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List of abbreviations

Abbreviation	Meaning
SERS	Surface Enhanced Raman Scattering
DNA	Deoxyribonucleic Acid
RNA	Ribonucleic Acid
EM	Electromagnetic
NIR	Near Infra Red
CE	Chemical Enhancement
LSP	Localized Surface Plasmon
LSPR	Localized Surface Plasmon Resonance
EF	Enhancement Factor
HOMO	Highest Occupied Molecular Orbit
LUMO	Lowest Unoccupied Molecular Orbit
EBL	Electron Beam Lithography
FIB	Focused Ion Beam
NIL	Nanoimprint Lithography
NSL	Nanosphere Lithography
RSD	Residual Standard Deviation
PVD	Physical Vapor Deposition
AAO	Anodic Aluminum Oxide
LoD	Limit of Detection
DVD	Digital Versatile Disc
CCD	Charge Coupled Device
PVC	Polyvinyl Chloride
PDMS	Polydimethylsiloxane
PDDA	Poly(diallyl dimethylammonium)
PVS	Polyvinylsiloxane
PVA	International Organization for Standardization
BRDVD	Blu-ray Digital Versatile Disc

UV-VIS	Ultraviolet-Visible
BOD	Biological oxygen Demand
DASAuNP	Diagonally Aligned Squared Gold Nanopillar
FEM	Finite Element Method
FESEM	Field Emission Scanning Electron Microscope
TEM	Transmission Electron Mi- croscope
RhB	RhodamineB
R6G	Rhodamine6G
MG	Malachite Green
PVP	Polyvilylpyrrolidone
DI	Deionized
GSM	Gram per Square Meter
BPE	1,2- bis(4-pyridyl)ethylene
ppm	Parts Per Million

List of symbols

Symbol	Meaning
m	Atomic mass
K	Bond strength
x	Displacement
μ	Reduce mass
q	Total displacement
ν_m	Frequency of molecular vibration
M	Dipole moment
α	Polarizability
P_0	Power of incident light
P_s	Power of scattered light
I_0	Intensity of incident photons
α_R	Raman cross section
λ	Wavelength
E	Electric field
M_R	Local field induced dipole moment
P_{rad}	Power radiated by dipole
$\epsilon(r)$	Relative dielectric function
I_{SERS}	SERS signal intensity
I_R	Raman signal intensity
I_{REF}	Reference Raman signal intensity
N_{REF}	Number of molecules within the excitation volume on the reference substrate
N_{SERS}	Number of molecules within the excitation area on SERS substrate
c	Concentration of analyte
N_A	Avogadro's number

mL	Milliliter
μL	Microliter
mg	Milligram
μg	Microgram
nm	Nanometer
mM	Millimolar
μM	Micromolar
nM	Nanomolar
V/m	Volt per meter
σ	Standard deviation
S	Slope