

Majewska-Nowak, K., Kawiecka-Skowron, J. Desalination of Organic Dye Solutions by Electrodialysis. *Ochrona Srodowiska* 2011, Vol. 33, No. 2, pp. 11–15.

Abstract: Laboratory tests were conducted to verify the applicability of electrodialysis (ED) as a method for the desalination of model solutions containing anionic organic dyes. For this purpose use was made of a laboratory ED stack with 10 cell pairs. The tests were performed with five anionic organic dyes differing in molecular weight (from 618 to 1060 Da), at a current intensity ranging from 0.05 to 0.2 A. Dye and sodium chloride concentrations in the concentrate and diluate were determined in the course of the ED process performed in the batch system. The study has produced the following findings. The ED process enabled anionic dye and mineral salt recovery by receiving two streams from a salt and dye mixture – one being enriched with dye alone (diluate), and the other one being a salt solution with no organic matter present (concentrate). The efficiency of separation strongly depended on the current intensity applied and the molecular weight of the dye. The most efficient was the desalination of the direct black solution – the dye concentration in the diluate remained almost constant, and salt removal totalled 98.5%. The final dye concentration in the concentrate was negligibly low. The concentrations of low-molecular-weight dyes in the diluate decreased with operation time, which should be attributed to the adsorption of dye particles in the structure or at the surface of the membrane.

Keywords: Membrane processes, electrodialysis, ion-exchange membrane, desalination, dye.