



Recovery of mixed acid and base from wastewater with bipolar membrane electro dialysis—a case study

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ABSTRACT

The current study simultaneously examined the treatability of wastewater by electro dialysis unit and recovery of ions removed as acidic/alkaline solutions. With a bipolar membrane electro dialysis process, the removed ions are stored separately in anolyte/catholyte solutions, and then turned into mixed acids and bases. After the treatment of the leachate using the BMED process, the molar concentration of H⁺ ions in the acidic solution and the OH⁻ ions in the alkaline solution reached up to 0.095 and 0.048 M (conditions: 1 L wastewater and 1 L anolyte/catholyte solutions), respectively. When the ratio of wastewater to initial volume of anolyte and catholyte was ¼ (1 L wastewater and 0.25 L anolyte or catholyte solutions) at the end of a 360-min treatment period, 3.8- (from 0.01995 to 0.07586 M for [H⁺]) and 3.98- (from 0.02344 to 0.09333 M for [OH⁻]) times more intense acid and base concentrations were determined, respectively. This demonstrates that the process can be considered as a cleaner technology for the treatability of wastewater by obtaining more concentrated acid and base as recovered material and fewer byproducts.

Keywords: Electro dialysis; Bipolar membrane; Leachate; Desalination; Recovery

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