Electrochemical Energy Conversion

Dick Bedeaux [C, S] and Signe Kjelstrup
Department of Chemistry, Norwegian University of Science and Technology, Trondheim, Norway
dick.bedeaux@chem.ntnu.no

It is shown how non-equilibrium thermodynamics can be used to describe energy conversion in electrochemical cells [1]. The entropy production is actively used to find the electric potential profile under reversible conditions and to define the overpotential. Two variable sets are useful, and we give the transformations between these. We next prescribe procedures for calculations of profiles of temperature, concentrations and electric potential across a cell. Applications to saline power plants and thermoelectric generators are briefly discussed.

References

[1] S. Kjelstrup and D. Bedeaux, Non-equilibrium thermodynamics of heterogeneous systems, World Scientific, 2008.