

Majewska-Nowak, K., Kawiecka-Skowron, J. Applicability of Ceramic Membranes to the Removal of Organic Dyes from Aqueous Solutions. *Ochrona Srodowiska* 2009, Vol. 31, No. 2, pp. 55–60.

Abstract: Laboratory tests were conducted to determine the efficiency of anionic organic dye removal from aqueous solutions by ultrafiltration when use is made of ceramic membranes. The transport and separation properties of the membranes were evaluated by analyzing the volume flux of the permeate, and the efficiency of dye removal from the solution. The tests were performed with three single-channel CéRAM *INSIDE*® (Tami Industries) membrane modules differing in cut-off values (1 kDa, 15 kDa, and 50 kDa), with nine anionic organic dyes of molecular weights ranging from 327 to 1060 Da, and with a laboratory UF installation of ProFlux M12 (Millipore) type, at a transmembrane pressure of 0.03 MPa, 0.06 MPa and 0.09 MPa. The efficiency of the process was analyzed both in terms of the molecular weights of particular dyes and in terms of the pressure applied. The applicability of the ceramic membranes to the removal of organic dyes from aqueous solutions has been substantiated. The tests have produced the following findings. The ceramic membrane with the cut-off value of 15 kDa exhibited the best separation properties, whereas that with the cut-off value of 50 kDa was characterized by excellent permeability. All of the ceramic membranes under study provided 95–99% retention of high-molecular-weight organic dyes (>700 Da) irrespective of the transmembrane pressure applied. In economic terms, it is advisable to use 50 kDa cut-off ceramic membranes as they enable high removal efficiencies to be achieved for dyes of higher molecular weights.

Keywords: Ultrafiltration, ceramic membrane, textile wastewater, dye removal.