelka-Munk function.
hυ	Photon energy.
K	Scherrer constant.
K_p	Apparent first-order rate constant.
n	Integer.
Rα	Reflectance coefficient of the sample.
t	Time.
V	Volume.
β	Full width at half maxima.
θ	Diffraction angle at maximum peak.
λ	Wavelength of X-ray.