



Background and purpose

Redox flow battery Output leveling of renewable energy

Background

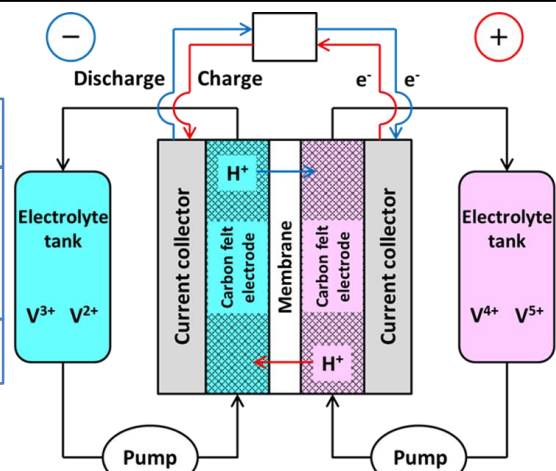
η : Overpotential $\eta_{cell} = \eta_{act} + \eta_{res}^E + \eta_{res}^{IR} + \eta_{con}^B + \eta_{con}^S$

Many parameters are needed to evaluate each overpotential

Task: Degree of contribution of the parameter is unclear

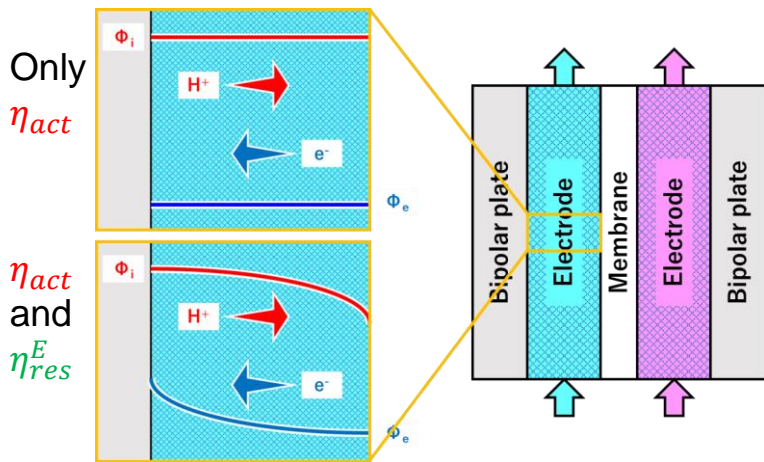
Purpose: Define the contribution to the overpotential

➔ **Develop a new evaluation method that can evaluate overpotential easily.**

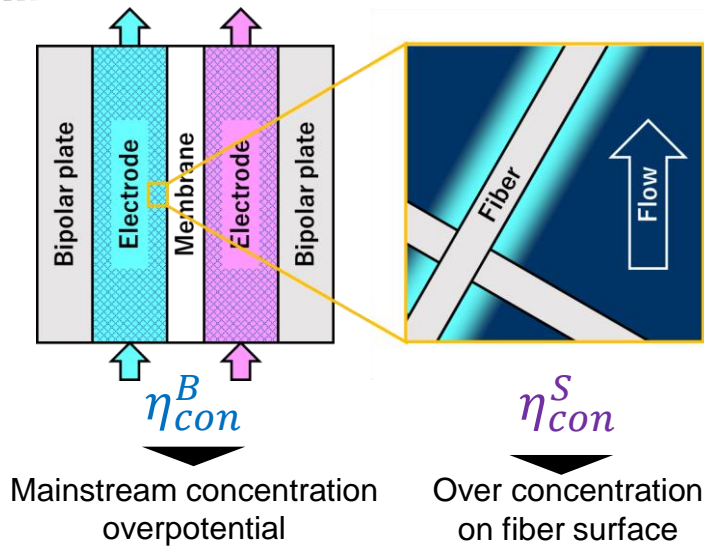


Description of each overpotential

$$\eta_{cell} = \eta_{act} + \eta_{res}^E + \eta_{res}^{IR} + \eta_{con}^B + \eta_{con}^S$$



Φ_i : Ion potential distribution
 Φ_e : Potential distribution of electrons
 η_{res}^E : Overpotential due to potential distribution



η_{res}^{IR} : Contact resistance and membrane resistance (Not subject to evaluation)

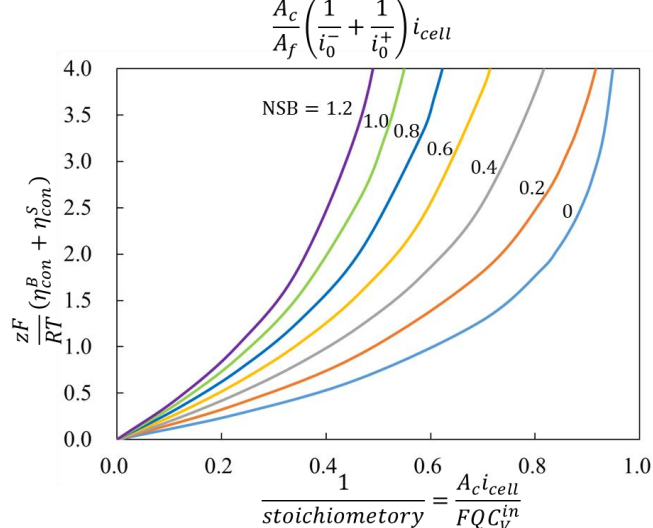
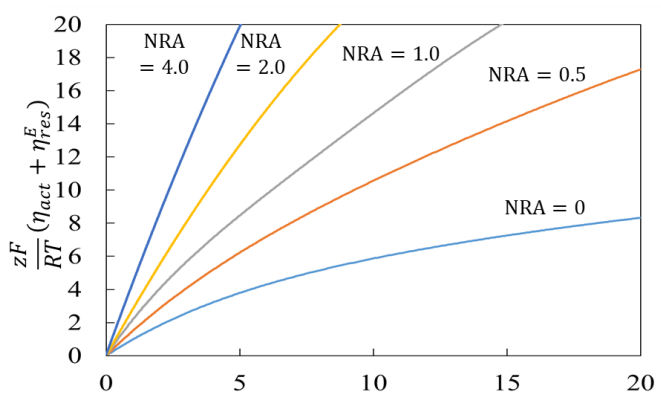
Derivation of Major Factors

Influence of η_{res}^E	Influence of η_{con}^S
Influence of η_{act}	Influence of η_{con}^B
= NRU	= NSU

NRU: Number of Resistance overpotential Unit
NSU: Number of Surface concentration overpotential Unit

Evaluation diagrams

Creating two evaluation diagrams with NRU and NSU



Overpotential can be easily evaluated using two evaluation diagrams.