Preparation and Characterization of Alumina-Silica and Alumina-Silica-Magnesia Nano-composites from Industrial Wastes for Advanced Applications

Thesis For

Ph.D. Degree in Chemistry

To

Chemistry Department, Faculty of Science,
Ain Shams University
By

Moustafa Mohammed Saad Moustafa Sanad

M. Sc. in Chemistry, 2009

2014

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Under the Supervision of

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LIST OF ABBREVIATIONS

Symbol	Definition
SDS	Sodium dodecyl sulfate
CTAB	Cetyl trimethyl ammonium bromide
PVA	Poly vinyl alcohol
PL	Photoluminescence
DTA	Differential thermal analysis
DSC	Differential scanning calorimetry
ICP	Inductively Coupled Plasma Spectrophotometer
XRD	X-ray diffraction analysis
XRF	X-ray fluorescence analysis
SEM	Scanning electron microscope
TEM	Transmission electron microscope
S_{BET}	Specific surface area
rpm	Rotations per minute
x	Ratio of dopant ion
θ	X-Ray diffraction angle
β	Full width at half-maximum of X-ray peak
D	Average crystalline size
λ	X-ray wavelength
E_a	Apparent activation energy
T_p	Crystallization peak temperature
R	Gas constant
Φ	Heating rate per minute

List of Abbreviations

Symbol	Definition
ΔT	Full width at half maximum of the exothermic peak
n	Shape factor (Avrami constant)
ρ	Electrical resistivity
έ	Real dielectric permittivity
″ε	Imaginary part dielectric permittivity
tanδ	Dielectric loss factor
HV	Vickers microhardness
DC	Direct current
AC	Alternating current
ICDD	International Center for Diffraction Data
V	Volume of unit cell
a, b, c	Lattice parameters
ppm	Part per million
GPa	Giga Pascal
MHz	Megahertz
GHz	Gigahertz
ALW	Washing liquor of Al etching
ALD	Leaching liquor of Al dross
SR	Leaching liquor of silica wastes
SF	Leaching liquor of silica fume
GB	Leaching liquor of ground bricks of lining furnaces

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