

# **Coupled Transport Phenomena Across Porous Membranes**

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Membrane systems can be found in a variety of applications – water desalination, power production, and filtration, to name a few. On a macroscopic scale, membranes introduce a symmetry-breaking discontinuity that brings interesting physics to the table, such as the coupling between mass transfer and chemical reactions in the biological cell wall. Non-equilibrium thermodynamics provides a framework for describing such coupling phenomena, and for designing new concepts where the physics of the heterogeneous system can be applied. Our current research is focussed on the exploiting the coupling between heat and mass transfer across such membranes in order to harness waste heat for power production and water desalination. These concepts are motivated by the prevalent abundance of waste heat from applications of high-grade energy, and from industrial plants. Continued research will direct the optimisation of such systems for given applications.