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Capacitive Charging of Multi-ion Electrolytes confined in parallel electrodes[1] YUN SUNG PARK, IN SEOK KANG, Department of Chemical Engineering, POSTECH — Charging and discharging of ionic devices have been widely studied theoretically and experimentally. Especially, numerous kinds of electrolytes and their combinations have been utilized in order to enhance capacitances or frequency dependencies of the devices. However, the theoretical studies of effects of multiple ions on the properties of the devices are insufficient. In this work, we study the effect of multiple ions quantitatively using continuum approach. Electrolytes are confined in one-dimensional parallel electrodes, which is simplest system for many ionic devices. The multiple ions with different sizes and valences are chosen and their effects are compared along with the sparse and dense bulk concentrations. We focus on both the equilibrium distributions and the dynamic behaviors of ions, which are related to capacitances and frequency dependencies, respectively. The quantitative analyses are done numerically by dividing charge densities and fluxes of individual ions. Lastly, simple electroosmotic flows are calculated from the obtained charge densities.

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