

Majewska-Nowak, K. Recovery of Dyes and Mineral Salts from Process Waters by Batch Electrodialysis with Monoanion Selective Ion-exchange Membranes. *Ochrona Srodowiska* 2012, Vol. 34, No. 4, pp. 35–42.

Abstract: Laboratory tests were conducted to determine the efficiency of dye solution desalination by batch electrodialysis involving monoanion selective ion-exchange membranes (instead of conventional anion-exchange membranes). In the study use was made of saline (NaCl) organic dye solutions differing in molecular weight (from 327 to 1080 Da). In the course of electrodialysis current density varied from 0.78 to 3.91 mA/cm². It was found that the efficiency of anionic organic dye separation from mineral salts was strongly influenced by the value of the current density applied, and that the influence of the dye's molecular weight was negligible. Taking into account the need of recovering the highest possible quantity of dyes, and assuming a 95% extent of desalination, it was necessary to conduct the electrodialysis process at the current density of 1–1.4*i*_{lim}. When the process involved lower current density values, the dyes were adsorbed by the membranes. When the current density values were higher, the dyes penetrated through the membranes into the concentrate. At high current density (>2*i*_{lim}), the duration of the electrodialysis process was noticeably shorter, but the quality of the diluate deteriorated significantly and energy demand increased.

Keywords: Electrodialysis, desalination, dye, ion-exchange membrane.