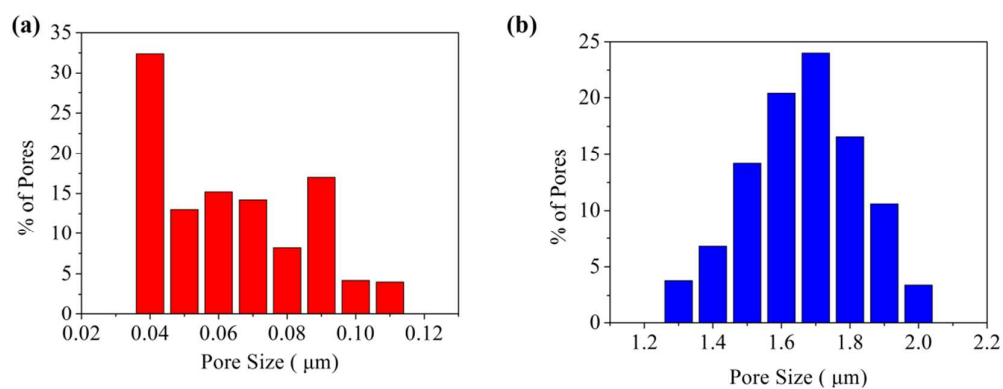


# Breath Figure in Reactive Vapor: A new Route to Nanopore Array

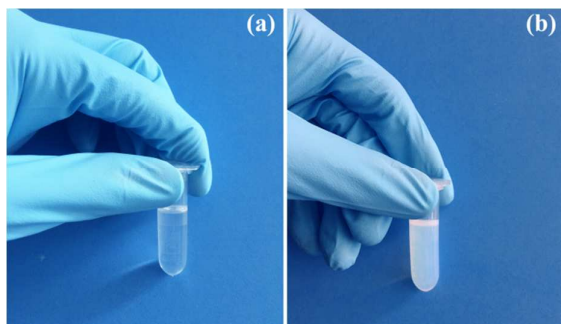
Tianchan Luo, Hua Bai and Lei Li\*

1.



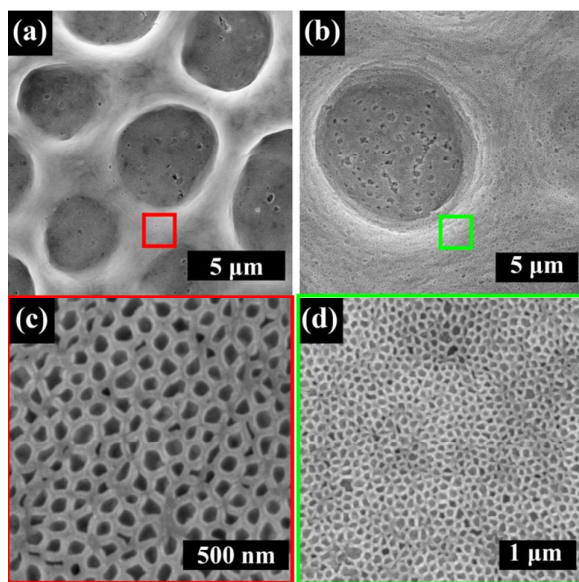
**Figure S1.** Pore size statistical analysis of Figure 1a (a) and d (b).

2.



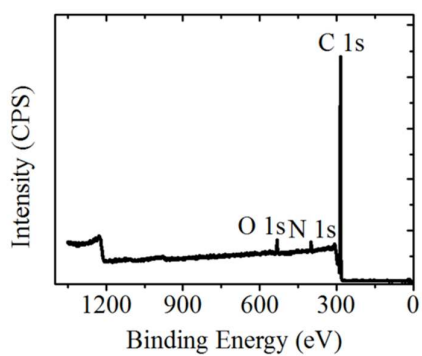
**Figure S2.** Digital photos of PS-*b*-P4VP solution dissolved in CS<sub>2</sub> before (a) and after (b) added a drop of formic acid.

3.



**Figure S3.** SEM images of PS-*b*-PVP film formed in mixed vapor with the volume ratio of water and formic acid is 1/1 (a and c) and 1/3 (b and d).

4.



**Figure S4.** XPS survey-wide scan of PS-*b*-P4VP film fabricated in water vapor.

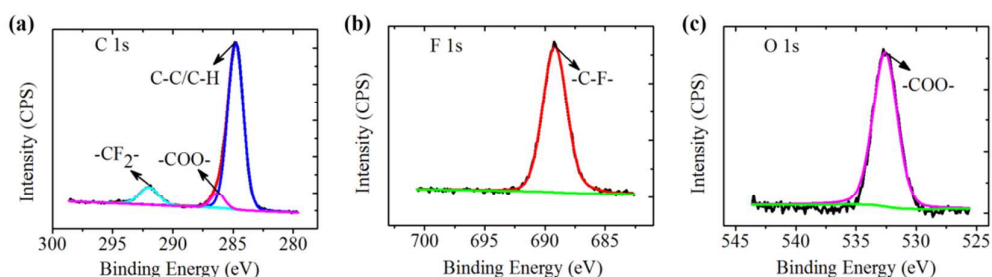
**Table S1.** Elemental composition of PS-*b*-P4VP films fabricated in FA and water vapor.

Sample Name	Content of elements		
	C	N	O
	atomic %		

PS- <i>b</i> -P4VP film formed in FA vapor	91.80	2.08	5.71
PS- <i>b</i> -P4VP film formed in water vapor	94.37	2.41	2.97

According to XPS survey-wide scan, we found that the elementary composition of the sample formed in water vapor is as the same as that of the sample formed in FA vapor as shown in Figure 4a. However, the N1s lines in the XPS of nanoBFA and conventional BFA shown in Figure 3 indicate the ratio of pyridinium/pyridine is larger in nanoBFA (0.22) than that in conventional BFA film (0.16) actually, showing that more protonated pyridinium exists on the surface of nanoBFAs. In addition, the elemental composition illustrated in table S1 also demonstrates this point.

## 5.



**Figure S5.** XPS core scan of Figure 5b of individual element on substrate: (a) C1s, (b) F1s, (c) O1s.

The core level scan of carbon indicated three main components at 284.8, 286.3 and ca. 292 eV, respectively (Figure S5a). The one around 284.8 eV corresponds to C-C or C-H bonds, and that around 286.3 eV corresponds to -COO- bonds.<sup>1,2</sup> The third peak of much smaller intensity near 292 eV is assigned to CF<sub>2</sub> peak.<sup>3</sup> The F1s spectrum (Figure S5b) also confirmed the existence of C-F bond, whose peak was

located at around 688 eV.<sup>4</sup> And the O1s peak (Figure S5c) demonstrated the existence of -COO- bonds.

## References

1. N. A.Kumar, M.Togami, Y. Dai, M. Oishi, M.Tominaga, H. Ihara Takafuji, *RSC Adv.* **2015**, 5, 23367.
2. F. Fusalba, N. E. Mehdi, L. Breau, D.Bélanger, *Chem. Mater.* **1999**, 11, 2743.
3. R. d'Agostino, R. Lamendola, P. Favia, *J. Vac. Sci. Technol., A* **1994**, 12, 308.
4. Y. Xu, K. Zhang, C. Brüsewitz, X. Wu, Hofsäss, H. C. *AIP Adv.* **2013**, 3, 072120.