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Charged species transport and the formation of ionic depletion/enrichment zone in the junction between micro- and nano-channel KUAN-DA HUANG, RUEY-JEN YANG, National Cheng Kung University, Tainan, Taiwan — Charged species transport exhibits ionic exclusion and enrichment effect when the channel scale down to the magnitude of the electric double layer thickness. The effect as a semipermeable interface results in a wide range ionic depletion zone and enrichment zone in the adjacent microchannel when an electrical field passes through the nanochannel. We utilize an alternating depletion and enrichment effect to achieve the goal of the species concentration in microchannels. Besides, the bulk charge layer originates from the theory of the electroosmosis second kind is used to explain the formation of high speed recirculation within the ionic depletion zone in this study. We also used latex particle to visualize these recirculation structures to evidence the specific flow field in the junction between micro- and nano-channel.

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