

Removal of dyes from wastewater using polyelectrolyte enhanced ultrafiltration (PEUF)

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Received 23 June 2009; Accepted in revised form 24 March 2010

ABSTRACT

Polyelectrolyte-based separation of toxic dyes is studied to estimate the potential of polyelectrolyte enhanced ultrafiltration (PEUF) using poly(ammonium-acrylate) as anionic polymer. PEUF experiments are conducted to study the retention characteristics of two model dyes (Safranin T (ST) and Eriochrome Blue Black R (EBBR) in the continuous cross flow system. Effects of the operating conditions, e.g., transmembrane pressure, feed polyelectrolyte concentration, feed dye concentration, ionic strength and pH on the permeate flux profile and observed retention have been investigated. The results show that the highest rejection for ST and EBBR dyes are 99% and 90% respectively. The enhancement is primarily due to the formation of complexes between the anionic polymer and dye molecules. The retention of ST decreases with ionic strength. High retention was obtained at pH range 4–10 in the case of ST; this effect was attributed to the increase of electrostatic interaction. The ionic strength and pH have no effect on the removal of EBBR.

Keywords: Safranin T; Eriochrome Blue Black R; Polyelectrolyte; Ultrafiltration

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