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ABBREVIATIONS AND SYMBOLS

A	Absorption
A^+	Electron acceptor
at.%	Atomic %
B	Peak width measured at half height measured in radius
BET	Brunauer-Emmett-Teller
C	Amount of carbon
C	A constant, related to the free energy of adsorption
c	Speed of light
CRT	Cathode-ray tube
CMU	Chiang Mai University
C_A	Concentration of element A
C_B	Concentration of element B
°C	Degrees Celsius
d_{hkl}	Interplanar distance between (hkl) planes
d	Lattice planar spacing
cb	Conduction band
e^-	Electron
e^-_{cb}	Conduction band electron
eV	Electron volt

E	Binding energy
EDS, EDX	Energy dispersive X-ray spectroscopy
EM	Electron microscope
E_0	Energy of ground state
E_1	Energy of first excited state
E_a	Apparent activation energy
E_b	Binding energy
E_g	Optical band gap of the semiconductor
E_k	Kinetic energy
E_{vac}	Energy of vacuum level
g/L	grams/liter
h	Plank's constant (6.63×10^{-34} Js)
hν	Photon energy
h^+	Hole
h^+_{vb}	Valence band hole
I_0	Intensity of the incident beam
I	Intensity of the transmittance
I_A	Background subtracted peak intensities for A
I_B	Background subtracted peak intensities for B
IUPAC	International union of pure and applied chemistry
J	Intensity of the reflected radiation
JCPDS	Joint committee powder diffraction standards
K	Kelvin
K	Absorption coefficient
k	Conductivity value
keV	kilo electron volt
kV	kilo-volt
$\tilde{k}$	Wave vector
$\tilde{k}'_{cb}$	Wave vector of the lowest energy state in the conduction band

$\tilde{k}'_{vb}$	Wave vector of the highest energy state in the valence band
mg	Milligram
min	Minute
ml	Milliliter
mS	Millisiemen
n	Order of diffraction
nm	Nanometer (10^{-9} m)
N_a	Avogadro's number (6.02×10^{23})
O	Oxygen
$O_2^{\bullet -}$	Superoxide radical
$OH^{\bullet}$	Hydroxyl radical
P	Pressure at the constant temperature
P_0	Saturation pressure at the measurement temperature
R_α	Absolute remittance
rpm	Revolution per minute
r_k	Kelvin radius
r_p	Actual pore radius
S	Twice the scattering coefficient of sample
SEM	Scanning electron microscopy
SSA	Specific surface area
S.A.	Surface area
S_{BET}	BET surface area
T	Transmittance
TTIP	Titanium tetraisopropoxide
TEM	Transmission electron microscopy
t	Thickness (t) of adsorbed N_2 layers
t_{hkl}	Particle size measured from X-rays diffracted from the (hkl) planes
UNSW	University of New South Wales

UV-Vis	Ultraviolet-visible
UV-Vis DRS	Ultraviolet-visible diffuse reflectance spectroscopy
V	Volume, reduced to standard conditions (STP) of gas adsorbed per unit mass of adsorbent at a given pressure
vb	Valence band
V_m	Volume of gas adsorbed at STP per unit mass of adsorbent, when the surface is covered by a unimolecule layer of adsorbate
V_{mol}	Molar volume of absorbate gas at STP (22.4 mol^{-1})
WDS	Wavelength dispersive X-ray spectroscopy
XPS	X-ray photoelectron spectroscopy
XRD	X-ray diffraction
Z	Atomic number
λ	Wavelength
μg	Microgram (10^{-6} g)
μg C	Microgram of carbon
μm	Micron (10^{-6} meter)
$\mu S/cm$	MicroSiemens /square centimeter
Φ	Work function
ε	Absorptivity
θ	Bragg angle for the reflection
ν	Frequency
ν_{as}	Frequency asymmetric
ν_s	Frequency symmetric