



## Micro-Structured Spacers for Intensified Membrane Process Performance

By Clemens Fritzmann

Shaker Verlag Mrz 2012, 2012. Buch. Condition: Neu. Neuware - The efficiency of membrane processes like ultrafiltration or reverse osmosis depends on optimized flow conditions within the membrane module. Spacers implemented in flat sheet membrane modules largely contribute to efficient operation since mass transfer rates are substantially increased by the spacer-induced flow while fouling is reduced. The use of spacers is not free of drawbacks and although generally beneficial to mass transport, it is associated with higher energy dissipation in the flow channel and can lead to additional operating problems such as intensified bio-fouling. Further, the application of membrane spacers to the treatment of fluids with high solid loads is prohibited, since the spacer filaments imply a high risk of channel blockage. Within this thesis, a new type of micro-structured membrane spacer design resembling structured packings or static mixers is introduced that reduces current shortcomings of net spacers. The new spacer type has been analyzed regarding its potential to enhance mass transfer and to reduce fouling. It was further investigated if the new spacer design can open up new applications for flat-sheet membranes systems incorporating spacers, where severe fouling and clogging problems so far eliminate the benefit of spacers. Evaluation...

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