**VOLUME-TUNABLE ON-CHIP STORAGE OF REAGENTS USING DEFORMABLE MEMBRANE BASED RESERVOIRS**

Small tubes and bottles are still widely used for liquid reagent storage with many applications, fluidic transfer of tubes and bottles are not convenient, as it requires extra transfer tools, such as syringes or pipettes, and those containers are not portable. Therefore, liquid storage has attracted the attention as it is of increasing importance, particularly for on-chip storage. Most of liquid reagent on-chip storage device used microfluidic chambers and blisters. Liquid reagent storage and fluidic transfer could have incensement of portability, minimization of interconnections between chips and external vials, fluidic transfer without extra transfer tools, common condition fluidic transfer without using special bio-required condition offering by bio-hood, lower cost, easy connection with both loading and testing equipment, safe condition for medical use. On-chip liquid storage technology offers so many advantages with easy manufactory conditions. Thus, multiple research and products have been made for convenient and efficient liquid reagent storage technology. Most liquid reagent device in those companies are made by blisters which sits on microfluidic channels with a liquid blocking membrane between blisters and channels. Blister is a fix volume liquid container which has a needle facing to blocking membrane. After pressing the blister, the needle will break the blocking membrane and allow liquid flows into the microfluidic channels for fluidic transfer. However, this type of liquid reagent devices are fixed volume which means it requires large amount of different volume size of products for multiple testing requirements. In addition, both MEMS and traditional external liquid storage reservoirs cannot be able to have flexible volume to each experiment, and large amount of those MEMS devices and traditional reservoirs wasted after one-time use as they are not be able to reload and the total volume size is designed for one-time use as well.

In this paper, we reported a volume-tunable on-chip storage of reagents using deformable membrane based reservoirs as a liquid balloon, which overcomes the fixed volume on-chip storage. Once valving the output, a constant pressure source is needed for loading process, liquid keeps flowing into microfluidic channels and the storage area, as only the Ecoflax membrane at storage area could have a dramatic shape deformation which forms a volume tunable chamber with a semi-sphere shape, the volume of liquid keep increasing by the time of flowing. Therefore, a balloon is growing with the flowing of liquid after full filling the deformation part and valving both input and output screw valve, the storage is completed, and the fluidic transfer volume can be controlled by releasing output screw valve, and liquid reagent will flow out from microfluidic channels to output. Once the volume of releasing achieved one-time testing requirement, fluidic transfer can be stopped by closing the output screw valve.