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Particle Tracking for Membranes Including Filtration¹

DARRYL JAMES, Texas Tech University, STEPHEN WEBB, Sandia National Laboratories — Particle transport including filtration is an important phenomenon in many engineering and biological systems. Phenomenological modeling of a cross-flow filtration experiment has been performed to investigate the biofouling potential of a porous membrane. Spherical particles sized one micron and smaller are released into a steady flow field. The porous membrane is characterized by a Darcy number equal to 10^8 . Forces include electric double layer (EDL), van der Waals (vdW), induced lift, and transverse and Stokes-corrected normal drag including near-wall effects. For the negatively charged particles investigated, the EDL and vdW forces become significant within only within one particle radius from the membrane and produce repulsive and attractive forces respectively. Results will be presented quantifying fouling performance as a function of particle sizes, and cross-flow and filtration velocities and compared with experimental data.

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- Prefer Oral Session
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