Abstract: A scheme to achieve high desorption rates in a microscale system has been conceived based on the use of a hydrophobic porous membrane forming one wall of a high aspect ratio channel. To accomplish desorption, vapor is drawn through the membrane, during the addition of heat, as the binary mixture flows along the channel. The channel geometry is designed to achieve a thin film of binary mixture (lithium bromide and water) that is approximately 350 microns thick, while achieving a high membrane surface area which is approximately 3 cm × 6 cm. Vapor is drawn from the channel by creating a pressure differential across the membrane. Experiments were run varying the inlet mass flow rate, heat input, and pressure difference across the membrane, for an inlet mass fraction of 0.41. Mass fraction increases through the channel were up to 0.05. It is shown that the mass flux of vapor per mass flow rate into the channel decreases as the inlet flow rate increases, for a given heat flux. Also, the mass flux of vapor is linearly dependent on the heat input rate and not a function of inlet flow rate or pressure differential for the range of conditions studied. Images within the channel show bubble formation and desorption through the membrane under high heat flux and low inlet flow conditions.