

## Micro-Scale Distillation for the Separation of Methanol-Water Mixture

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Separation of methanol-water mixture has been executed using a micron scale distillation device. Microchannel was patterned on PDMS (Polydimethylsiloxane) elastomer using soft lithography and was covered by glass substrate. For vaporization of the liquid feed, Peltier device was used as a microheater. PDMS micro-distillation device consisted of two parts, feed evaporation, i.e. vapor generation and vapor-liquid separation. Distillation efficiency and methanol recovery were chosen as performance criteria and the effect of different parameters such as flow rate, suction pressure, temperature, and geometry of microchannel and microchamber were investigated. Device performances were compared with and without Teflon membrane as a separation media and greater efficiency was obtained without membrane. The distillation efficiency using micro-distillation device was more than 90%, and single and two stage recoveries were about 50 and 70 % respectively. It is stated that instead of a tall tower and vertical operation of a conventional distillation column, this device permits a short microchannel and a microchamber to achieve the same degree of separation in a horizontal mode.