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Time Transient Effects in Heterogeneous Permselective Systems YOAV GREEN, SINWOOK PARK, GILAD YOSSIFON, Technion-Israel Institute of Technology — The passage of an electric current through a permselective medium (membranes/nanochannels) under an applied electric field is characterized by the formation of ionic concentration gradients which result in regions of depleted and enriched ionic concentration at opposite ends of the medium, i.e. concentration polarization (CP). In this work, we study the time-transient behavior of the concentration and electric potential distributions in a realistic two dimensional and three layered system (i.e. microchannel-permselective medium-microchannel device). We provide an analytical solution for the concentration under the simplifying assumptions of local-electroneutrality, ideal permselectivity and negligible convection while the electric potential is solved numerically. It is shown that time transient effects occur over the diffusive time scale until steady-state is achieved. The numerical steady state solution is compared with previous analytical results and good quantitative behavior is observed.

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