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NOMENCLATIRE

Abbreviation	Meaning
AEM	Anion exchange membrane
ANOVA	Analysis of variance
BBD	Box-Behnken Design
CA	Chronoamperometry
CEM	Cation exchange membrane
CNT	Carbon nanotube
CV	Cyclic voltammetry
3D	Three-dimensional
DBFC	Direct borohydride fuel cell
DEFC	Direct ethanol fuel cell
Df	Degree of freedom
DMFC	Direct methanol fuel cell
DSBFC	Direct sodium borohydride fuel cell
EIS	Electrochemical impedance spectroscopy
FTIR	Fourier transform Infrared spectroscopy
GDL	Gas diffusion layer
IEC	Ion exchange capacity
MPD	Maximum power density
MWCNT	Multi-walled carbon nanotube
OCV	Open circuit voltage
PEMFC	Proton exchange membrane fuel cell
PVA	Poly(vinyl) alcohol
SD	Standard deviation
SEM	Scanning electron micrscopy
TEOS	Tetraethylorthosilicate
XRD	X-ray diffraction

Alphabetic symbols	**Meaning**
A	Freeze-thaw cycle
B	NaOH doping concentration
C	TEOS loading
C_{HSA}	High surface area carbon black
k	Number of factors in RSM study
N	Total number of experiments in RSM study
p-value	Probability value
R^2	Coefficient of determination
X_i and X_j	Independent variables for the selected in RSM study
Y	Response (Power density)

Greek Symbols	**Meaning**
α_o	Linear parameter
α_{ii}	Quadratic parameter
σ	Ionic conductivity
θ	Theta (in degree)
η_{FC}	Total efficiency
η_r^{cell}	Thermodynamics efficiency
η_V	Electrochemical efficiency
η_F	Faraday efficiency
η_H	Heating value efficiency