

Polyvinylidene fluoride membranes modified with TiO₂ nanoparticles for beer filtration

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Membrane modifying with nanoparticles with photocatalytic properties is a promising method to prevent fouling of membrane surface. For this purpose, TiO₂, ZnO, SnO₂ nanoparticles and their composites are widely used.

Polyvinylidene fluoride membranes with cut-off of 150 kDa were modified with polyetheleneimine (PEI) and TiO₂ nanoparticles. Unfiltered beer “Opillia” was used to evaluate membrane fouling in the dead-end mode. Dependence of the volumetric flux on an applied pressure for membranes is presented in Fig.

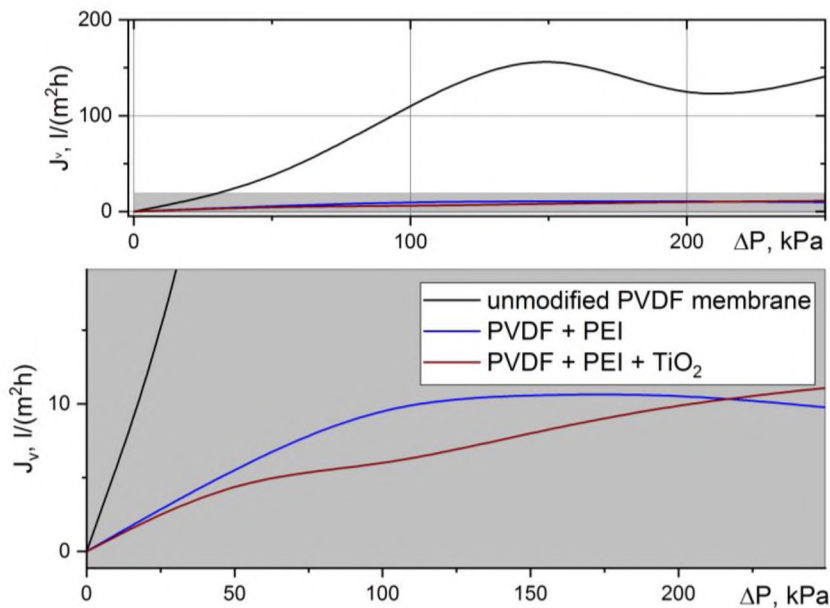


Fig. Dependence of the volumetric flux on an applied pressure for membranes in the process of beer filtration

The unmodified polyvinylidene fluoride membrane was characterised with the highest flux compared with modified membranes, but a dramatic fouling during beer filtration was observed. For membrane, modified only with PEI, decline of the volumetric flux with a pressure increasing was shown because of a concentration polarization. Membrane modified with PEI and TiO₂ nanoparticles demonstrated the linear dependence of the flux on pressure due to photocatalytic properties of titanium(IV) oxide nanoparticles.