

## **Enhanced membrane retention due to smart surface modification**

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Membrane filtration has gained a stable position in drinking and waste water treatment due to its versatility and reliability. Pentair X-Flow will present a new development in the field of nanofiltration technology which takes the advantage of specific surface modifications to different challenges.

How to create a membrane capable of retaining maximum of organic compounds from water without upsetting its natural mineral balance?

This question was answered in an FP7 project – LbLBRANE –, coordinated by the RWTH Aachen, dealing with Layer by Layer (LbL) technology, to modify membranes. Polyelectrolytes have been deposited onto the surface of microporous polymeric capillary membranes, which yielded in a back washable open nanofiltration membrane with high hypochlorite resistance. The LbL layer is strongly hydrophilic which facilitates the easy removal of adsorbed foulants as well as highly charged and thus successful in rejecting natural organic matter. We sequentially coat the membrane with a positively and a negatively charged polyelectrolyte. For these polyelectrolyte multilayers (PEMs), the properties are determined by the type of polyelectrolyte and the conditions (e.g. pH, presence and type of salt) under which the layer is prepared. In addition, especially in the case of membranes, the influence of the substrate on which the PEMs is applied is important for the final product performance. Only with a proper support, a stable adhesion of the PEMs can be achieved. This will give the desired backwash capabilities of the hollow fiber NF. We will show that by selecting the proper substrate and polyelectrolyte pair, a physically and chemically stable nanofiltration layer can be applied on hollow fiber membranes. Pilot and full-scale installation data will show the successful scale up and implementation of this unique new membrane by Pentair X-Flow.