

List of Abbreviations

Abbreviations	Names
0D	Zero dimensional
1D	One dimensional
2D	Two dimensional
3D	Three dimensional
DMSO	Dimethyl sulfoxide
DI	Deionized
EPR	Electron paramagnetic resonance
EDS	Energy dispersive X-ray spectroscopy
FF	Ferrofluid
FTIR	Fourier transform infrared spectroscopy
FWHM	Full width at half maxima
GNP	Gd ₂ O ₃ nanoparticle
GNR	Gd ₂ O ₃ nanorod
GOF	Gd ₃ O ₄ F ₆
HRTEM	High resolution transmission electron microscopy
KeV	Kilo electron volt
LNT	Low nitrogen temperature
MeV	Mega electron volt
MRI	Magnetic resonance imaging
MR	Magnetorheological

nm	Nanometer
OR	Ostwald ripening
OA	Oriented attachment
PL	Photoluminescence
QD	Quantum dots
rpm	round per minute
REO	Rare earth oxide
RT	Room temperature
SAED	Selected area electron diffraction
SQUID	Superconducting quantum interference device
TM	Transition metal
TGA	Thermogravimetric
UV	Ultra-violet
XRD	X-ray diffraction
Å	Angstrom

List of Symbols

Symbols	Meanings
k_B	Boltzmann constant
η	Microstrain
μ	Refractive index
M_r	Remanence
H_c	Coercivity
η_{vs}	Apparent viscosity
E_a	Activation energy
R	Universal gas constant (8.314 J·mol ⁻¹ K ⁻¹).
f	frequency
μ_B	Bohr magnetron
S_n	Nuclear energy losses
S_e	Electronic energy losses
R_p	projectile range
$\dot{\gamma}$	shear rate
γ	Gamma ray
μ_0	Permeability of the free space
τ_{sl}	Spin-lattice relaxation
τ_{ss}	Spin-spin relaxation
m	Power law index
τ_g	growth parameter
τ_d	Decay parameter