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List of Abbreviations and Symbols

Abbreviation	Nomenclature
CTI	Computed tomography imaging
MRI	Magnetic resonance Imaging
SPECT	Single-Photon Emission Computed Tomography
BI	Bioluminescence imaging
FI	Fluorescence imaging
PTT	Photothermal therapy
NIR	Near-infrared light
FCPN	Fluorescent calcium carbonate prenucleation clusters
Qd's	Quantum dots
BSA	Bovine Serum Albumin
MTT Assay	3-(4, 5-dimethylthiazol-2-yl)-2, 5-diphenyl tetrazolium bromide
CTCF	Corrected total cell fluorescence (CTCF) analysis
TGA	Thermogravimetric analysis
CCPN	Calcium carbonate prenucleation clusters
m_0	Initial weight of CCPN before TGA
m_f	Final weight of CCPN after TGA
α	Conversion
J_0	Kinetic barrier of nucleation
A_α	Pre-exponential kinetic factor
E_α	Activation energy of nucleation
R	Gas constant
ΔG	Change in Gibbs free energy
ΔH	Change in enthalpy
ΔS	Change in entropy
$exp(\Delta G/RT)$	Thermodynamic barrier
I	Nucleation Rate
$f(\alpha)$	Differential function
$g(\alpha)$	Integral function
β	Heating Rate
vyazovkin AIC	Vyazovkin Advanced isoconversional method
T_p	Peak temperature in DTG curve
K_B	Boltzmann constant
h	Plank constant
σ	Interfacial energy of nanomaterial
ρ_{nm}, M, v_0, N_A	Density, molar mass, specific volume, Avogadro Number
$z(\alpha)$	Product of differential and integral function
FFT	Fast fourier transform
IFFT	Inverse Fast fourier transform