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**Overlimiting current through ion concentration polarization layer: Hydrodynamic convection effects**[1] INHEE CHO, SUNG JAE KIM, Seoul National University — In this presentation, we experimentally investigated an effect of the hydrodymanic convective flow on an ion transport through nanoporous membrane in a micro/nanofluidic system. The convective motion of ions in an ion concentration polarization zone was controlled by external hydrodynamic inflows adjacent to the nanoporous membrane. The ion depletion region (which is regarded as a high electrical resistance) is spatially confined to a triangular shape with an additional hydrodymanic convective flow, resulting in a significant alternation in classical liming current value. Furthermore, the extreme spatial confinement can completely eliminate the limiting current region at higher flow rate so that one can obtain high current value which turns to be high power efficiency. Therefore, this mechanism would be utilized as minimizing power consumption for various electrochemical membrane systems such as fuel-cell, electro-desalination system and nanofluidic preconcentrator, etc.

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