Supplementary Material (ESI) for Lab on a Chip

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In situ fabrication of temperature- and ethanol-responsive smart membrane in microchip

Supplementary Material

Yi-Meng Sun,^{*a*} Wei Wang,^{**a*} Yun-Yan Wei,^{*a*} Nan-Nan Deng,^{*a*} Zhuang Liu,^{*a*} Xiao-Jie Ju,^{*a*} Rui Xie^{*a*} and Liang-Yin Chu^{**ab*}

- ^a School of Chemical Engineering, Sichuan University, Chengdu, Sichuan, 610065, China *E-mail:* wangwei512@scu.edu.cn (W. Wang), chuly@scu.edu.cn (L.-Y. Chu); Tel & Fax:
 +86 28 8546 0682
- ^b State Key Laboratory of Polymer Materials Engineering, and Collaborative Innovation Center for Biomaterials Science and Technology, Sichuan University, Chengdu, Sichuan, 610065, China

Ethanol-Responsive Volume Change Behaviors of PNIPAM Nanogels

The ethanol-responsive volume change behaviors of PNIPAM nanogels were studied by measuring their hydraulic diameters in ethanol solutions with different concentrations ranging from 0 wt% to 40 wt% by dynamic light scattering method (DLS, Zetasizer Nano, ZEN 3690, Malvern). As shown in Fig. S1, the PNIPAM nanogels change from a swollen state to a shrunk state with increasing the ethanol concentration. The critical ethanol concentration (C_C) is defined as the concentration at which the PNIPAM nanogels reach a critical diameter (D_C) . The D_C is defined as follows:

$$D_{\rm C} = \frac{D_{\rm max} + D_{\rm min}}{2} \tag{S1}$$

where D_{max} and D_{min} represent the maximum and minimum diameters of the PNIPAM nanogels during the ethanol-responsive volume changes. From the results in Fig. S1, the calculated value of D_{C} is 597 nm and the corresponding critical ethanol concentration (C_{C}) is 8 wt%. As shown in Fig. S1, at ethanol concentration around C_{C} , the PNIPAM nanogels exhibit a dramatic volume change.



Fig. S1 Effect of ethanol concentration on the hydraulic diameter of PNIPAM nanogels at 25 °C.