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**BOOK OF  
ABSTRACTS**



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# Reverse osmosis membrane efficiency in removal of PFAS

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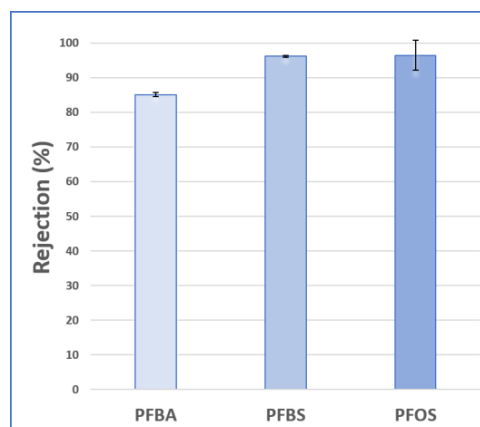
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**Introduction.** Per- and polyfluoroalkyl substances (PFAS) comprise of over 4000 artificially manufactured compounds with widescale consumer and industrial applications<sup>[1]</sup>. Due to their extensive use, PFAS are often detected in the aquatic environment and represent a global concern due to their persistence, adverse effects on living organisms and bioaccumulative potential. Conventional water treatments are insufficient in the removal of PFAS and, therefore, additional treatment methods are often required<sup>[2]</sup>. Advanced processes, such as nanofiltration and reverse osmosis, are considered to be extremely effective in removal of various emerging contaminants, including PFAS<sup>[3]</sup>. This study reports the efficiency of reverse osmosis membrane in removal of selected PFAS compounds from model water samples.

**Experimental/methodology.** Commercially available polyamide reverse osmosis membrane, SW30HR (Filmtec, USA), was used for removal of three PFAS compounds: perfluorobutanoic acid (PFBA), perfluorobutane sulfonate (PFBS) and perfluorooctane sulfonate (PFOS). Reverse osmosis experiments were conducted in METcell® dead-end unit (EVONIK, Germany). High pressure nitrogen gas cylinder was used for obtaining 30 bar pressure in the system. Ultrapure (Milli Q) water was used for feed preparation and the solution was spiked with 0.3 ng/mL of each selected PFAS. Initial sample volume (feed) was 200 mL and the experiment continued until 100 mL of permeate was collected. Temperature of the spiked solution was set at 25 °C and pH value was set at 7.

**Results and discussion.** Obtained results are presented in Figure 1. Rejections above 80% were achieved for all selected PFAS with the SW30HR membrane. An increase in rejection was observed with an increase in molecular weight (MW) of selected PFAS. The lowest rejection could be observed for PFBA (MW = 214.04 Da), while significantly higher rejections were observed for PFBS (MW = 300.01 Da) and PFOS (MW = 500.13 Da). Due to the low molecular weight cut off (MWCO = 100 Da) of the reverse osmosis membrane, high rejections of PFBA, PFBS and PFOS were expected. However, despite low MWCO, presence of selected compounds in the permeate suggests influence of other factors on PFAS rejection, such as PFAS molecular length, width, pKa and logKow values.



**Figure 1** Rejection of selected PFAS by reverse osmosis membrane

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