Supplementary Information

Dynamic Insights into Formation of Honeycomb Structures Induced by Breath Figures

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Experimental

Dodecanethiol-stabilized gold nanoparticles (AuNPs) with an average diameter of 4 nm were synthesized according to the literature.[1] Polystyrene (PS, M_w ~250 k) was purchased from ACROS Organics. A 5 μL chloroform solution containing 2.5 g L^{-1} PS and 1.0 g L^{-1} AuNPs was cast onto glass substrates under a moist nitrogen gas flow. The flow rate and relative humidity were 1 L min^{-1} and 75–80%, respectively. The humidity was measured with a CEM digital hygrometer. Generally, the droplet evaporated completely in 10 s after casting. The gas flow was removed quickly from the droplet surface after 5 s to obtain the honeycomb structures with different domains. The patterned films were characterized with an optical microscope (Zeiss Axioskop 40), field-emission scanning electron microscopes (JEOL JSM-6700F and Hitachi S-4800), and an atomic force microscope (Veeco NanoScope IIIa).

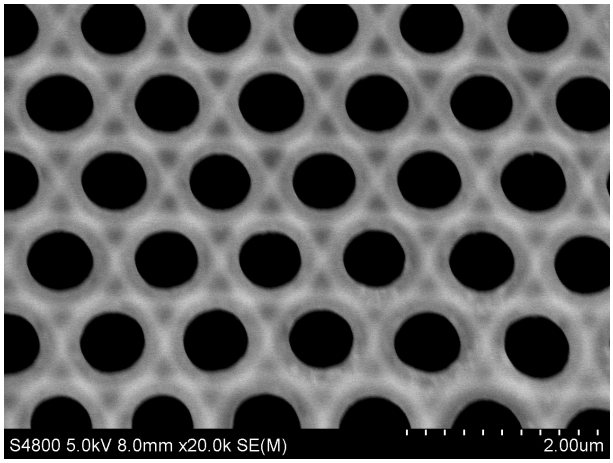

Fig. S1 SEM image of a honeycomb-patterned film prepared by the breath figure method.

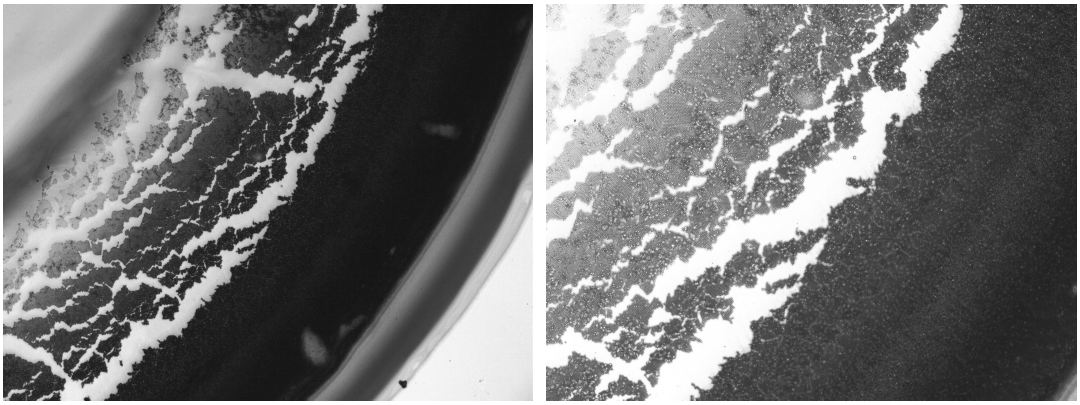

Fig. S2 Optical micrographs of the patterned polymer nanocomposite film with magnifications of 100x (left) and 400x (right).

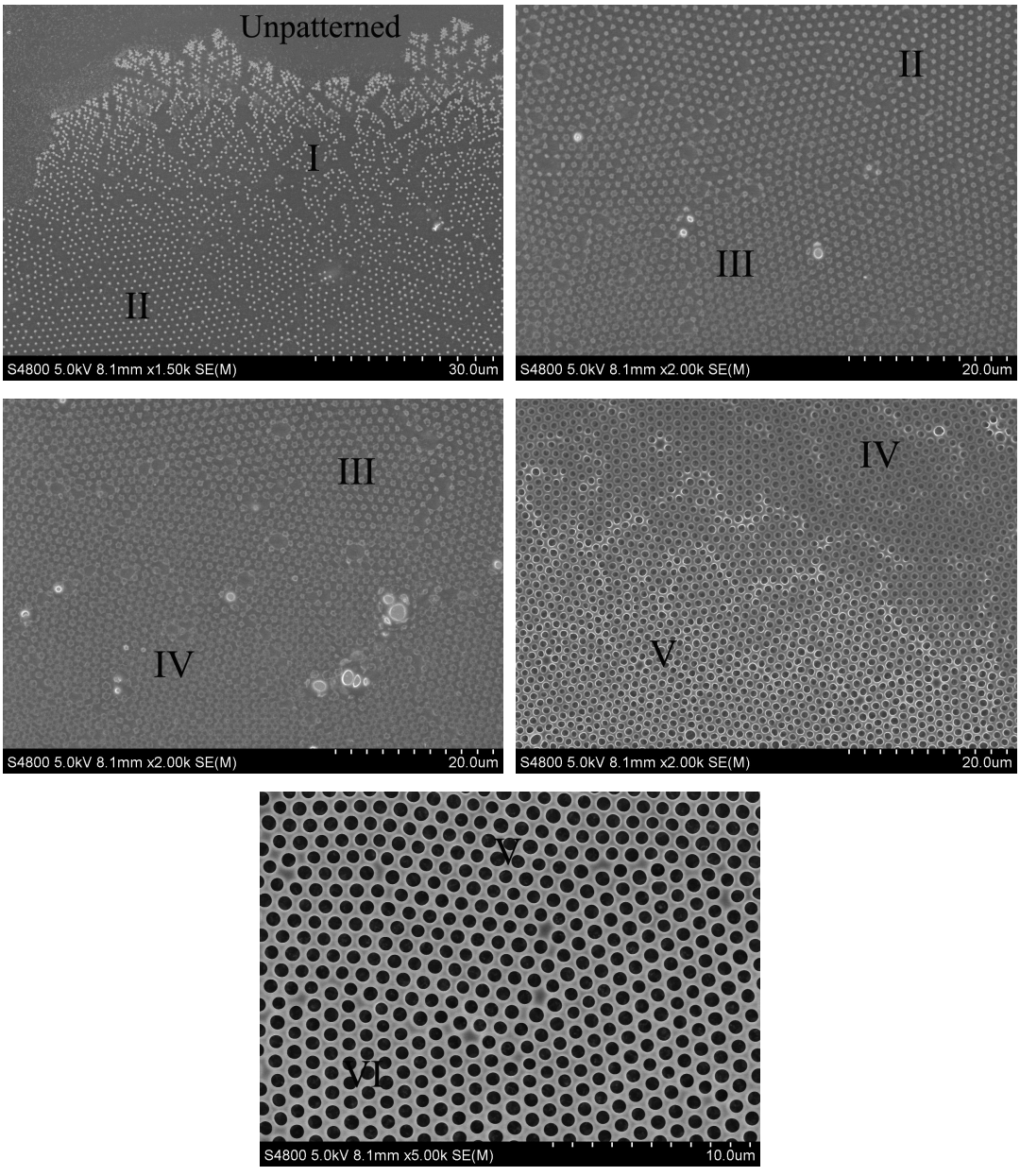

Fig. S3 SEM images of honeycomb structures observed at domain boundaries.

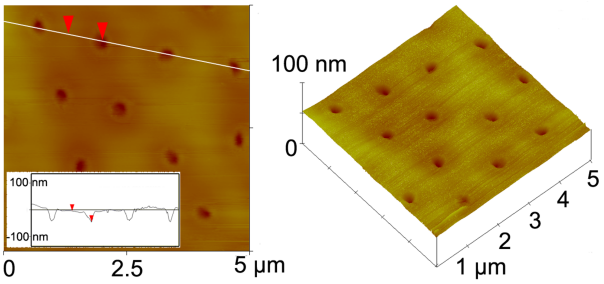

Fig. S4 AFM images of honeycomb structures in domain I.

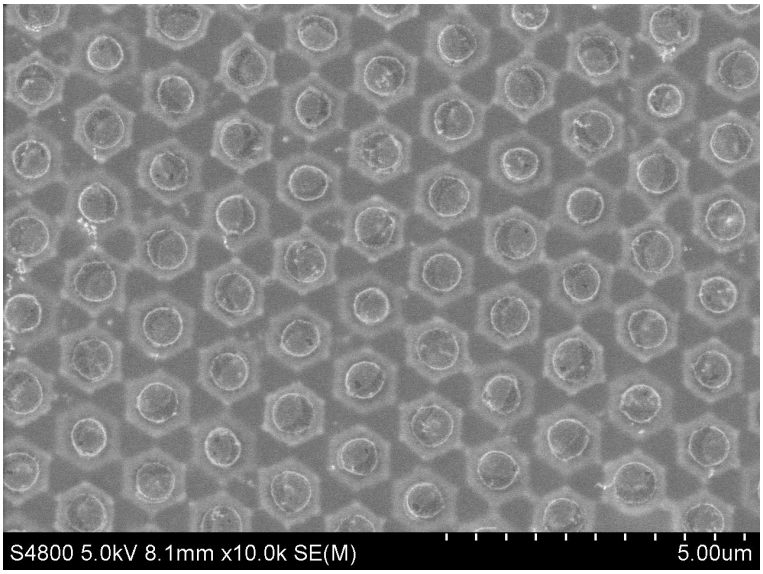

Fig. S5 SEM image of honeycomb structures showing hexagonal pore cavities.

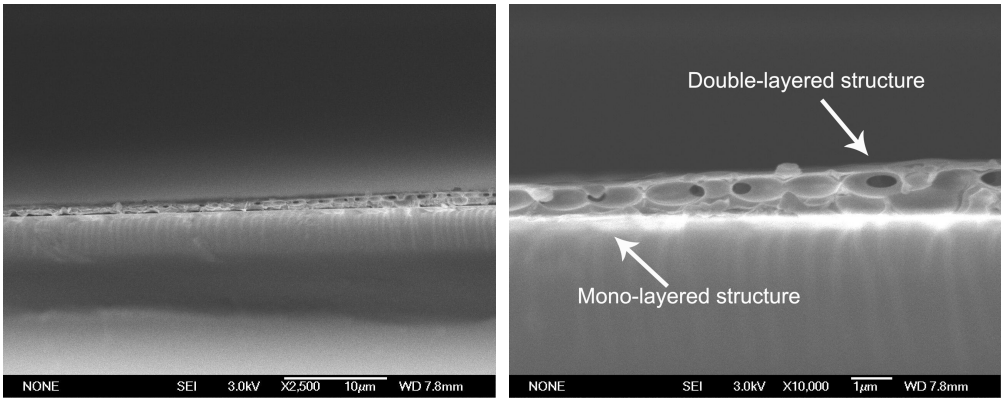

Fig. S6 Cross-sectional SEM images of the honeycomb film with different magnifications showing that both double-layered and mono-layered honeycomb structures were formed.

1 J. C. Hu, P. Y. Su, V. Lapeyronie, S. L. Cheng, M. Y. Lin and L. J. Chen, *J. Electron. Mater.*, 2004, **33**, 1058-1063.