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BOOK REVIEW

CROSSFLOW FILTRATION

J. Murkes and C.G. Carlsson

John Wiley & Sons, Chichester; New York, 1988;
hardbound, 133 pages, \$48.90

The authors describe a number of novel filtration approaches which, curiously enough, did not evolve from old well-established filtration techniques, but from the more modern membrane filtration, ultrafiltration and reverse osmosis approaches. In membrane ultrafiltration and later in reverse osmosis, the application of crossflow proved to be indispensable, from the earliest development of these techniques*, as a conditio sine qua non for maintaining a reasonable flux, for minimizing surface polarization, or "clogging", and for enhancing the sharpness of rejection.

The authors give a thorough description of low-shear as well as of high-shear crossflow filtration. Industrial applications of low-shear crossflow filtration are: Microfiltration of effluents from galvanic plants, Purification of degreasing and wash water, Effluent from production of image tubes, Concentration and washing of magnesium hydroxide, and of nickel hydroxide sludge, Concentration of PVC latex, Purification of water in gasoline emulsions, Filtration of microbial suspensions, Purification of wine and grape juice, Bioman retention, Industrial water purification and colloid removal in general.

*The first use of crossflow ultrafiltration was reported by this Reviewer; see, e.g.: Netherlands Patent #74531 of 3-17-1954, application of 3-3-1952; British Patent #721,087; Thesis, University of Paris, 1955; see also S. Loeb, Desalination 1, 35 (1966).

The authors have been especially involved in developing high-shear crossflow filtration methodology and apparatus, generally utilizing rotary devices for generating high shear. This approach appears to be especially promising in membrane filtration of oil in water emulsions, with virtually no surface polarization. Other applications of this approach are: Concentration of dye-stuff, Dewatering of black lignin-containing liquor, Concentration of bakers' yeast, Separation processes in nuclear power plants, Water purification in the alkaline extraction in bleaching plants, Separation of oil from water on off-shore platforms.

A novel, promising approach for the further improvement of crossflow filtration is briefly described at the end of the book, i.e., enhanced crossflow filtration in an electric field, which by electrophoretic removal of clogging particles, decreases "clogging" and thus enhances flux, while the electrosmotic flow through the membrane, further increases flux, provided of course that the membrane or porous filter material have the same sign of charge as the particles or droplets that should be rejected (which usually, but not invariably, is the case).

This work is highly recommended to chemical engineers and all workers who are interested or involved in laboratory, pilot-plant or industrial separation processes.

Carel J. van Oss