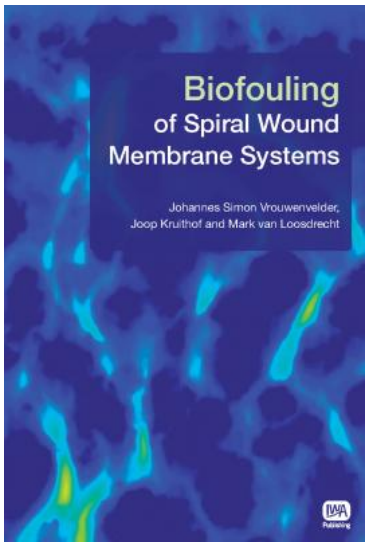
Biofouling of Spiral Wound Membrane Systems



The study of membrane biofouling has increased strongly in the past four years, compared to the previous twenty two years, indicated by the more than doubling of the number of scientifi c papers. However, no single source gives an updated overview of biofouling.

Biofouling of Spiral Wound Membrane Systems gives a complete and comprehensive overview of all aspects of biofouling, bridging the gap between microbiology, hydraulics and membrane technology.

High quality drinking water can be produced with membrane filtration processes like reverse osmosis (RO) and nanofiltration (NF). As the global demand for fresh clean water is increasing, these membrane technologies are increasingly important. One of the most serious problems in RO/NF applications is biofouling – excessive growth of biomass – affecting the performance of the RO/NF systems. This can be due to the increase in pressure drop across membrane elements (feed-concentrate channel), the decrease in membrane permeability or the increase in salt passage. These phenomena result in the need to increase the feed pressure to maintain constant production and to clean the membrane elements chemically.

Biofouling of Spiral Wound Membrane Systems relates biomass accumulation in spiral wound RO and NF membrane elements with membrane performance and hydrodynamics and determines parameters influencing biofouling. It focuses on the development of biomass in the feed-concentrate (feed-spacer) channel and its effect on pressure drop and flow distribution. It can be used to develop an integral strategy to control biofouling in spiral wound membrane systems.

Most past and present methods to control biofouling have not been very successful. An overview of several potential complementary approaches to solve biofouling is given and an integrated approach for biofouling control is proposed.

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