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# Silicon nanoporous membranes as a rigorous platform for validation of biomolecular transport models

by

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**Abstract**

Microelectromechanical systems (MEMS), a technology that resulted from significant innovation in semiconductor fabrication, have recently been applied to the development of silicon nanopore membranes (SNM). In contrast to membranes fabricated from polymeric materials, SNM exhibit slit-shaped pores, monodisperse pore size, constant surface porosity, zero pore overlap, and sub-micron thickness. This development in membrane fabrication is applied herein for the validation of the XDLVO (extended Derjaguin, Landau, Verwey, and Overbeek) theory of membrane transport within the context of hemofiltration. In this work, the XDLVO model has been derived for the unique slit pore structure of SNM. Beta-2-microglobulin (B2M), a clinically relevant