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NOMENCLATURE AND ABBREVIATIONS

Latin Symbols

Letter	Description	Unit
A	Surface area	[m^2]
A_c	Effective collecting area	[m^2]
C_c	Cunningham slip correction factor	-
D	Particle diffusion coefficient	[m^2/s]
De	Deutsch number	-
E	Electric field strength	[V/m]
E_c	Corona discharge onset field	[V/m]
E_o	Breakdown field	[V/m]
E_{ps}	Pseudo-homogeneous electric field	[V/m]
E_{ce}	Electric field near the collecting wall	[V/m]
F_D	Aerodynamic drag force	[N]
F_E	Electrostatic force	[N]
F_G	Gravitational force	[N]
I	Current	[A]
I_e	Electron current	[A]
I_i	Ion current	[A]
J	Net flux of particles	-
K_E	Translational kinetic energy	[N.m^2/C^2]
Kn	Knudsen number	-
L	Length of the tube	[m]
N_i	Ion concentration	[ions/m^3]
N_p	Particle number concentration	[particles/m^3]
N_s	Ion concentration above the surface	[ions/m^3]
N_m	Molecules concentration	-
P	Operating pressure	[Pa]
P_0	Reference pressure (1.013×10^5pa)	[Pa]
Q_g	Volumetric flow rate of gas	[l/min]
Re	Reynolds number	-
S	Sutherland constant	-
T	Absolute temperature	[K]
T_o	Reference temperature	[K]

Letter	**Description**	**Unit**
T_e	electron temperature	[K]
T_i	Ion temperature	[K]
U	Mean flow velocity	[m/s]
U_g	Gas velocity	[m/s]
U_m	Migration velocity	[m/s]
U_p	Particle velocity	[m/s]
V	Electric Potential	[V]
V_c	Corona discharge onset voltage	[V]
V_{diff}	Deposition velocity of particle diffusion	[m/s]
Z_i	Ion electrical mobility	[m^2/V.s]
$Z_{i,p}$	Ion electrical mobility at operating pressure	[m^2/V.s]
Z_p	Particle electrical mobility	[m^2/V.s]
Z_p	Particle radius	[m]
r_p	Mean thermal speed of ions	[m/s]
$\bar{c}_i$	Collision diameter of the particle	[m]
d_m	Particle diameter	[m]
d_p	Electron charge(1.6×10^{-19})	[C]
e	Pulse frequency	[Hz]
f	Current density	[A/m$^{2]}$
j_{ion}	Ion current density	[A/m^2]
k	Boltzmann's constant $(1.38066 \times 10^{-23})$	[J/K]
m	Mass	[kg]
m_e	Electron mass	[kg]
m_i	Ion mass	-
m_p	Particle mass	-
n	Number of elementary charges	-
n_{diff}	Average charge number of diffusion charging	-
n_e	Number of electron	-
n_{field}	Average charge number of field charging	-
n_i	Number of ion charges	-
n_p	Number of elementary charges on the particle	-
n_s	Number of Saturation charge on the particle	-
r	Radial coordinate	[m]
r_c, r_1	Radius of corona wire	[m]
r_2	Radius of corona wire	[m]
t	Mean residence time	[s]

Letter	Description	Unit
t_d	Pulse duration time	[s]
t_s	Ion transit time	[s]

Greek Letters

Letter	Description	Unit
δ	Air density	[kg/m^3]
ε	Dielectric constant	[F/m]
ε_0	Electric permittivity of vacuum	[F/m]
η_t	Overall collection efficiency	-
η_f	Grade or fractional collection efficiency	-
η_r	Reduction efficiency	-
η_c	Overall collection efficiency	-
λ	Mean free path	[m]
λ_0	Reference mean free path	[m]
λ_D	Debye length	[m]
λ_{De}	Electron Debye length	[m]
μ	Gas Viscosity	[Pa.s]
μ_0	Reference Viscosity	[Pa.s]
ρ	Density	[kg/m^3]
ρ_p	Particle density	[kg/m^3]
σ	Standard deviation	-
σ_g	Geometric standard deviation	-
α	Townsend coefficient	-
α'	Net Townsend coefficient	-
β	Townsend coefficient	-

Abbreviations

Letter	Description
AC	Alternating Current
ADS	Anode Directed Streamer
BLPI	Berner-Type Low-Pressure Impactor
CDS	Cathode Directed Streamer
CNC	Condensation Nuclei Counter

Letter	Description
DBD	Dielectric Barrier Discharge
DC	Direct Current
DMPS	Differential Mobility Particle Sizer
DOP	Dioctyl Phthalate
DVM	Digital Voltmeter
EAA	Electrostatic Agglomeration Apparatus
ELPI	Low-Pressure Impactor
E/S	Electrospray
ESP	Electrostatic Precipitator
GMD	Geometric Mean Diameter
GSD	Geometric Standard Diameter
HEPA	High Efficiency Particulate Air
HV	High Voltage
NTP	Non-Thermal Plasma
PCD	Pulsed Corona Discharge
PDA	Doppler Anemometer
PM	Particular Matter
RF	Radio Frequency
RH	Relative Humidity
SMPS	Scanning Mobility Particle Sizer
UV	Ultraviolet