

Recovery of Iodide Ion from TFT-LCD Wastewater by Forward Osmosis

Authors : Yu-Ting Chen, Shiao-Shing Chen, Hung-Te Hsu, Saikat Sinha Ray

Abstract : Forward osmosis (FO) is a crucial technology with low operating pressure and cost for water reuse and reclamation. In Taiwan, with the advance of science and technology, thin film transistor liquid crystal displays (TFT-LCD) based industries are growing exponentially. In the optoelectronic industry wastewater, the iodide is one of the valuable element; it is also used in the medical industry. In this study, it was intended to concentrate iodide by utilizing FO system and can be reused for TFT-LCD production. Cellulose triacetate (CTA) membranes were used for all these FO experiments, and potassium iodide solution was used as the feed solution. It has been found that EDTA-2Na as draw solution at pH 8 produced high water flux and minimized salt leakage. The result also demonstrated that EDTA-2Na of concentration 0.6M could achieve the highest water flux (6.69L/m² h). Additionally, from the recovered iodide ion from pH 3-8, the I⁻ species was found to be more than 99%, whereas I₂ was measured to be less than 1%. When potassium iodide solution was used from low to high concentration (1000 ppm to 10000 ppm), the iodide rejection was found to be than more 90%. Since, CTA membrane is negatively charged and I⁻ is anionic in nature, so it will from electrostatic repulsion and hence there will be higher rejection. The overall performance demonstrates that recovery of concentrated iodide using FO system is a promising technology.

Keywords : draw solution, EDTA-2Na, forward osmosis, potassium iodide

Conference Title : ICEWRM 2017 : International Conference on Environment and Water Resource Management

Conference Location : Tokyo, Japan

Conference Dates : May 28-29, 2017