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Dye adsorption behavior of polyvinyl Alcohol/Glutaraldehyde/ β -Cyclodextrin polymer membranes — [Source link](#)





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Abstract :

Crosslinked polyvinyl alcohol/glutaraldehyde (PVA/GA) membranes were prepared, and attempts to obtain hydrophilic crosslinked PVA membranes were made by adding various amounts of β -cyclodextrin (β -CD), which is a typical cyclic oligosaccharide able to form inclusion complexes with organic host molecules (host-guest complexes). Thus, membranes of PVA/GA/ β -CD were synthesized. The membranes were characterized by infrared spectroscopy (FTIR) and swelling measurements. The ability of cyclodextrin to include a wide variety of chemicals was also exploited for the dye adsorption to show the potentialities of the membranes in textile liquid waste processing. Adsorption of reactive methyl orange, and methylene blue dyes on PVA/GA/ β -CD membranes was consequently studied using UV-Vis spectroscopy at wavelengths of 547, 463, and 660 nm. Adsorption reached equilibrium after 24 h. Results indicated that there is no covalent bond formation between PVA and β -CD; the β -CD is completely mixed into the PVA matrix polymer. The adsorption capacity increases with increasing amounts of cyclodextrin; the maximum adsorption capacity was obtained with 8% β -CD. Therefore, the change in adsorption capacities may be due to the dye structure effect, and the negative value of free energy indicated the spontaneous nature of adsorption