

# **Properties of Thermodynamic Couplings between Chemical and Transport Processes with External Resistances**

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Reaction-transport systems control the behavior of many physical, chemical, and biological systems, such as catalytic reactions, pattern formation, and biochemical pumps. This study presents the formulations of some thermochemical and thermophysical properties through the modeling of thermodynamically coupled reaction-transport systems with external heat and mass transfer resistances. The formulations are based on the linear nonequilibrium thermodynamics approach by assuming that the system is in the vicinity of global equilibrium. Some methodologies are suggested for estimating the properties. These properties represent the thermodynamic coupling and external resistances in describing and modeling reaction-transport systems thoroughly.