



Polyethersulfone/Chromoleana Odorata (PES/CO) adsorptive membranes for removal of Congo red from water

Simphiwe Zwane (1), Monaheng Masheane (1), Gcina Vilakati (2), Alex Kuvarega (1), Sabelo Mhlanga (1), Bheki Mamba (1), Hlengilizwe Nyoni (1), and Derrick Dlamini (1)

(1) University of South Africa, Johannesburg, South Africa (simphiwezwane661@gmail.com), (2) University of Swaziland, Manzini, Swaziland (vilakatigcina@yahoo.com)

The demand for manufacturing and application of dyes and pigments in textile industries is increasing. During the application processes almost a quarter of the dyes are lost as wastewater yet they are difficult to treat due to their complex structures. Removing dyes in wastewater before discharging the effluent in the environment is essential. Adsorptive membranes have emerged as a viable tool to treat dye wastewater. Herein, the adsorption of Congo red dye from aqueous solutions was conducted using polyethersulfone (PES)/Chromoleana odorata (CO) hybrid membranes fabricated using the phase inversion method. The effect of contact time, initial concentration, and initial pH on adsorption efficiency was investigated. Fourier transform infrared spectroscopy (FTIR) confirmed that PES/CO membranes had hydrophilic functional groups. Addition of CO in PES decreased the surface charge of the prepared membranes by 92.8%. Dye adsorption percentages of 92%, 27.4% and 84% were recorded for the CO particles, PES membranes and hybrid PES/CO membranes at pH 6 respectively. The Langmuir-Freundlich isotherms confirmed multilayer adsorption of Congo red on the heterogeneous surface. The adsorption kinetics model suggested that diffusion was the rate determining step in the adsorption process.

Keywords: Adsorptive membranes; Chromoleana odorata; Congo red; phase inversion; polyethersulfone.