Basic equations for desalination by reverse osmosis: a deduction based on the thermodynamics of irreversible processes

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ABSTRACT

The thermodynamics of irreversible processes is a useful tool for understanding and quantifying transport phenomena in dense membranes where the membrane structural parameters are not essential. Because of the existence of driving forces, the components within the solution are transported from one side of the membrane to the other by diffusion. The aim of this paper is to provide basic equations for reverse osmosis derived from a set of more general equations established for membrane transport which relates fluxes and driving forces, based on non-equilibrium thermodynamics.

Keywords: Thermodynamics of irreversible processes; Transport phenomena; Membrane; Reverse osmosis

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