

Modified poly(vinylidene fluoride) nanomembranes for dye removal from water – A review

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Abstract

Water contamination due to soluble synthetic dyes has serious concerns. Membrane-based wastewater treatments are emerging as a preferred choice for removing dyes from water. Poly(vinylidene fluoride) (PVDF)-based nanomembranes have gained much popularity due to their favorable features. This review explores the application of PVDF-based nanomembranes in synthetic dye removal through various treatments. Different fabrication methods to obtain high performance PVDF-based nanomembranes were discussed under surface coating and blending methods. Studies related to use of PVDF-based nanomembranes in adsorption, filtration, catalysis (oxidant activation, ozonation, Fenton process and photocatalysis) and membrane distillation have been elaborately discussed. Nanomaterials including metal compounds, metals, (synthetic/bio)polymers, metal organic frameworks, carbon materials and their composites were incorporated in PVDF membrane to enhance its performance. The advantages and limitations of incorporating nanomaterials in PVDF-based membranes have been highlighted. The influence of nanomaterials on the surface features, mechanical strength, hydrophilicity, crystallinity and catalytic ability of PVDF membrane was discussed. The conclusion of this literature review was given along with future research. © 2023 Elsevier Ltd

Author keywords

Membrane technology; Nanomaterials; Organic membranes; Poly(vinylidene fluoride); Synthetic dyes