

### A Feasibility Study on Concentrating Salt Waste by Ion-exchange Membrane Process

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In order to use the ammonium sulfate in RO retentate as a fertilizer, a feasibility of electro dialysis(ED) process was studied. Electro dialysis experiments were carried out using pilot-scale ED unit (TS-2-10, Tokuyama Soda Co.) at various concentration of ammonium sulfate (15-35%) and current densities (40-100 mA/cm<sup>2</sup>). It was observed that the current efficiency decreased slightly from 97.2 to 94.1% with the increasing ammonium sulfate concentration of the concentrate compartment. But the average current efficiency was above 95%, which indicates ED process is feasible to concentrate ammonium sulfate over 35%. It was found that the current efficiency was not changed with the current densities tested in this study. Furthermore, water transport index decreased with the increasing current densities, which lead to increase the maximum concentrate concentration. It was possible to concentrate ammonium sulfate up to 42.6% at the current density of 100 mA/cm<sup>2</sup>. The electric power consumption increased linearly from 0.22 to 0.47 kWh/kg with the increasing current densities in the rage of 40-100 mA/cm<sup>2</sup>. From the results of this study we can suggest that ED process can be employed successfully in concentrating RO retentate.