NOMENCLATURE

a	constant, coefficient, fiber radius, dimension, filtration coefficient, parameter
A	constant, coefficient, activity, strength, Kuhn's segment
b	constant, coefficient, dimension (thickness, thickness of fibrous trapping layer, width, parameter)
B	constant, coefficient, thermal mobility of aerosol particle
c	constant, concentration by weight, specific volumetric activity
C	molal concentration, constant, function of permeability of fiber shell
C_{Kn}	Cunnigham correction
C_i	coefficient of hydrodynamic drag of the channel
d	impact parameter, diameter, dimension, width, distance between electrodes
d_{p}	particle diameter
D	aerosol particle diffusion coefficient
e	base of natural logarithms
E	electric field strength
f	index, density distribution function

F	force, distribution function
g	acceleration of gravity
G	energy, elastic modulus, weight, surface density
ΔG	viscous flow activation energy
h	dimension, height, thickness, distance between ends of macromolecule, function
H	distance, height, depth, thickness, function
ΔH	heat of vaporization
i	integer, power exponent
I	electric current
J	aerosol particles flux
k	Boltzmann's constant, hydrodynamic factor
k'	viscosimetric constant
K	permeability of aerosol particles through the filtering layer, efficiency
[K]	standard permeability of aerosol particles (at U_f = 1 cm/sec)
κ	Cyrillic K allowing for the mutual effect of fibers on the flow mode
K_M	Martin's constant
l, L	length, specific load, depth of channels, function
L_{br}	breaking length
L_{fb}	length of fibers per unit filtering-layer surface
m	integer, mass of aerosol particle, sensitivity of method in units of mass or of a quantity proportional to it
M	mass
n	denumerable aerosol-particles concentration, coefficient, constant, integer
N	number of aerosol particles, integer
p	number, relative gas pressure, degree of polymerization, porosity, variable
P	gas pressure
ΔP	hydrodynamic drag, pressure difference
$[\Delta P]$	standard hydrodynamic drag (at U_f = 1 cm/sec)
q	electric charge, its volumetric [bulk] density, relative volumetric gas flowrate
Q	constant, volumetric gas flowrate

r	radius of aerosol particle, radial coordinate
r^*	radius of the most penetrating aerosol particles
R	coupling parameter ($R = r/a$), gas constant, radius, radial coordinate
S	surface area
t	time
T	temperature
U	linear velocity of aerosol particle, flow, drift velocity, filtration rate
U_f	linear velocity of gas
V	volume, potential difference
V_f	volume of filter
V_{lay}	volume of filtering layer
W, w	probability function, length of generatrix, length, relative electric field strength, power
W_f	width of filter
x, X	coordinate
y	variable

Dimensionless numbers

$\mathrm{Eu} = \dfrac{E^2}{4\rho U^2} = \dfrac{\pi^2 r^4 E^2}{4\rho Q^2}$	Euler number
$\mathrm{Fr} = U_f^2/2ag$	Froude number
$\mathrm{Ki} = \dfrac{2\pi\gamma\chi}{\varepsilon U} = \dfrac{2\pi^2 r^3 \gamma\chi}{\varepsilon Q}$	isochoric number
$\mathrm{Kn} = \lambda/a$	Kundsen number
$\mathrm{Pe} = 2U_f a/D$	Peclet number
$\mathrm{Re}, \mathrm{Re_f} = 2U_f a\rho/\eta$	Reynolds number
$\mathrm{Stk} = C_{dr}\rho r^2 U_f/18\eta a$	Stokes number
$\mathrm{We} = \dfrac{2\alpha}{\rho r U^2} = \dfrac{2\pi^2 r^3 \alpha}{\rho Q^2}$	Weber number

Greek letters

α	filtration (filtering action) coefficient, filtration quality, surface tension

$[\alpha]$	standard filtration (filtering action) coefficient
β	volumetric density of fiber packing in the filtering layer
γ	specific electrical conductivity; filtration coefficient in units inverse to the layer thickness
δ	distance to wall, thickness of permeable shell
$\delta + 1 + C_1/C_2$	characteristic of adjoining flow passages in a configured filtering layer
$\delta = 2I/\mu E^2$	applied electric field shielding parameter, thickness
Δ	difference symbol
ε	dielectric permittivity, relative longitudinal elongation of filtering material
ε_{rel}	maximum relative longitudinal elongation of filtering material (at rupture)
ζ	measure of nonuniformity of the filtering-material and fiber-layer thickness
η	viscosity
λ	mean free path of gas molecules, mean free path of molecules or electrons in the gas, configuration factor
μ	electrical mobility of aerosol particle
ν	capture factor, dimensionless distance, secondary-electron emission factor
$[\eta]$	characteristic viscosity
υ	dimensionless mean velocity of jet
Θ	angle, relaxation time
χ	dielectric polarization factor, thermal conductivity
ξ	dimensionless radius
π	3,141592654
ρ	density of gas (spinning solution)
ρ_p	volumetric density of particle (ρ_0)
ρ_{fb}	density of fiber
υ	compactness of filter
χ	dielectric polarization factor, thermal conductivity, gas permeability of fiber shell
σ	surface density of electric charges, strain intensity, deviation of random quantity
τ	dimensionless time, relaxation time
φ	dimensionless scale parameter, pressure gradient

ψ	dimensionless volumetric electric charge density
ω	dimensionless acceleration of jet, volumetric fraction of polymer in spinning solution

Subscripts

a	air
ac	activation
aerodyn	aerodynamic
ap	applied
av	available
b	bottom
bd	breakdown
br	breaking
ch	channel
conv	convective
cor	corona
cr	critical
d	drift
dr	droplet
e	electric
ef	effective
eq	equivalent
ew	electric wind
exp	experimental
F	filter
f	filter
fb	fiber
fil	filament
fr	friction
g	gravitational
geom	geometric
h	hydrodynamic
hd	header
in	inlet
int	initial
ion	ion
j	jet

lay	layer
liq	liquid
long	longitudinal
M	Martin
m	median
mat	material
max	maximum
min	minimum
n	nozzle
out	outlet
p	particle
pr	predicted
res	residue
s	surface
sc	secondary
sol	solvent
sp	specific
St	Stokesian
str	structure
t	top
t.loss	tenacity losses
v	vapor
W	Van der Waals

Abbreviations

ANM	air–nitrogen mixture
ANMF	air–nitrogen mixture filter
CE	collecting electrode
DOPH	dioctyl phthalate
ESP	electrospinning process
FC	filtration coefficient
FS	filtering station
HEF	high-efficiency aerosol filter
HEGF	high-efficiency gas filtration
HEMF	high-efficiency, modular aerosol filter
HEPA	high-efficiency particulate air
HVS	high-voltage source

PF	Petryanov filters
SC	spinning chamber
SFAC	standard filtering action coefficient
SOF	standard oil fog
SSI	spinning solution injector
ULPA	ultra low-penetration air
WNA	weak nitric acid.