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Cationic dyes adsorption study on graphene- Polyvinylidene fluoride nanocomposite membranes

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Abstract

Polyvinylidene fluoride (PVDF) is one of the well-known polymers in different types of membranes for water treatment applications, because of its unique chemical, mechanical and thermal properties. Because of the presence of fluorine groups in polymer chain, the PVDF has a negative electrostatic surface charge that makes the PVDF a suitable adsorbing material for cationic dyes such as Rhodamine B (RB) and Methylene Blue (MB). The presence of two-dimensional graphene oxide sheets with negative electrostatic surface charge in the PVDF matrix, can improve the adsorption of the dyes on PVDF/graphene oxide (PGO) composite membranes due to increasing of negative electrostatic charge. In this study, we aimed to explore synthesis and characterization of the PGO composite membranes by Scanning Electron Microscopy (SEM), Atomic Force Microscopy (AFM), Raman spectroscopy, X-Ray diffraction (XRD), to confirm the effective presence of the GO sheets in PVDF matrix. In continue, the mechanisms of physical adsorption of the dyes on PGO membranes have been investigated.

Keywords: PGO composite membranes, water treatment, effects of surface charge, electrostatic interactions

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