

LIST OF ABBREVIATIONS

TMA	Tetravalent Metal Acid
ZrATMP	Zirconium Amino trismethylene phosphonic acid,
TiATMP	Titanium Amino trismethylene phosphonic acid,
ATMP	Amino trismethylene phosphonic acid
ZrD	Zirconium Diethylene triamine
ZrT	Zirconium Triethylene tetra amine
ZrT-X	Zirconium membrane (X=45, 50, 55 wt. % of ZrT gel)
ZrT gel	Zirconium Triethylene tetra amine gel
ZrP	Zirconium phosphate
ICP-AES	Inductively Coupled Plasma - Atomic Emission Spectrometry
TGA	Thermogravimetric Analysis
DSC	Differential Scanning Calorimetry
XRD	X-ray Diffraction
SEM	Scanning Electron Microscope
FT-IR	Fourier Transform Infra Red Spectroscopy
AAS	Atomic absorption spectroscopy
CEC	Cation exchange capacity
AEC	Anion exchange capacity
BTC	Breakthrough capacity
K_d	Distribution Coefficient
K'_c	Selectivity coefficient
α	Separation factor
$U(t)$	Fractional attainment of equilibrium
$^{\circ}\text{C}$	Degree Celsius
ΔG°	Standard Gibbs free energy change.
ΔH°	Standard enthalpy change
ΔS°	Standard entropy change
T	Temperature
CEM	Cation Exchange Membrane
AEM	Anion Exchange Membrane

PVC	Poly (vinyl chloride)
PVA	Poly (vinyl alcohol)
CE	Current electrode
RE	Reference electrode
SF	Solution flux/ Separation factor
HLC	Haber-Luggin Capillary
DC	Direct current
ϕ_w	Water uptake
Φ_{H_2O}	Swelling
τ	Void porosity
X_m	Surface Charge Concentration
λ_w	Number of water molecules/ionic sites
κ^m	Specific membrane conductivity
P_e	Electro-osmotic permeability
P_s	Perm-selectivity of membrane
F	Faraday constant
χ_o	Specific friction co-efficient
LCD	Limiting current density
J^m	Flux in membrane
I_{lim}	Concentration polarization
BM	Potential across membrane
R_s	Solution resistance
C	Capacitance
R_p	Interfacial resistance
I	Current density
t_i^m	Counter ion Transport number through membrane
t_w	Water transport number across the membrane
t_i^{MT}	True transport number
t_i^{MA}	Apparent transport number
ρ_d	Density of dry membrane
W_0	Weight loss fraction

IEC₀

Fraction change in IEC