Contribution ID: **363** Type: **Oral Presentation**

A Graphical Representation of Membrane Filtration with Adsorption

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We study the performance of a membrane filter represented by a pore network based on two criteria: 1) total volumetric throughput and 2) accumulated foulant concentration. We first formulate the governing equations of fluid flow on a general network, and we model adsorptive fouling by imposing an advection equation on each pore (edge) and imposing conservation of fluid and foulant volumetric flow rate at each pore junction (vertex), which yields a system of partial differential equations. We study the influence of three geometric network parameters on filter performance: 1) average number of neighbors of each vertex; 2) initial total void volume of the pore network; and 3) tortuosity of the network. We find that total volumetric throughput has a stronger dependence on the initial void volume than on average number of neighbors. Tortuosity turns out to be a universal parameter, leading to almost perfect collapse of all results for a variety of different network architectures. In particular, the accumulated foulant concentration shows an exponential decay as tortuosity increases.

Time Block Preference

Time Block C (18:00-21:00 CET)

References

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