Blue line marks off the size of the poster (A0 = 84,1 cm width and 118,9 cm height)

MABMEM – A Toolbox for High Performance Ultrafiltration Membranes

Oliver Gronwald [1], Martin Weber [1],
MABMEM-Team

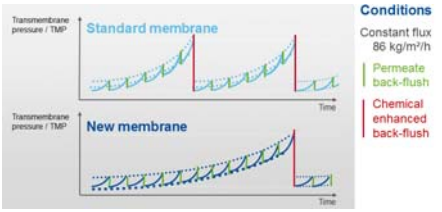
[1] BASF SE, Advanced Materials & Systems RAP/OUB, D-67056 Ludwigshafen, Germany

Motivation

- Drinking water contamination with micro- and macro pollutants (e.g organic compounds, heavy metals)
- Membrane processes are already used for removal of organic compounds as pretreatment for water desalination
- Membrane processes suffer from efficiency losses due to fouling

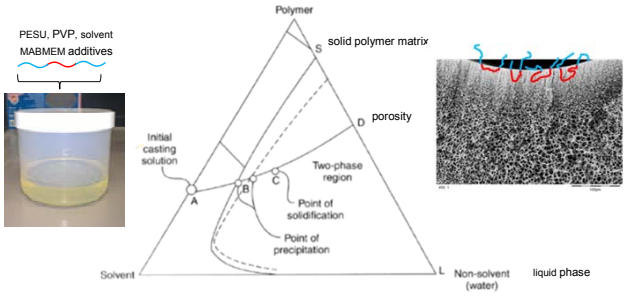
Aim

Improve UF membranes to lower the costs of operations (reduced fouling / increased lifetime)



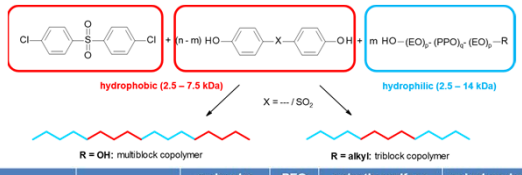
- Improve surface hydrophilicity; reduce the amount of irreversible fouling
- Design of polyphenylenesulfone (PPSU) polymer matrix

Strategy



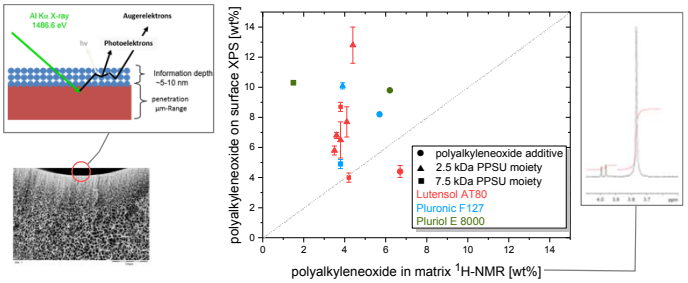
- Matrix approach for selective modification of membrane surface
- Additives in polymer dope solution agglomerate on membrane surface upon NIPS

Additive toolbox for anti-fouling



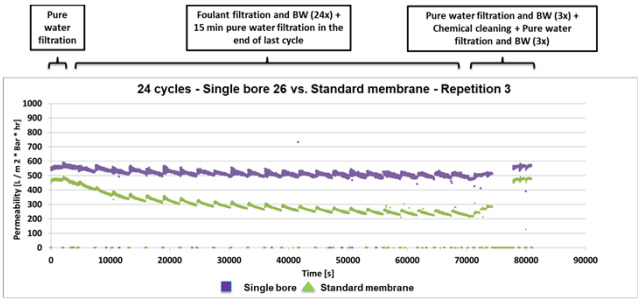
structure	type	molecular weight (M_n)	PEO share	polyethersulfone X = -SO_2- (PESU)			polyphenylensulfone X = --- (PPSU)		
				2.5 k	5.0 k	7.5 k	2.5 k	5.0 k	7.5 k
H(O-CH_2-CH_2)-OAlkyl	Lutensol® AT80	~ 3500 g/mol	97 %	✓	✓	✓	✓	✓	✓
	Lutensol® AT50	~ 2500 g/mol	92 %	✓					
	Pluriol® A 5010 E	~ 5000 g/mol	99 %	✓	✓				
H(O-CH_2-CH_2)-OH	Pluriol® E 8000	~ 8000 g/mol	100 %	✓		✓			✓
H[EO]-[PO]-[EO]-OH	Pluronic® F127	~ 14000 g/mol	73 %	✓		✓	✓		✓

Surface enrichment of additives



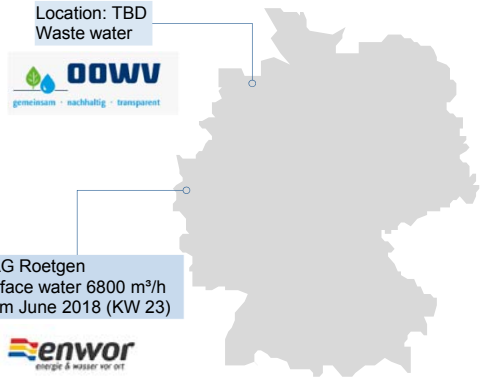
PPSU additives agglomerate on the membrane separation layer of PPSU single bore membranes

Example for fouling result of PPSU membrane



Fouling with flower soil – PPSU with 6.3kPPSU/AT80 additive (SB 26)

Demonstrator testing of development candidates



Triflux testing equipment

Cooperation partners

UNIVERSITÄT DUISBURG ESSEN
Offen im Denken

Helmholtz-Zentrum Geesthacht
Centre for Materials and Coastal Research

BASF
We create chemistry

inge
heart of pure water

IWW
IWW ZENTRUM WASSER

GEFÖRDERT VOM
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