

W0232

Pore Morphology of Membrane Filters. Dale Schaefer, A'reum Kim, Kumar Chokalingam, Ryan Justice, Max Belfor, Chemical & Materials Engineering, Univ. of Cincinnati, ERC 501L, Cincinnati, OH 45221-0012 USA.

In spite of the widespread use of commercial membrane filters, there is a paucity of information on the relationship between filtration performance and membrane morphology. We have used USAXS, USANS, SEM and light scattering to characterize both cellulose and polyvinylidene fluoride filtration media. The results show a qualitative relationship between nominal pore size (determined by bubble point measurements) and the pore chords determined by scattering. In some cases, however, the pore sizes are substantially different from those found by bubble point techniques. In addition, some of the samples show a hierarchical morphology.

Coated membranes were also investigated. Hydrophobic membranes are typically coated to improve performance in aqueous media. USAXS shows that coating modifies the short-scale morphology while leaving the large-scale morphology unchanged. We have also investigated multilayer polyelectrolyte-coated membranes. In this case, we do observe substantial changes in pore morphology depending on the dipping conditions.