

## ***ABSTRACT***

Capacitive Deionization (CDI) technology is one of the methods of seawater desalination which has several advantages compared to other techniques, the CDI are more efficient, low energy consumption, lower cost manufacturing, more environmentally friendly, and higher salinity reduction efficiency. In this study, we focuss to improve the ability of CDI cells in adsorbing  $\text{Na}^+$  and  $\text{Cl}^-$  ions. A carbon nanopore synthesis of coconut shell as CDI electrode has been done. To increase the efficiency of salt absorption, a Sulfosuccinic acid (SSA) membrane is added and the electrode composition are varied with the ratio of carbon mass of nanopore: graphite: PVA (*polyvinyl alcohol*) of 9:0:1, 8:1:1, 7.5:1,5:1, 7:2:1, 6: 3:1, 5:4:1. It is observed the variations in CDI electrode composition affect the percentage reduction of the salt content of NaCl with the greatest reduction occurred at 8:1:1 composition. In addition, the use of SSA membranes can prevent ion-derived processes desorption, which subsequently result in greater salinity reduction and fewer cycles. For membrane-free testing, a maximum salinity reduction of 20.68 % is obtained at the 15th cycle while it is of 23.92 % at reduction in membrane case occurring the 11th cycle.

**Keywords:** Capacitive deionization, desalination, NaCl solution, membrane SSA