

Brownian dynamics simulation of particle deposition on patterned membrane

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For the sustainable and efficient use of membrane, various approaches to reduce membrane fouling have been proposed ranging from surface treatment to topographic structures. Patterned membrane which has micron-sized patterns on its surface is shown to mitigate particle deposition without any chemical treatment, so many researchers are trying to investigate the mechanism of particle deposition on patterned membrane and draw crucial parameters to design better morphology to provide better performance. In this study, particle deposition on patterned membrane is numerically studied and analyzed by Brownian dynamics simulation. High shear stress distribution on patterned membrane and vortex development between surface patterns are observed and these flow characteristics influence the approach, attachment, detachment and deposition of particles around membrane surface. Analysis of patterned membrane by numerical particle simulation is shown to give insight to design more improved patterned membrane system.