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List of Abbreviations

Abbreviation	Meaning
μR	Micro-Raman
AC	Activated carbon
BET	Brunauer-Emmett-Teller
BJH	Barrett-Joyner-Halenda
CNT	Carbon nanotubes
CP	Conducting polymer
CV	Cyclic voltammetry
DI	Deionized water
EDL	Electric double layer
EDLC	Electric double layer capacitance
EIS	Electrochemical impedance spectroscopy
FESEM	Field emission scanning electron microscopy
FTIR	Fourier transform infrared spectroscopy
GCD	Galvanostatic charge-discharge
GO	Graphene oxide
GO-PAniNTs	Graphene oxide-polyaniline nanotubes
GO-PPyNTs	Graphene oxide-polypyrrole nanotubes
HRTEM	High resolution transmission electron microscopy
ITO	Indium tin oxide
IUAC	Inter University Accelerator Centre
I-V	Current-voltage
MeV	Mega electron volt
MnO_2NTs	Manganese oxide nanotubes
MO	Methyl orange
MO-$FeCl_3$	Methyl orange-Ferric chloride
nA	Nano-ampere
OWRK	Owens, Wendt, Rabel and Kaelble
PAni	Polyaniline
PAniNTs	Polyaniline nanotubes

PEDOT	Poly (3,4-ethylene dioxythiophene)
PPy	Polypyrrole
PPyNTs	Polypyrrole nanotubes
PTh	Polythiophene
RGO	Reduced graphene oxide
RGO-PAniNTs	Reduced graphene oxide-polyaniline nanotubes
RGO-PPyNTs	Reduced graphene oxide-polypyrrole nanotubes
SDFCL	SD fine chemicals limited
SEM	Scanning electron microscopy
SHI	Swift heavy ion
SNICS	Source of negative ions by cesium sputtering
SRIM	Stopping ranges of ions in matter
SRL	Sisco Research Laboratory
TG	Thermogravimetric
TGA	Thermogravimetric analysis
TMOs	Transition metal oxides
XRD	X-ray diffraction

List of Symbols

Symbol	Meaning
η	Coulombic efficiency
C_{sp}	Specific capacitance
G_0	Low field conductance
R_{ct}	Charge transfer resistance
R_s	Equivalent series resistance
S_e	Electronic energy loss
S_n	Nuclear energy loss
T_{onset}	Onset decomposition temperature
T_{rpd}	Rapidest decomposition temperature
V_0	Voltage scale factor
X_c	Crystallinity percentage
Z_W	Warburg impedance
σ	Conductivity
ρ	Resistivity