

# Study on capacitive deionization microfluidic desalination

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## Abstract:

The commercially applied macro desalination methods such as reverse osmosis, multi-stage flash distillation and multi-effect distillation suffer from several drawbacks such as high power consumption and low separation performance. Recently, microfluidics desalination technology is immersing due to it is utilizing the domination of many apparent fluids physical properties (viscosity and surface tension) in the micro-flow systems. It is believed that the micro-scaled structures will optimize the mixing efficiency of the micro-flow liquid and lead to higher desalination performance. The present work introduces a microfluidics chip for water desalination which fabricated using polydimethylsiloxane soft lithography method. Aluminium and titanium were being used as the electrodes which achieved 65% and 15% of salt removal efficiency, respectively. Titanium was further treated by using the etching method and the performance was studied. The desalination efficiency was analyzed and evaluated with the flow rate of 90mL/h using capacitive deionization method. The result revealed that the performance of untreated titanium was better than the treated titanium. The findings in this work show that the desalination efficiency was relied on the electrode surface properties.

**Keywords:** : Polydimethylsiloxane; High Power Consumption; Surface Tension; Aluminium

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